Department for Business, Energy & Industrial Strategy

ENERGY TRENDS SEPTEMBER 2016

September 2016

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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

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

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Introduction

Energy Trends and Energy Prices are produced by the Department for Business, Energy and Industrial Strategy (BEIS) on a quarterly basis. Both periodicals are published concurrently in June, September, December and March. The September editions cover the second 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-of-energy-climate-change/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 second quarter of 2016:

- Total energy production was 3.6 per cent lower than in the second quarter of 2015.
- Oil production rose by 1.1 per cent when compared with the second quarter of 2015, boosted by new fields coming online and less maintenance activity than in 2015.
- Natural gas production was 4.0 per cent lower than the second quarter of 2015. Gas imports rose by 20 per cent driven by increased imports from Norway.
- Coal production in the second quarter of 2016 was 61 per cent lower than the second quarter of 2015, due to mines closing and some other mines producing less coal as they are coming to the end of operation. Coal imports were 77 per cent lower as generators' demand for coal fell by 71 per cent to a record low.
- Total primary energy consumption for energy fell by 0.5 per cent. However, when adjusted to take account of weather differences between the second quarter of 2015 and the second quarter of 2016, total primary energy consumption fell by 2.1 per cent continuing the downward trend.
- Temperatures in the quarter were on average 0.2 degrees warmer than a year earlier, however April 2016 was 1.6 degrees cooler than a year earlier.
- Final energy consumption (excluding non-energy use) was 1.7 per cent higher than in the second quarter of 2015. Other final users (mainly services) consumption rose by 2.6 per cent, transport consumption rose by 2.4 per cent, domestic consumption rose by 1.6 per cent, whilst industrial consumption fell by 0.3 per cent. On a temperature adjusted basis, final energy consumption rose by 3.1 per cent, with rises in all sectors except industry which fell by 0.7 per cent.
- Gas demand was 16.4 per cent higher than the second quarter of 2015 driven by an increase in use by electricity generators, whilst electricity consumption was 0.6 per cent lower than in the second quarter of 2015.
- Total deliveries of the key transport fuels were up 2.1 per cent when compared to the same period last year. Motor spirit deliveries were down 0.1 per cent, whilst DERV deliveries were up 2.9 per cent and aviation turbine fuel deliveries were up 2.6 per cent.
- Electricity generated in the second quarter of 2016 fell by 0.3 per cent, from 78.5 TWh a year earlier to 78.3 TWh. There has been a large switch in generation from coal to gas, which will have reduced emissions.
- Of electricity generated in the second quarter of 2016, gas accounted for 45.2 per cent, whilst coal accounted for a record low of only 5.8 per cent. Nuclear generation accounted for 21.3 per cent of total electricity generated in the second quarter of 2016.
- Low carbon electricity's share of generation dropped slightly from 47.0 per cent in the second quarter of 2015 to 46.2 per cent in the second quarter of 2016.
- Renewables' share of electricity generation decreased from 25.4 per cent in the second quarter of 2015 to 24.9 per cent in the second quarter of 2016, this was despite increased renewable capacity but was due to less favourable weather conditions for renewable generation (lower wind speeds, rainfall and sun hours). Renewable electricity generation fell by 2.2 per cent compared to a year earlier.

Section 1 - Total Energy

Key results show:

Total energy production was 3.6 per cent lower than in the second quarter of 2015. (**Charts 1.1 & 1.2**)

Total primary energy consumption for energy uses fell by 0.5 per cent. However, when adjusted to take account of weather differences between the second quarter of 2015 and the second quarter of 2016, primary energy consumption fell by 2.1 per cent. (**Chart 1.3**)

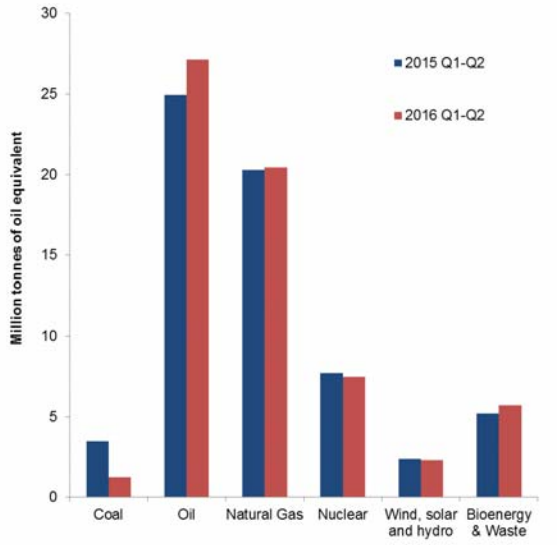
Final energy consumption (excluding non-energy use) rose by 1.7 per cent compared to the second quarter of 2015. Other final users' consumption rose by 2.6 per cent, transport consumption rose by 2.4 per cent, domestic consumption rose by 1.6 per cent, whilst industrial consumption fell by 0.3 per cent. (**Charts 1.4 & 1.5**)

On a temperature adjusted basis, final energy consumption rose by 3.1 per cent, with rises in all sectors except industry, down 0.7 per cent. (**Chart 1.5**)

Net import dependency was 35.8 per cent, up 2.3 percentage points from the second quarter of 2015. (**Chart 1.6**)

Fossil fuel dependency fell to 80.5 per cent, a record low, in the second quarter of 2016. (**Chart 1.7**)

Chart 1.1 Production of indigenous primary fuels



Total production in the second quarter of 2016 stood at 31.0 million tonnes of oil equivalent, 3.6 per cent lower than in the second quarter of 2015.

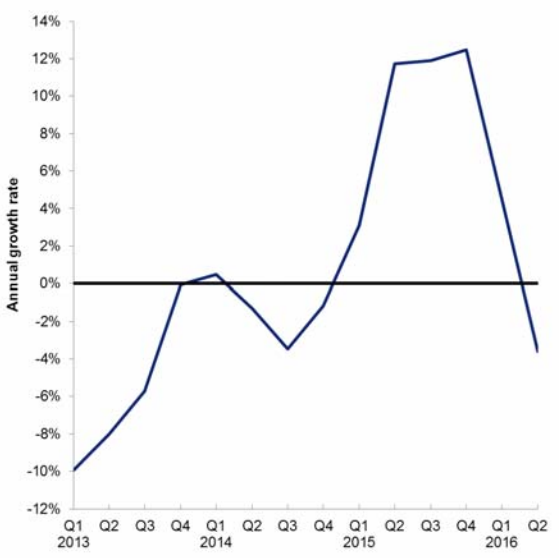
Production of oil rose by 1.0 per cent, boosted by new fields coming online and also less maintenance activity than last year, whilst production of natural gas fell by 4.0 per cent.

Primary electricity output in the second quarter of 2016 was 3.1 per cent lower than in the second quarter of 2015. Nuclear electricity output was 1.5 per cent lower, whilst output from wind, hydro and solar pv were 8.5 per cent lower, despite an increase in wind and solar capacity, due to lower wind speeds, rainfall and sun hours.

Production of bioenergy and waste was 8.8 per cent higher compared to the second quarter in 2015.

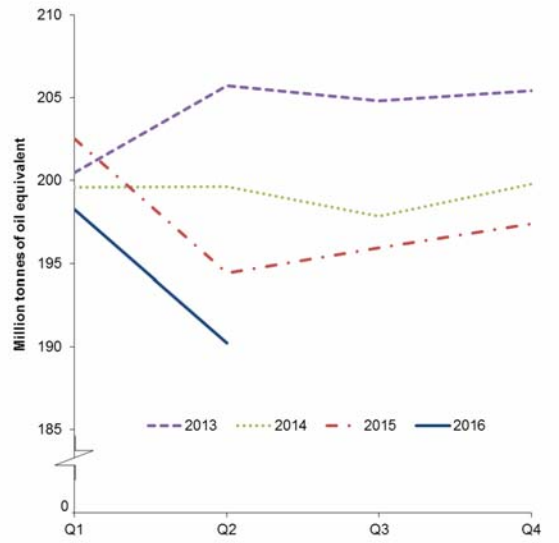
In the second quarter of 2016 production of coal and other solid fuels was 60 per cent lower than the corresponding period of 2015. This was due to mines closing and some other mines producing less coal as they are coming to the end of operation.

Chart 1.2 UK production (annual growth rate)



In the second quarter of 2016, the annual growth rate of UK quarterly production was -3.6 per cent. The fall in production follows a strong period of growth since the beginning of 2015 which was largely due to increases in oil and gas as well as in renewable sources.

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



(1) Seasonally adjusted and temperature corrected annual rates

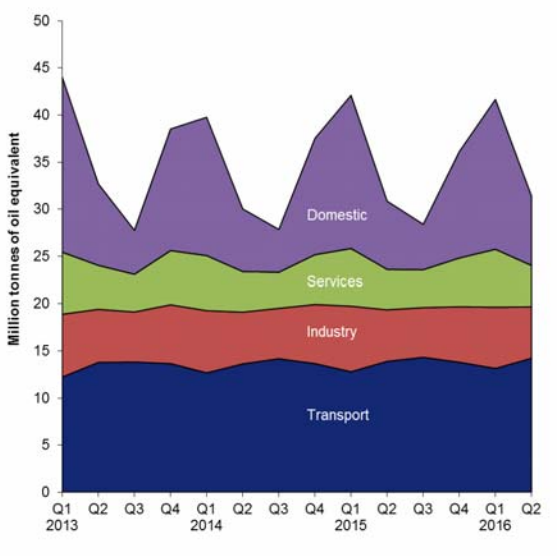
Total inland consumption on a primary fuel input basis (seasonally adjusted and temperature corrected annualised rate), was 190.2 million tonnes of oil equivalent in the second quarter of 2016, 2.1 per cent lower than in the second quarter of 2015. The average temperature in the second quarter of 2016 was 0.2 degree Celsius warmer than the same period a year earlier.

Between the second quarter of 2015 and the second quarter of 2016 (on a seasonally adjusted and temperature corrected basis) coal and other solid fuel consumption fell by 58 per cent, driven by decreased coal use in electricity generation.

On the same basis, natural gas consumption rose by 13.0 per cent between the second quarter of 2015 and the second quarter of 2015, due to increased demand from electricity generators.

Also on a seasonally adjusted and temperature corrected basis, oil consumption in the second quarter of 2016 was 2.7 per cent higher than in the second quarter of 2015. On the same basis and over the same period, there was a fall of 1.2 per cent in nuclear consumption but an increase of 14.5 per cent in bioenergy & waste consumption.

Chart 1.4 Final energy consumption by user



Total final energy consumption rose by 2.6 per cent between the second quarter of 2015 and the second quarter of 2016.

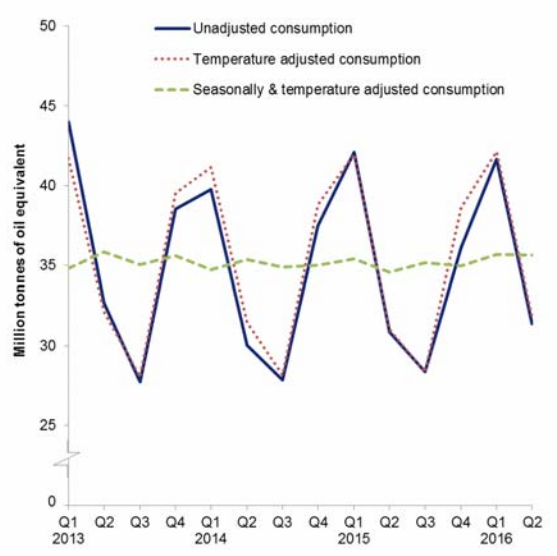
Domestic sector energy consumption rose by 1.6 per cent. Average temperatures in the second quarter of 2016 were 0.2 degree Celsius warmer than a year earlier, however April 2016 was 1.6 degree Celsius cooler than April 2015.

Service sector energy consumption rose by 2.6 per cent.

Industrial sector energy consumption fell by 0.3 per cent.

Transport sector energy consumption rose by 2.4 per cent.

Chart 1.5 Seasonally adjusted and temperature corrected final energy consumption



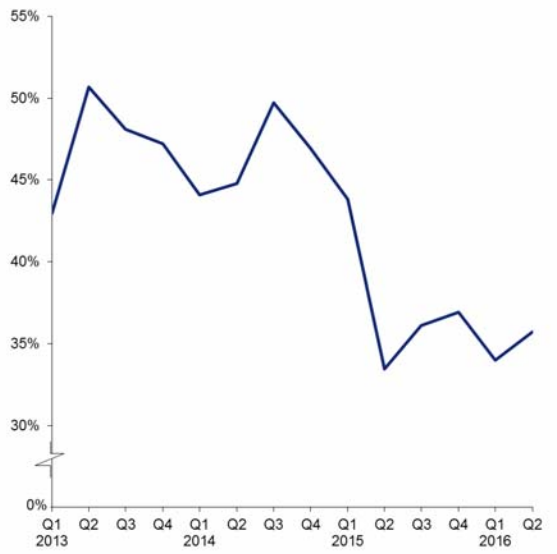
Total unadjusted final energy consumption (excluding non-energy use) rose by 1.7 per cent between the second quarter of 2015 and the second quarter of 2016.

On a seasonally and temperature adjusted basis final energy consumption (excluding non-energy use) rose by 3.1 per cent between the second quarter of 2015 and the second quarter of 2016. The high growth rate is due, in part to the very low level of consumption calculated for the second quarter of 2015. Compared to the first quarter of 2016, consumption fell by 0.1 per cent.

Unadjusted domestic consumption rose by 1.6 per cent over this same period, and was up 4.8 per cent on a seasonally and temperature adjusted basis.

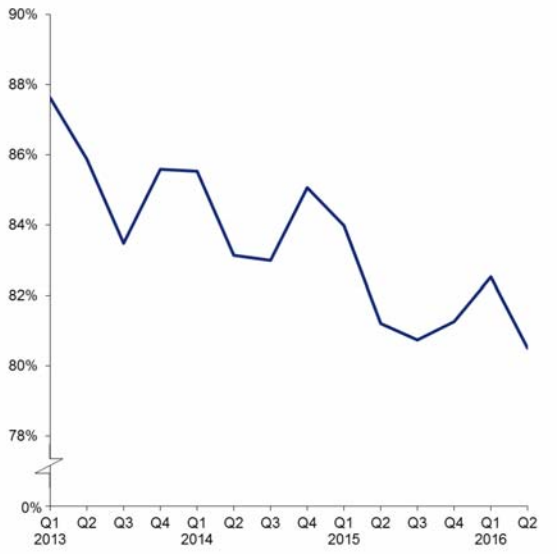
Consumption data by fuel and sector is available in the table ET 1.3c on the BEIS section of the GOV.UK website at:
www.gov.uk/government/statistics/total-energy-section-1-energy-trends

Chart 1.6 Net import dependency



In the second quarter of 2016 net import dependency was 35.8 per cent, up 2.3 percentage points from the second quarter of 2015, reflecting the increase in oil production, and reduced coal imports.

Chart 1.7 Fossil fuel dependency



In the second quarter of 2016 fossil fuel dependency was 80.5 per cent, a new record low, down 0.7 percentage points from the second quarter of 2015.

Relevant tables

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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 2	32.2	1.5	13.2	10.4	2.2	3.7	1.11
	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	0.6r	13.8r	10.4r	3.3r	3.8	1.30r
	Quarter 2 p	31.0r	0.6r	13.3r	10.0r	2.4r	3.7	1.02r
Per cent change[7]		*-3.6*	*-60.4*	*+1.0*	*-4.0*	*+8.8*	*-1.5*	*-8.5*

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

		Total	Coal[1]	Petroleum[2]	Natural gas[3]	Bioenergy & waste[4, 5]	Primary electricity: Nuclear	Primary electricity: Wind, solar and hydro[6]	Net imports
		Unadjusted[7]							
2011		203.5	32.2	67.8	77.6	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
2013		206.9	39.1	65.8	72.7	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
2015		194.8	25.1	66.7	67.9	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*
2015	Quarter 2	44.2	5.6	16.4	13.9	3.0	3.7	1.11	0.48
	Quarter 3	41.2	4.6	17.0	11.6	2.8	3.6	0.94	0.51
	Quarter 4	50.7	5.7	16.9	18.6	3.7	4.1	1.33	0.40
2016	Quarter 1	56.4r	4.9r	16.6r	25.0r	4.2r	3.8	1.30r	0.52
	Quarter 2 p	44.0r	2.4r	16.8r	16.2r	3.4r	3.7	1.02r	0.46
Per cent change[10]		*-0.5*	*-57.7*	*+2.7*	*+16.8*	*+14.5*	*-1.5*	*-8.5*	*-3.5*

		Total	Coal	Petroleum	Natural gas	Bioenergy & waste	Primary electricity: Nuclear	Primary electricity: Wind, solar and hydro	Net imports
		Seasonally adjusted and temperature corrected[8,9] *(annualised rates)*							
2011		209.0	34.0	67.8	81.5	7.7	15.6	1.86	0.53
2012		207.9	40.9	67.0	73.3	8.3	15.2	2.28	1.02
2013		204.1	38.4	65.8	70.6	9.6	15.4	3.02	1.24
2014		199.2	33.2	65.8	69.9	11.2	13.9	3.60	1.76
2015		197.6	25.5	66.7	70.2	13.2	15.5	4.66	1.80
Per cent change		*-0.8*	*-23.0*	*+1.4*	*+0.5*	*+18.1*	*+11.8*	*+29.3*	*+2.0*
2015	Quarter 2	194.4	27.2	65.6	67.9	12.0	14.7	5.10	1.91
	Quarter 3	195.9	23.3	68.1	71.3	11.4	14.9	4.90	2.03
	Quarter 4	197.4	21.1	67.5	71.4	14.6	16.9	4.34	1.58
2016	Quarter 1	198.3r	16.9r	66.3r	77.1r	16.9r	14.7	4.30r	2.06
	Quarter 2 p	190.2r	11.4r	67.3r	76.7r	13.8r	14.6	4.69r	1.84
Per cent change[10]		*-2.1*	*-58.2*	*+2.7*	*+13.0*	*+14.5*	*-1.2*	*-8.1*	*-3.5*

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 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	113,626	124,547	*+9.6*	28,784	24,695	29,251	31,852	32,157	27,636	32,903	33,296r	31,002	*-3.6*
Imports	164,955	154,846	*-6.1*	39,179	38,650	43,407	43,766	35,233	36,170	39,676	39,572r	35,097	*-0.4*
Exports	-70,629	-76,667	*+8.5*	-18,258	-16,948	-17,471	-16,955	-19,532	-20,270	-19,910	-19,452r	-18,256	*-6.5*
Marine bunkers	-3,004	-2,593	*-13.7*	-711	-740	-812	-564	-720	-725	-584	-553r	-821	*+14.0*
Stock change [2]	-3,935	+2,868		-2,998	-2,763	+72	+2,507	-960	+479	+841	+5,741r	-739	*(+)*
Primary supply	201,013	203,001	*+1.0*	45,996	42,893	54,448	60,606	46,178	43,291	52,926	58,605r	46,283	*+0.2*
Statistical difference [3]	-374	523		-54	-218	-96	258	32	20	213	-74r	10	
Primary demand	201,387	202,478	*+0.5*	46,050	43,111	54,544	60,348	46,146	43,271	52,713	58,678r	46,274	*+0.3*
Transfers [4]	-3	21		-5	6	-2	19	2	3	-3	-4r	1	
TRANSFORMATION	-44,010	-41,212	*-6.4*	-10,456	-10,049	-11,358	-12,147	-9,596	-9,093	-10,376	-10,815r	-8,853	*-7.7*
Electricity generation	-39,578	-37,603	*-5.0*	-9,397	-8,902	-10,286	-10,984	-8,629	-8,346	-9,644	-9,930r	-8,110	*-6.0*
Heat generation	-1,105	-1,084	*-1.9*	-240	-210	-312	-350	-240	-207	-287	-351	-240	*+0.0*
Petroleum refineries	-505	-40	*-92.2*	-145	-196	-111	-80	-6	12	34	-74r	-35	*(+)*
Coke manufacture	-334	-176	*-47.2*	-77	-85	-86	-48	-46	-38	-44	-20	-20	*-56.9*
Blast furnaces	-2,379	-2,201	*-7.5*	-573	-626	-537	-665	-647	-485	-404	-407	-425	*-34.3*
Patent fuel manufacture	-66	-64	*-2.4*	-17	-18	-15	-10	-18	-17	-20	-21	-11	*-39.4*
Other [5]	-44	-44	*+0.7*	-8	-11	-11	-10	-9	-12	-12	-13	-11	*+20.1*
Energy industry use	11,873	12,485	*+5.2*	2,987	2,808	2,975	3,197	3,115	3,056	3,118	3,080r	3,126	*+0.4*
Losses	3,270	3,147	*-3.7*	714	705	915	982	649	658	858	859r	657	*+1.1*
FINAL CONSUMPTION	142,232	145,654	*+2.4*	31,892	29,563	39,289	44,032	32,791	30,474	38,356	43,910r	33,643	*+2.6*
Iron & steel	1,359	1,263	*-7.1*	345	338	317	369	343	291	260	249r	236	*-31.3*
Other industries	22,359	22,332	*-0.1*	5,149	5,015	5,952	6,593	5,127	4,986	5,626	6,252r	5,219	*+1.8*
Transport	54,126	54,810	*+1.3*	13,623	14,169	13,658	12,791	13,894	14,325	13,800	13,141r	14,223	*+2.4*
Domestic	38,232	39,623	*+3.6*	6,648	4,537	12,361	16,265	7,247	4,814	11,297	15,921r	7,364	*+1.6*
Other Final Users	19,063	19,403	*+1.8*	4,259	3,781	5,232	6,069	4,238	3,969	5,127	6,094r	4,347	*+2.6*
Non energy use	7,093	8,223	*+15.9*	1,868	1,723	1,769	1,944	1,942	2,090	2,247	2,254r	2,254	*+16.1*
DEPENDENCY [6]													
Net import dependency	46.2%	38.0%		44.8%	49.7%	46.9%	43.8%	33.5%	36.1%	36.9%	34.0%r	35.8%	
Fossil fuel dependency	84.3%	82.0%		83.1%	83.0%	85.1%	84.0%	81.2%	80.7%	81.3%	82.5%	80.5%	
Low carbon share	14.3%	16.5%		15.4%	15.4%	13.7%	14.8%	17.1%	17.3%	17.4%	16.1%	17.8%	

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 2									2016 Quarter 2 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	1,526	-	13,188	-	10,410	2,201	4,833	-	-	604	-	13,326	-	9,997	2,395	4,681	-	-
Imports	3,375	206	13,216	9,045	7,982	891	-	518	-	821	202	12,926	9,947	9,598	1,120	-	483	-
Exports	-57	-53	-10,213	-5,660	-3,421	-88	-	-42	-	-58	-3	-8,827	-6,777	-2,493	-76	-	-24	-
Marine bunkers	-	-	-	-720	-	-	-	-	-	-	-	-	-821	-	-	-	-	-
Stock change[1]	+631	+27	-419	-249	-949	-	-	-	-	+809	+15	-510	-307	-745	-	-	-	-
Primary supply	5,476	180	15,772	2,416	14,021	3,005	4,833	476	-	2,176	214	16,915	2,042	16,356	3,440	4,681	460	-
Statistical difference[2]	-22	-1	-6	-2	+15	+12	-	+36	-	-40	+1	-30	-5	+56	-	-	+27	-
Primary demand	5,498	182	15,778	2,417	14,006	2,993	4,833	440	-	2,216	213	16,944	2,047	16,300	3,440	4,681	432	-
Transfers[3]	-	8	-476	+478	-8	-	-1,110	+1,110	-	-	+8	-494	+495	-9	-	-1,015	+1,015	-
TRANSFORMATION	-5,052	293	-15,302	15,114	-4,770	-2,057	-3,723	5,586	315	-1,785	32	-16,451	16,237	-6,784	-2,408	-3,666	5,656	315
Electricity generation	-3,818	-209	-	-138	-4,284	-2,043	-3,723	5,586	-	-1,127	-149	-	-133	-6,297	-2,394	-3,666	5,656	-
Heat generation	-27	-13	-	-16	-486	-14	-	-	315	-27	-13	-	-16	-486	-14	-	-	315
Petroleum refineries	-	-	-15,399	15,393	-	-	-	-	-	-	-	-16,569	16,534	-	-	-	-	-
Coke manufacture	-823	777	-	-	-	-	-	-	-	-333	313	-	-	-	-	-	-	-
Blast furnaces	-340	-308	-	-	-	-	-	-	-	-263	-162	-	-	-	-	-	-	-
Patent fuel manufacture	-45	45	-	-19	-	-	-	-	-	-36	44	-	-18	-	-	-	-	-
Other[7]	-	-	97	-106	-	-	-	-	-	-	-	119	-130	-	-	-	-	-
Energy industry use	-	203	-	988	1,338	-	-	518	68	-	106	-	1,088	1,375	-	-	489	68
Losses	-	78	-	-	96	-	-	475	-	-	29	-	-	120	-	-	507	-
FINAL CONSUMPTION	446	201	-	17,021	7,794	936	-	6,142	251	432	119	-	17,690	8,012	1,032	-	6,108	251
Iron & steel	8	127	-	3	125	-	-	80	-	7	67	-	0	87	-	-	74	-
Other industries	337	4	-	824	1,659	242	-	1,887	174	322	0	-	836	1,731	240	-	1,915	174
Transport	2	-	-	13,555	-	241	-	96	-	3	-	-	13,835	-	289	-	96	-
Domestic	96	40	-	450	4,216	350	-	2,086	9	93	41	-	490	4,317	391	-	2,023	9
Other final users	3	-	-	391	1,681	103	-	1,993	69	6	-	-	399	1,763	112	-	1,999	69
Non energy use	-	30	-	1,799	113	-	-	-	-	-	11	-	2,130	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.

Section 2 - Solid Fuels and Derived Gases

Key results show:

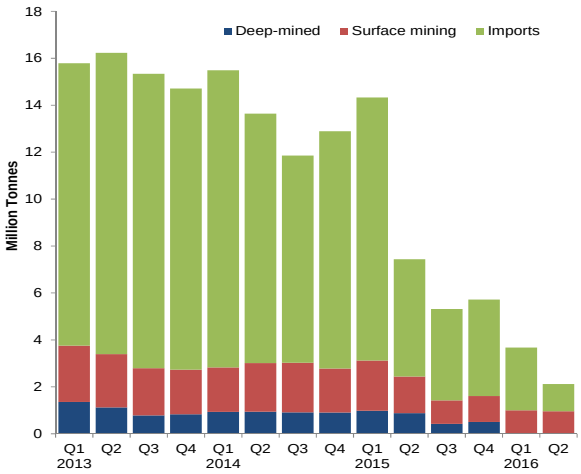
Overall coal production in the second quarter of 2016 was down 61 per cent (-1.5 million tonnes) compared with the second quarter of 2015. This was due to mines closing and some other mines producing less coal as they are coming to the end of operation. Deep-mined and surface mine output both fell to record lows, down 99 per cent and 39 per cent respectively. **(Chart 2.1)**

Coal imports fell to their lowest value in the last 18 years, down 77 per cent (-3.8 million tonnes) on levels shown in the second 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 second quarter of 2016 fell to a new record low of 1.8 million tonnes and was 71 per cent (-4.3 million tonnes) lower than demand in the second 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 51 per cent (-9.5 million tonnes) to 9.1 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)**

Chart 2.1 Coal supply



Coal production in the second quarter of 2016 at 1.0 million tonnes (a new record low) was 61 per cent lower than the second quarter of 2015, due to mines closing and some other mines producing less coal as they are coming to the end of operation. Surface mine production fell by 39 per cent to 1.0 million tonnes (a new record low), whereas deep mine production fell by 99 per cent to 6 thousand tonnes (also a new record low), mainly due to Hatfield and Thoresby collieries closing in early July 2015 and the last large deep mine Kellingley closing in December 2015. There are just seven small deep mines remaining (See Table 2B in this month's special article Coal in 2015).

Table 2A Coal imports by origin

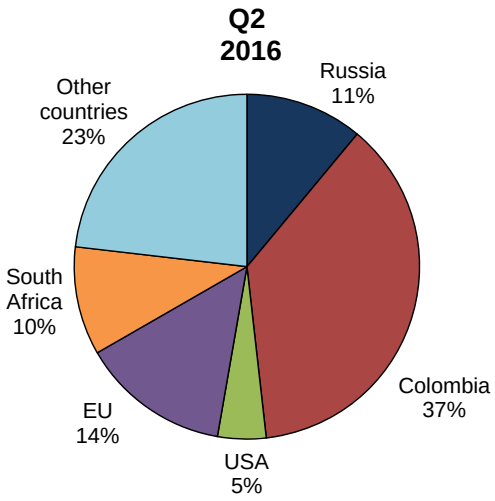
Thousand Tonnes

	2014	2015	2015 Q2	2016 Q2 p
European Union	764	614	207	96
Russia	17,869	9,187	1,921	287
Columbia	9,700	7,070	1,281	172
USA	11,182	5,317	1,165	220
Australia	1,249	910	290	166
Other Countries	1,461	1,101	134	215
Total imports	42,225	24,198	4,997	1,156

Imports of coal in the second quarter of 2016 were 77 per cent lower than in the second quarter of 2015 at 1.2 million tonnes. The decrease reflects the fact that consumption by electricity generators was down. 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.

Total coal imports in the second quarter of 2016 decreased by 77 per cent to 1.2 million tonnes (lowest value for at least 18 years). Russia was the largest supplier with 25 per cent of total imports, followed by the USA (19 per cent) and Colombia (15 per cent)

Chart 2.2 Steam coal imports by origin



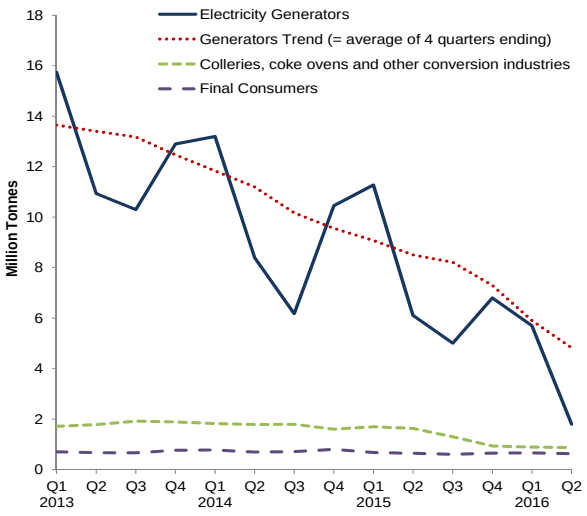
Steam coal imports in the second quarter of 2016 fell by 86 per cent to 0.5 million tonnes and accounted for 40 per cent of total coal imports (lower than coking coal imports for the first time in at least 18 years).

Coking coal imports in the second quarter of 2016 fell by 58 per cent to 0.7 million tonnes and accounted for 58 per cent of total coal imports.

In the second quarter of 2016, 48 per cent of steam coal imports came from Colombia (37 per cent) and Russia (11 per cent). Large falls for steam coal imports were recorded from Russia (97 per cent), and Colombia (87 per cent).

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 21 thousand tonnes of steam coal to the UK in the second quarter of 2016. It did not export any steam coal to the UK in the first quarter of 2016.

Chart 2.3 Coal consumption



Total demand for coal in the second quarter of 2016, at 3.3 million tonnes, was 61 per cent lower than in the second quarter of 2015. Consumption by electricity generators was down by 71 per cent to 1.8 million tonnes.

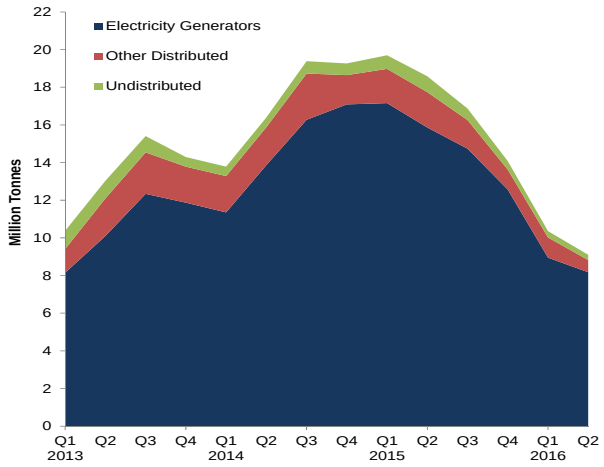
Electricity generators accounted for 54 per cent of total coal use in the second quarter of 2016; compared with 73 per cent a year earlier.

Demand for coal for coke manufacture fell 60 per cent in Q2 2016 compared to a year earlier, from 1.1 million tonnes to 0.4 million tonnes.

Sales to industrial users fell by 4.4 per cent in the second quarter of 2016 and sales to other final consumers including domestic increased by 1.7 per cent to 0.1 million tonnes during the second quarter of 2016.

Coal used in blast furnaces was 0.3 million tonnes in the second quarter of 2016, a decrease of 23 per cent compared to the second quarter of 2015.

Chart 2.4 Coal stocks



Coal stocks showed a fall of 1.3 million tonnes during the second quarter of 2016 and stood at 9.1 million tonnes (a new record low), 9.5 million tonnes lower than at the end of June 2015.

The level of coal stocks at power stations at the end of the second quarter of 2016 was 8.2 million tonnes, 7.7 million tonnes lower than at the end of June 2015, reflecting higher use of coal stocks for generation from coal.

Stocks held by coke ovens were 0.6 million tonnes at the end of the second quarter of 2016, this was 0.4 million tonnes lower than stock levels at the end of June 2015.

Stocks held by producers (undistributed stocks) at the end of the second quarter of 2016 were 0.3 million tonnes (a new record low), 0.6 million tonnes lower than at the end of June 2015.

Relevant tables

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2 SOLID FUEL AND DERIVED GASES

Table 2.1 Supply and consumption of coal

Thousand tonnes

	2014	2015	*per cent change*	2014 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	11,648	8,598	*-26.2*	3,009	3,030	2,776	3,122	2,441	1,424	1,612	1,001r	962	*-60.6*
Deep mined	3,685	2,784	*-24.5*	936	916	901	980	880	420	504	7	6	*-99.4*
Surface mining[2]	7,962	5,814	*-27.0*	2,072	2,113	1,875	2,142	1,561	1,004	1,108	994r	957	*-38.7*
Imports[4]	42,225	24,198	*-42.7*	10,631	8,826	10,114	11,207	4,997	3,891	4,103	2,675	1,156	*-76.9*
Exports[5]	425	385	*-9.3*	79	112	105	111	75	104	96	103r	76	*+1.7*
Stock change[6]	-4,973	+5,134	*(-)*	-2,606	-2,988	+96	-419	+1,001	+1,710	+2,842	+3,673r	+1,251	*+24.9*
Total supply	48,474	37,545	*-22.5*	10,955	8,755	12,882	13,799	8,364	6,921	8,461	7,247r	3,294	*-60.6*
Statistical difference	+219	+173		+63	+59	+25	+141	-34	-5	+71	-11r	-16	
Total demand	48,255	37,372	*-22.6*	10,892	8,696	12,857	13,658	8,398	6,926	8,390	7,258r	3,309	*-60.6*
TRANSFORMATION	45,255	34,776	*-23.2*	10,192	7,981	12,053	12,976	7,747	6,316	7,737	6,593r	2,679	*-65.4*
Electricity generation	38,234	29,198	*-23.6*	8,401	6,183	10,451	11,278	6,112	5,010	6,799	5,699r	1,802	*-70.5*
Heat generation[7]	272	213	*-21.7*	55	45	80	80	43	32	58	80	43	-
Coke manufacture	4,977	3,699	*-25.7*	1,287	1,264	1,156	1,165	1,083	880	572	443	438	*-59.6*
Blast furnaces	1,513	1,444	*-4.6*	377	416	309	423	447	330	244	316	345	*-22.7*
Patent fuel manufacture	259	223	*-13.9*	72	72	57	31	63	64	65	55	51	*-19.3*
Energy industry use	1	-	*-100.0*	0	-	-	-	-	-	-	-	-	
FINAL CONSUMPTION	3,000	2,596	*-13.5*	699	714	804	682	651	610	653	665r	630	*-3.2*
Iron & steel	54	45	*-17.5*	13	14	13	12	12	12	10	10	10	*-10.2*
Other industries	2,351	1,968	*-16.3*	546	568	618	502	505	477	483	480r	484	*-4.3*
Domestic	546	552	*+1.0*	126	119	163	159	127	114	152	161r	124	*-2.7*
Other final users	48	32	*-34.7*	13	14	9	9	7	8	8	13	13	*+86.0*
Stocks at end of period													
Distributed stocks	18,641	13,629	*-26.9*	15,872	18,732	18,641	18,971	17,742	16,255	13,629	10,021r	8,818	*-50.3*
Of which:													
Major power producers[8]	17,091	12,569	*-26.5*	13,858	16,275	17,091	17,158	15,864	14,737	12,569	8,948r	8,178	*-48.4*
Coke ovens	795	621	*-21.9*	473	739	795	836	955	742	621	531	562	*-41.2*
Undistributed stocks	622	452	*-27.3*	519	647	622	724	839	616	452	334	286	*-65.9*
Total stocks[9]	19,263	14,081	*-26.9*	16,391	19,379	19,263	19,695	18,581	16,871	14,081	10,355r	9,104	*-51.0*

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 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [3]
SUPPLY													
Indigenous production	3,906	2,965	*-24.1*	1,025	990	897	895	868	727	474	376	385	*-55.7*
Coke Oven Coke	3,601	2,716	*-24.6*	940	912	830	854	800	658	404	320	319	*-60.1*
Coke Breeze	31	18	*-42.0*	8	8	7	5	5	4	5	4	4	*-8.0*
Other MSF	274	231	*-15.8*	77	70	60	36	64	65	66	51	61	*-4.1*
Imports	940	1,132	*+20.5*	202	283	251	302	290	215	325	287	284	*-2.2*
Exports	112	111	*-0.6*	30	29	13	23	74	7	8	6	4	*-94.3*
Stock change[1]	-212	+64	*(-)*	-92	-75	-87	+73	+37	-50	+4	-2	+21	*-42.6*
Transfers	-5	-3		-13	9	-	-2	-1	-	-	-1	-1	
Total supply	4,518	4,047	*-10.4*	1,093	1,177	1,049	1,246	1,121	885	796	654	685	*-38.9*
Statistical difference	-1	0		-	-0	-0	-0	-	0	-0	-0	-	
Total demand	4,519	4,047	*-10.4*	1,093	1,177	1,049	1,246	1,121	885	796	654	685	*-38.9*
TRANSFORMATION	3,585	3,257	*-9.1*	856	929	842	1,009	908	705	635	525	548	*-39.7*
Coke manufacture	-	-		-	-	-	-	-	-	-	-	-	
Blast furnaces	3,585	3,257	*-9.1*	856	929	842	1,009	908	705	635	525	548	*-39.7*
Energy industry use	-	-		-	-	-	-	-	-	-	-	-	
FINAL CONSUMPTION	934	790	*-15.4*	237	248	207	237	213	179	161	130r	137	*-35.6*
Iron & steel	634	539	*-14.9*	161	174	134	165	151	125	98	75	79	*-47.6*
Other industries	45	17	*-62.9*	10	10	14	10	6	-	-	-	-	*-100.0*
Domestic	256	235	*-8.2*	66	64	59	62	56	54	63	55	58	*+3.8*
Stocks at end of period[2]	1,188	1,124	*-5.4*	994	1,093	1,188	1,115	1,028	1,038	1,124	1,126	1,108	*+7.8*

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 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	25,441	22,156	*-12.9*	6,393	6,673	5,748	6,995	6,315	4,972	3,874	3,406	3,603	*-42.9*
Coke oven gas	8,473	6,890	*-18.7*	2,211	2,199	1,931	2,264	2,030	1,595	1,000	870	836	*-58.8*
Blast furnace gas	15,386	14,131	*-8.2*	3,762	4,094	3,455	4,359	3,941	3,117	2,713	2,403	2,645	*-32.9*
Benzole & tars	1,582	1,136	*-28.2*	420	380	361	371	344	260	161	134	123	*-64.3*
Transfers	140	420	*(+)*	25	40	66	92	96	99	132	127	106	*+10.2*
Total supply	25,581	22,576	*-11.7*	6,418	6,713	5,813	7,088	6,411	5,071	4,006	3,534	3,709	*-42.1*
Statistical difference	-37	+41		+2	-29	+8	+33	-14	+5	+17	-9	+10	
Total demand	25,618	22,535	*-12.0*	6,416	6,742	5,805	7,054	6,425	5,066	3,989	3,543	3,699	*-42.4*
TRANSFORMATION	11,223	9,704	*-13.5*	2,775	2,862	2,668	3,192	2,580	2,053	1,880	1,804	1,882	*-27.0*
Electricity generation	10,626	9,107	*-14.3*	2,626	2,713	2,519	3,042	2,430	1,904	1,731	1,655	1,733	*-28.7*
Heat generation[2]	598	598	-	149	149	149	149	149	149	149	149	149	-
Energy industry use	9,331	8,330	*-10.7*	2,333	2,381	2,154	2,581	2,358	1,894	1,497	1,236	1,235	*-47.6*
Losses	2,517	2,646	*+5.1*	561	926	452	674	912	737	323	248	337	*-63.1*
FINAL CONSUMPTION	2,546	1,855	*-27.1*	747	573	531	608	576	383	289	255	245	*-57.4*
Iron & steel	800	719	*-10.1*	282	149	126	237	231	123	128	121	122	*-47.2*
Other industries[3]	165	-	*-100.0*	45	44	44	-	-	-	-	-	-	
Non-Energy Use[4]	1,582	1,136	*-28.2*	420	380	361	371	344	260	161	134	123	*-64.3*

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 Q2 2016 was 1.1 per cent higher than a year ago. This latest quarter shows a flattening off of oil production following strong growth in each of the preceding four quarters. **(Chart 3.1)**

Net imports of primary oils (crude oil, NGLs and process oils) in Q2 2016 increased to 3.7 million tonnes (up 37 per cent) due to increased refinery demand. This met about 16 per cent of UK's refinery demand. **(Chart 3.3)**

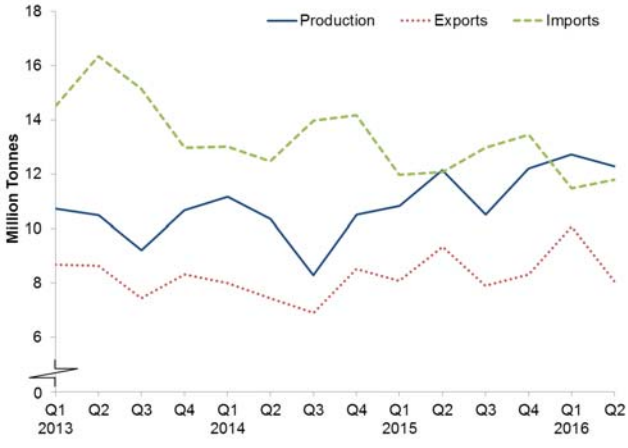
Indigenous production of petroleum products was 7.3 per cent higher in the second quarter of 2016 compared with the same quarter in 2015. Last year production was affected by maintenance at a major refinery. (**Chart 3.2**)

Exports increased by 19.6 per cent compared with the second quarter of 2015 due to robust production, and imports increased by 9.6 per cent to meet product demand. The UK was a net importer of petroleum products in Q2 2016, for the twelfth consecutive quarter, by 2.9 million tonnes. This follows a long period where the UK was generally a net exporter of petroleum products. **(Chart 3.2)**

In Q2 2016 total deliveries of key transport fuels increased by 2.1 per cent compared with Q2 2015. Petrol deliveries were steady at -0.1 per cent, road diesel deliveries increased by 2.9 per cent (excluding the blended bio-element), while deliveries of jet fuel increased by 2.6 per cent. (**Chart 3.5)**

Overall stocks of crude oil and petroleum products were up by 1.9 per cent at end of the Q2 2016. **(Chart 3.7)**

Chart 3.1 Production and trade of crude oil and NGLs



Indigenous crude oil production was higher by 0.4 per cent in Q2 2016 compared with the same quarter a year ago. Production has been boosted with new fields coming online through 2015.

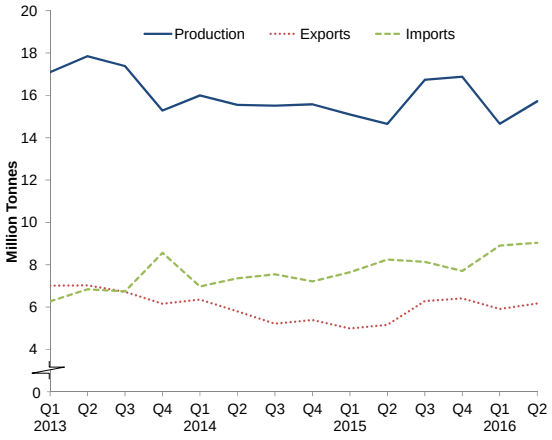
Production of Natural Gas Liquids (NGLs) increased by 9.9 per cent on the second quarter of 2015; the new fields contain a higher proportion of NGLs.

Taken together, indigenous production of crude and NGLs was 1.1 per cent higher, continuing the recent trend for strong production.

In Q2 2016 imports of crude oil and NGLs were 6.9 per cent lower compared with the same period a year ago, reflecting reasonably strong indigenous production and robust refinery demand. Exports of crude oil and NGLs decreased by 13.8 per cent.

Overall, net imports of primary oils (crude, NGLs and feedstocks) were 3.7 million tonnes in Q2 2016 compared with 2.7 million tonnes in the same quarter of 2015, reflecting the strong demand at refineries.

Chart 3.2 Production and trade of petroleum products

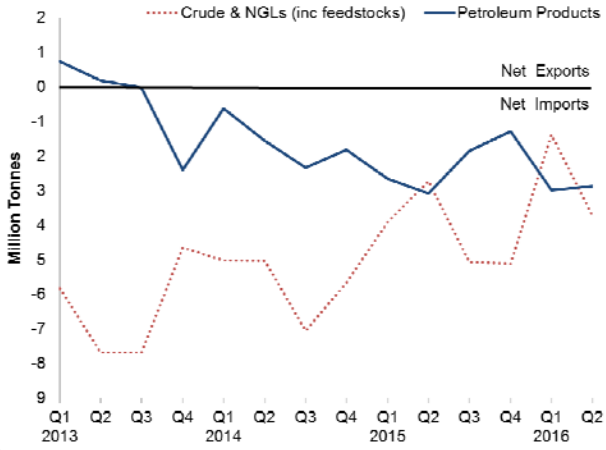


Indigenous production of petroleum products in Q2 2016 was higher by 7.3 per cent compared with the same quarter in 2015, due to maintenance in this period last year.

Imports increased by 9.6 per cent and exports by 19.6 per cent. The principal driver of this is the product mix, importing higher volumes of aviation turbine fuel and typically exporting more motor spirit and petroleum gases. In absolute terms, this quarter the largest increase in imports was for petrol, up by nearly half (0.3 million tonnes). (see Chart 3.5)

The UK was a net importer (2.9 million tonnes) of petroleum products in Q2 2016.

Chart 3.3 Overall trade of primary oils and petroleum products

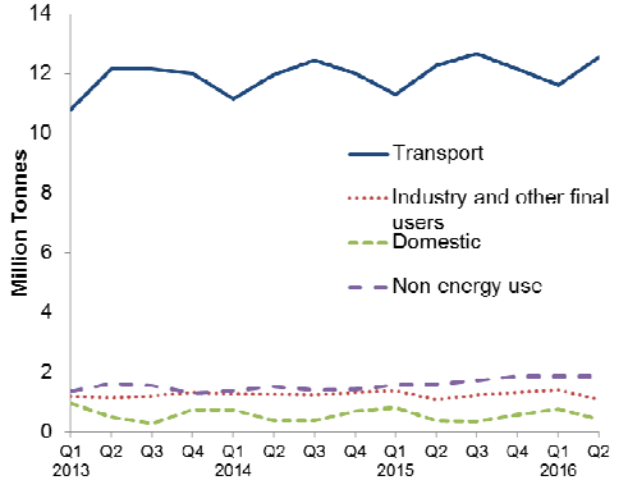


In Q2 2016, net imports of primary oils (crude, NGLs and feedstocks) increased to 3.7 million tonnes compared with 2.7 million tonnes in Q2 2015, an increase of 37 per cent and indicative of the strong refinery demand.

The UK's overall net import dependence for primary oils was 16 per cent in Q2 2016, down from 18 per cent in Q2 2015.

In Q2 2016 the UK was a net importer of petroleum products, by 2.9 million tonnes, down from 3.1 million tonnes in the same quarter of 2015. There have now been 12 consecutive quarters where the UK has imported more petroleum products than it exported. This follows decades where the UK has been a net exporter of petroleum; the last time was in 1984 when there was industrial action in the coal industry.

Chart 3.4 Final consumption of oil

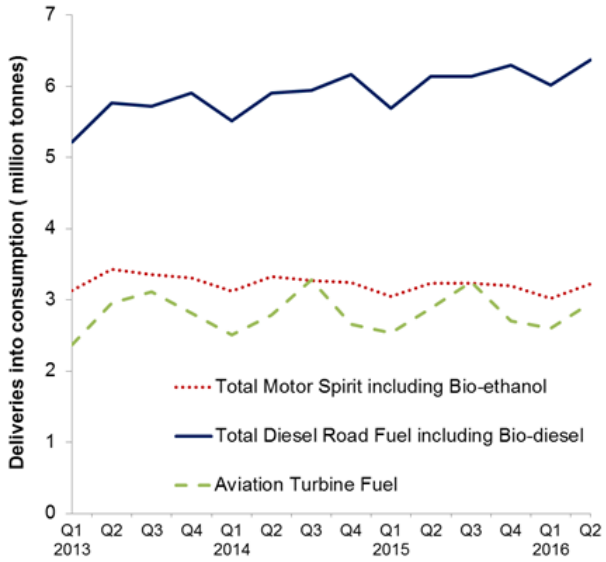


In Q2 2016, final consumption of petroleum products was higher by 3.8 per cent compared with Q2 2015. Within this:

Transport, which accounts for about three-quarters of UK final consumption, was higher by 2.1 per cent. This was largely driven by an increase in demand for road diesel. (See Chart 3.5 for more detail).

Demand for products for **non-energy use** was higher by 17.8 per cent in the latest quarter, fuelled by deliveries of gases and other products, including naphtha, to the petrochemical processing industry.

Chart 3.5 Demand for key transport fuels



In Q2 2016, total deliveries of key hydrocarbon transport fuels were higher by 2.1 per cent. Within this:

Motor spirit (petrol) deliveries were down by 0.1 per cent on the second quarter of 2015, the smallest contraction in the time series beginning in 1999. With the dieselisation of the vehicle fleet petrol consumption had until recently decreased 3.5 per cent on average each month.

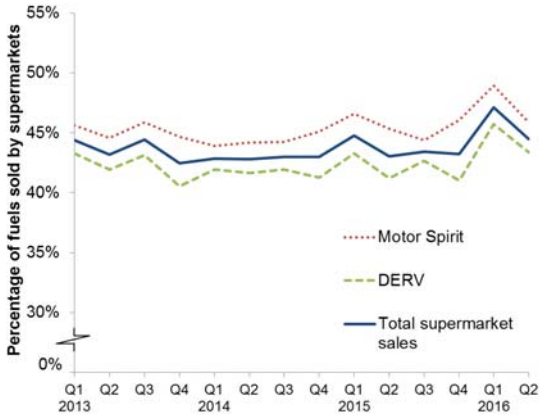
Overall **DERV** (diesel) demand increased by 2.9 per cent compared to Q2 2015. Total DERV consumption, including biodiesel, increased by 3.8 per cent as a greater quantity of biofuels were blended in Q2 2016.

Robust demand for road fuels has been noted in recent quarters. The increase could be attributed to the growth in the UK economy over the same period, with GDP rising 2.2 per cent compared to Q2 2015[1]. In addition the typical retail price of premium unleaded in June 2016 was 5.4 pence per litre cheaper compared to 2015, and for diesel was 9.4 pence per litre cheaper[2].

Demand for **aviation turbine fuel** increased by 2.6 per cent compared to Q2 2015. Consumption increased sharply on the first quarter of this year because demand is seasonal with more people flying during summer months.

[1] For GDP statistics see ONS economics statistics
[2] For road fuel price statistics see the BEIS road fuels prices statistics

Chart 3.6 Supermarket share of road fuel sales

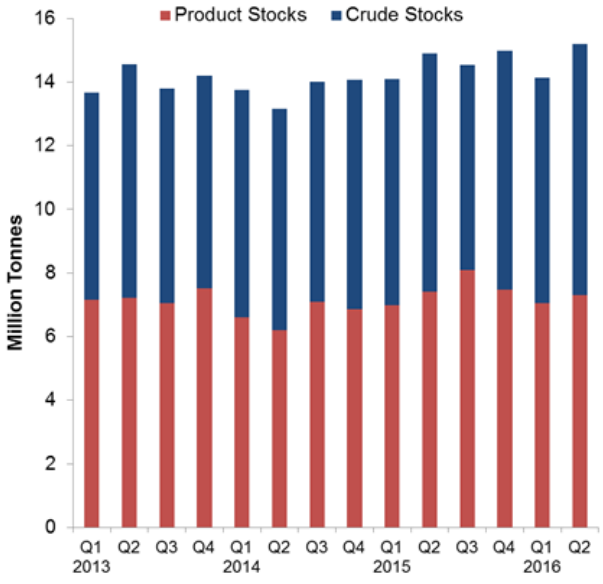


On an overall basis, in Q2 2016 supermarket outlets accounted for 44 per cent of total retail sales, up from 43 per cent in 2015. Within this:

The overall volume of **petrol** sales (including the bio-fuel element) decreased by 0.1 per cent and supermarkets sold 46 per cent of that volume, up slightly from 45 per cent in the same period last year.

Sales of **diesel** (including the bio-fuel element) increased 3.8 per cent and the supermarket share increased from 41 per cent to 43 per cent.

Chart 3.7 UK oil stocks



At the end of Q2 2016, total stocks for all oil were up by 1.9 per cent (0.3 million tonnes) compared to the same point in 2015. Total stocks are currently at the highest level since Q2 2010.

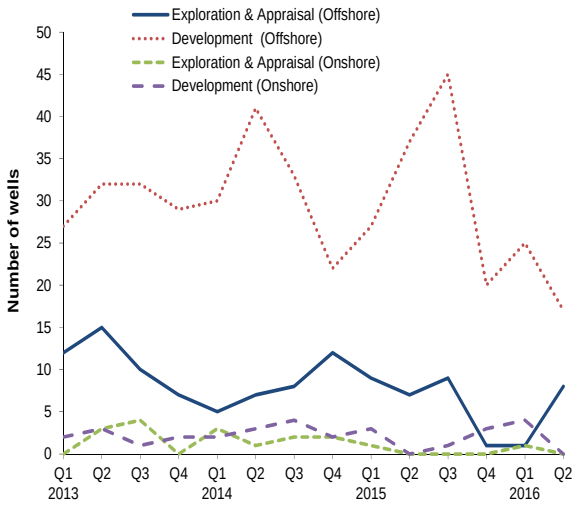
Total stocks of crude and process oils were 0.4 million tonnes (5.3 per cent) higher at the end of Q2 2016 compared with the same quarter a year earlier. Within this, stocks held at refineries decreased by over 440 million tonnes (12.4 per cent), whereas stocks held abroad under official agreement increased by over 660 million tonnes (36 per cent).

Despite an increase of 400kt of product being held in the UK (likely due to current low prices), there has been an overall decrease of 1.5 per cent in product stocks in Q2 2016. The decrease was driven by a 500kt (22 per cent) reduction in bilateral agreements.

Chart 3.7 combines stocks of products with the product equivalent of stocks of crude oil to give an overall level of UK stocks of key products.

At the end of the Q2 2016, the UK had stocks equal to around 70 days of demand.

Chart 3.8 Drilling activity on the UKCS



There were 8 exploration and appraisal wells started offshore in the second quarter of 2016, compared to 7 in the corresponding quarter of 2015.

There were 17 development wells drilled offshore in the second quarter of 2016, compared to 37 in the corresponding quarter of 2015.

There were no exploration and appraisal wells started onshore in either the second quarter of 2016 or the corresponding quarter of 2015.

There were no development wells drilled onshore in either the second quarter of 2016 or the corresponding quarter of 2015.

Relevant tables

Changes to published tables in September 2016

In March 2016, BEIS consulted on a number of proposals regarding the annual and quarterly tables. Please see the article 'Changes to the Oil and Gas tables' in the June issue of Energy Trends for a summary. BEIS continue to work with industry on this matter.

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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 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [8]
SUPPLY													
Indigenous production[2]	40,328	45,698	*+13.3*	10,358	8,296	10,510	10,836	12,141	10,515	12,206	12,720r	12,280	*+1.1*
Crude oil	37,474	42,826	*+14.3*	9,634	7,692	9,779	10,163	11,364	9,895	11,404	11,816r	11,414	*+0.4*
NGLs[3]	2,454	2,462	*+0.3*	644	503	623	577	689	508	688	784	757	*+9.9*
Feedstocks	400	410	*+2.6*	79	101	108	96	88	112	114	120	108	*+22.3*
Imports[4]	53,638	50,480	*-5.9*	12,481	13,964	14,174	11,985	12,068	12,979	13,448	11,479	11,798	*-2.2*
Crude oil & NGLs	48,890	45,159	*-7.6*	11,340	12,831	13,101	10,920	10,931	11,406	11,902	9,842	10,179	*-6.9*
Feedstocks	4,747	5,322	*+12.1*	1,142	1,133	1,074	1,065	1,137	1,574	1,547	1,637	1,619	*+42.5*
Exports[4]	30,869	33,660	*+9.0*	7,446	6,906	8,515	8,082	9,339	7,908	8,331	10,088	8,058	*-13.7*
Crude Oil & NGLs	29,809	31,730	*+6.4*	7,164	6,634	8,231	7,587	8,846	7,279	8,018	9,460	7,626	*-13.8*
Feedstocks	1,060	1,930	*+82.1*	282	273	284	494	493	630	313	628	433	*-12.2*
Stock change[5]	-592	-19	*(-)*	63	199	-566	-59	-384	970	-546	399	-473	
Transfers[6]	-1,439	-1,135	*-21.1*	-324	-306	-455	-83	-382	-225	-445	-389	-395	
Total supply	61,066	61,365	*+0.5*	15,132	15,246	15,149	14,597	14,104	16,332	16,332	14,121	15,152	*+7.4*
Statistical difference[7]	+4	-10	*(-)*	-2	-24	+8	-35	+1	-1	+24	+15	-20	
Total demand	61,063	61,375	*+0.5*	15,134	15,270	15,141	14,632	14,103	16,332	16,308	14,106	15,172	*+7.6*
TRANSFORMATION	61,063	61,375	*+0.5*	15,134	15,270	15,141	14,632	14,103	16,332	16,308	14,106	15,172	*+7.6*
Petroleum refineries	61,063	61,375	*+0.5*	15,134	15,270	15,141	14,632	14,103	16,332	16,308	14,106	15,172	*+7.6*

1. As there is no use made of primary oils and feedstocks by industries other than the oil and gas extraction and petroleum refining industries, other industry headings have not been included in this table. As such, this table is a summary of the activity of what is known as the Upstream oil industry.
2. Includes offshore and onshore production.
3. Natural Gas Liquids (NGLs) are condensate and petroleum gases derived at onshore treatment plants.
4. Foreign trade as recorded by the Petroleum Industry which may differ from the figures published by HM Revenue and Customs in the Overseas Trade Statistics. Data are subject to further revision as revised information on imports and exports becomes available.
5. Stock fall (+), stock rise (-). Stocks include stocks held at refineries, at oil terminals and also those held in tanks and partially loaded vessels at offshore facilities.
6. Mostly direct disposals to petrochemical plants.
7. Total supply minus total demand.
8. Percentage change between the most recent quarter and the same quarter a year earlier; (+) represents a positive percentage change greater than 100%.

3 OIL AND OIL PRODUCTS

Table 3.2 Supply and use of petroleum products

Thousand tonnes

	2014	2015	*per cent change*	2014 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production [2]	62,647	63,368	*+1.2*	15,556	15,515	15,577	15,097	14,652	16,736	16,883	14,658r	15,725	*+7.3*
Imports [3]	29,093	31,727	*+9.1*	7,358	7,546	7,213	7,643	8,247	8,134	7,703	8,902r	9,036	*+9.6*
Exports [3]	22,748	22,835	*+0.4*	5,796	5,212	5,387	4,984	5,159	6,283	6,409	5,913r	6,172	*+19.6*
Marine bunkers	2,824	2,426	*-14.1*	667	695	764	526	673	679	548	518r	767	*+13.9*
Stock change [4]	+292	-747		227	-324	184	-148	-229	-295	-75	+182r	-267	
Transfers [5]	-817	-1,218		-272	-181	-125	-529	-249	-257	-184	-310r	-273	
Total supply	65,643	67,869	*+3.4*	16,406	16,649	16,699	16,552	16,589	17,357	17,371	17,001r	17,282	*+4.2*
Statistical difference [6]	-109	+78		+38	-75	-34	+128	-4	-53	+7	+8r	-8	
Total demand	65,752	67,790	*+3.1*	16,368	16,724	16,733	16,424	16,593	17,410	17,363	16,994r	17,290	*+4.2*
TRANSFORMATION	1,055	1,116	*+5.8*	237	254	271	260	254	290	311	317r	266	*+4.7*
Electricity generation	490	551	*+12.4*	117	115	124	130	126	140	155	156r	119	*-6.0*
Heat generation	61	59	*-3.7*	15	15	15	15	15	15	15	15	15	*-0.0*
Other Transformation	504	506	*+0.5*	105	124	131	115	113	136	142	146	133	*+17.7*
Energy industry use	3,861	4,099	*+6.2*	957	957	938	994	933	1,108	1,064	962r	1,028	*+10.2*
Petroleum Refineries	3,198	3,400	*+6.3*	791	791	772	819	758	933	889	787r	853	*+12.5*
Blast Furnaces	-	-		-	-	-	-	-	-	-	-	-	
Others	663	699	*+5.5*	166	166	166	175	175	175	175	175	175	-
FINAL CONSUMPTION	60,837	62,576	*+2.9*	15,174	15,513	15,524	15,170	15,406	16,012	15,989	15,714r	15,996	*+3.8*
Iron & steel	6	6	*+6.6*	1	2	2	1	2	1	1	1	0	*(-)*
Other industries	3,765	3,612	*-4.1*	898	875	982	1,028	748	827	1,009	1,051r	760	*+1.6*
Transport	47,578	48,427	*+1.8*	11,960	12,442	12,020	11,316	12,290	12,660	12,161	11,627r	12,544	*+2.1*
Domestic	2,278	2,212	*-2.9*	398	404	715	844	405	363	600	792r	441	*+8.8*
Other final users	1,390	1,490	*+7.2*	374	374	356	379	353	415	342	366r	357	*+1.1*
Non energy use	5,820	6,830	*+17.4*	1,544	1,417	1,449	1,601	1,607	1,747r	1,875r	1,877r	1,893	*+17.8*

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 2nd quarter									2016 2nd quarter p								
	Total Petroleum Products	Motor spirit	DERV[9]	Gas oil[1]	Aviation turbine fuel	Fuel oils	Petroleum gases[2]	Burning oil	Other products[3]	Total Petroleum Products	Motor spirit	DERV[9]	Gas oil[1]	Aviation turbine fuel	Fuel oils	Petroleum gases[2]	Burning oil	Other products[3]
SUPPLY																		
Indigenous Production[4]	14,652r	3,811	2,836	1,796	1,251	1,256	1,660r	371	1,670	15,725	4,359	3,259	1,782	1,255	1,144	1,807	367	1,753
Imports[5]	8,247	779	3,796	474	2,052	229	158	168	591	9,036	1,097	3,789	589	1,991	307	400	215	647
Exports[5]	5,159	2,173	384	729	245	824	244	15	544	6,172	2,748	567	694	288	853	391	19	613
Marine bunkers	673	-	-	451	-	222	0	-	-	767	-	-	534	-	233	-	-	-
Stock change[6]	-229	+154	-101	-52	-109	-60	-34	-6	-23	-267	-76	-189	-59	+30	-23	-17	+28	+40
Transfers[7]	-249	+507	-158	+103	-83	-180	-	+76	-514	-273	+449	-106	+61	-33	-181	-	+25	-489
Total supply	16,589r	3,078	5,989	1,141	2,866	200	1,540r	594	1,180	17,282	3,081	6,185	1,145	2,956	161	1,799	616	1,338
Statistical difference[8]	-4	+2	-	-1	-11	-8	-0	+30	-16	-8	+9	-	-	+5	-1	+5	+8	-34
Total demand	16,593r	3,076	5,998	1,142	2,877	208	1,540r	564	1,187	17,290	3,072	6,173	1,145	2,951	163	1,794	608	1,384
TRANSFORMATION	254	-	-	24	-	43	154	-	33	266	-	-	24	-	43	170	-	28
Electricity generation	126	-	-	23	-	32	63	-	-	119	-	-	23	-	32	63	-	0
Heat generation	15	-	-	1	-	11	2	-	-	15	-	-	1	-	11	2	-	-
Petroleum refineries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coke manufacture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blast furnaces	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Patent fuel manufacture	22	-	-	-	-	-	0	-	22	22	-	-	-	-	-	0	-	22
Other transformation [9]	91	-	-	-	-	-	88	-	3	111	-	-	-	-	-	105	-	7
Energy industry use	933	-	-	158	-	77	427	-	271	1,028	-	-	158	-	76	492	-	302
FINAL CONSUMPTION	15,406r	3,076	5,998	959	2,877	89	960r	564	882	15,996	3,072	6,173	962	2,951	43	1,132	608	1,054
Iron & steel	2	-	-	-	-	2	1	-	-	0	-	-	-	-	0	-	-	-
Other industries	748r	-	-	370	-	57	87r	229	4	760	-	-	376	-	43	92	247	2
Transport	12,290	3,076	5,998	316	2,877	0	19	-	4	12,544	3,072	6,173	309	2,951	0	34	-	4
Domestic	405	-	-	29	-	-	41	335	-	441	-	-	32	-	-	48	361	-
Other final users	353r	-	-	240	-	29	84r	-	-	357	-	-	242	-	0	115	-	-
Non energy use	1,607	-	-	3	-	-	729	-	875	1,893	-	-	3	-	-	843	-	1,047

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

3 OIL AND OIL PRODUCTS

Table 3.5 Demand for key petroleum products[1]

Thousand tonnes

	2014	2015	*per cent change*	2014 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [2]
MOTOR SPIRIT													
of which, Hydrocarbon [3]	12,326	12,082	*-2.0%*	3,163	3,103	3,086	2,893	3,076	3,072	3,040	2,877	3,072	*-0.1%*
of which, Bio-ethanol [4]	645	631	*-2.1%*	164	168	160	150	161	163	157	146	154	*-4.4%*
Total Motor Spirit including Bio-ethanol	**12,971**	**12,713**	*-2.0%*	**3,327**	**3,271**	**3,247**	**3,043**	**3,237**	**3,235**	**3,197**	**3,023**	**3,226**	*-0.3%*
of which, sold through Supermarkets [5]	5,755	5,794	*0.7%*	1,471	1,448	1,464	1,418	1,467	1,435	1,473	1,480	1,479	*0.8%*
of which, sold through Refiners, and other traders [6]	7,216	6,919	*-4.1%*	1,856	1,823	1,783	1,625	1,770	1,800	1,724	1,543	1,747	*-1.3%*
of which, sold via commercial sales [7]	-	-		-	-	-	-	-	-	-	-	-	
DIESEL ROAD FUEL													
Hydrocarbon [8]	22,675	23,656	*4.3%*	5,674	5,701	5,960	5,575	5,998	5,976	6,106	5,889	6,173	*2.9%*
Bio-diesel [9]	850	595	*-29.9%*	230	243	204	111	135	158	191	127	195	*44.1%*
Total Diesel Road Fuel including Bio-diesel	**23,525**	**24,251**	*3.1%*	**5,903**	**5,944**	**6,164**	**5,687**	**6,133**	**6,134**	**6,298**	**6,016**	**6,368**	*3.8%*
of which, sold through Supermarkets [10]	6,394	6,644	*3.9%*	1,602	1,625	1,658	1,605	1,648	1,706	1,685	1,793	1,802	*9.4%*
of which, sold through Refiners, and other traders [11]	8,946	9,168	*2.5%*	2,247	2,252	2,360	2,103	2,351	2,293	2,421	2,129	2,350	*-0.1%*
of which, sold via commercial sales [12]	8,185	8,439	*3.1%*	2,054	2,067	2,146	1,979	2,134	2,135	2,192	2,094	2,216	*3.8%*
OTHER GAS DIESEL OIL [13]	**5,241**	**4,824**	*-8.0%*	**1,288**	**1,485**	**1,286**	**1,091**	**1,141**	**1,417**	**1,174**	**1,076r**	**1,145**	*0.3%*
AVIATION FUELS													
Total sales	11,238	11,383	*1.3%*	2,788	3,284	2,655	2,538	2,881	3,255	2,709	2,599r	2,956	*2.6%*
Aviation spirit	18	11	*-36.9%*	5	4	3	2	4	4	2	2	4	*25.9%*
Aviation turbine fuel	11,220	11,372	*1.4%*	2,784	3,280	2,652	2,536	2,877	3,252	2,707	2,597r	2,951	*2.6%*
FUEL OIL													
Total Sales	579	506	*-12.7%*	144	142	137	210	117	88	90	129r	103	*-11.8%*
Light	225	199	*-11.8%*	74	68	54	92	40	31	35	44r	45	*11.1%*
Medium	128	117	*-8.8%*	31	31	34	46	28	22	20	37r	37	*33.3%*
Heavy	209	173	*-17.5%*	32	37	52	66	42	32	33	48r	48	*13.7%*

1. Monthly data for inland deliveries of oil products are available - See BEIS website: https://www.gov.uk/government/collections/oil-statistics
2. Percentage change between the most recent quarter and the same quarter a year earlier
3. Demand excluding bioethanol. Based on HMRC data.
4. Bioethanol based on HMRC data and excludes other renewables
5. Data for sales by supermarkets collected by a monthly reporting system. Includes Asda, Morrisons, Sainsburys and Tesco only.
6. Equals total motor spirit sales minus supermarket and commercial sales.
7. Commercial sales are estimated through returns provided by the UK's refiners
8. Demand excluding biodiesel. Based on HMRC data.
9. Biodiesel based on HMRC data and excludes other renewables.
10. Data for sales by supermarkets collected by a monthly reporting system. Includes Asda, Morrisons, Sainsburys and Tesco only.
11. Equals total diesel sales minus supermarket and commercial sales.
12. Commercial sales are estimated through returns provided by the UK's refiners
13. This includes gas diesel oil used for other purposes such as heating and middle distillate feedstock destined for use in the petrochemical industry.

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	2nd quarter	3,384	1,226	548	1,799	6,956	887	1,118	1,715	241	718	1,529	6,208	3,328	9,837	13,164
	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	3,038	1,370r	478r	2,193	7,078r	1,086	1,450	1,641	256	807	1,812	7,052	4,005	10,125r	14,131r
	2nd quarter p	3,145	1,586	627	2,527	7,886	1,162	1,395	1,890	278	784	1,799	7,308	4,326	10,868	15,193
Per cent change [11]		*-12.4*	*+1.3*	*+32.2*	*+35.7*	*+5.3*	*+1.1*	*+10.3*	*+10.8*	*-20.0*	*+23.7*	*-22.3*	*-1.5*	*+3.6*	*+1.3*	*+1.9*

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.

3 OIL AND OIL PRODUCTS

Table 3.7 Drilling activity[1] on the UKCS

Number of wells started

		Offshore				Onshore	
		Exploration	Appraisal	Exploration & Appraisal	Development[2]	Exploration & Appraisal	Development[2]
2011		14	28	42	123	14	11
2012		22	31	53	122	4	13
2013		15	29	44	120	7	8
2014		14	18	32	126	8	11
2015		13	13	26	129	1	7
Per cent change		*-7.1*	*-27.8*	*-18.8*	*+2.4*	*-87.5*	*-36.4*
2014	2nd quarter	4	3	7	41	1	3
	3rd quarter	3	5	8	33	2	4
	4th quarter	4	8	12	22	2	2
2015	1st quarter	2	7	9	27	1	3
	2nd quarter	5	2	7	37	-	-
	3rd quarter	6	3	9	45	-	1
	4th quarter	-	1	1	20	-	3
2016	1st quarter	1	-	1	25r	1	4r
	2nd quarter p	5	3	8	17	-	-
Per cent change[3]		-	*+50.0*	*+14.3*	*-54.1*		

1. Including sidetracked wells

2. Development wells are production or injection wells drilled after development approval has been granted.

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

Section 4 - Gas

Key results show:

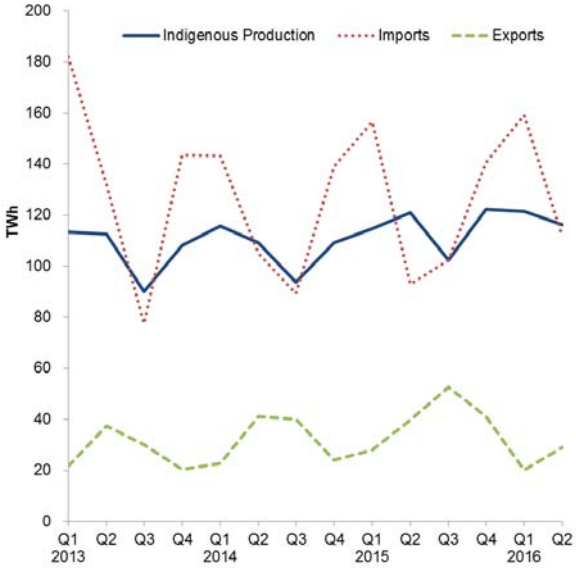
Gross UK production of natural gas in Q2 2016 was 4.0 per cent down on Q2 2015, at 116 TWh **(Chart 4.1)**. Within this production of associated gas was 3.0 per cent higher, whilst dry gas production was 15.5 per cent lower **(Chart 4.2)**. This decline contrasts with recent strong growth over the last year.

Net Imports increased by 56 per cent in comparison to Q2 2015 **(Chart 4.4)**.

Imports in Q2 2016 were up 20 per cent in comparison to the same quarter in 2015 **(Chart 4.5)**. This was largely driven by imports from Norway, which were up 34 per cent. Exports decreased by 27 per cent over the same time frame, driven by decreases in exports to Belgium via the interconnector and Ireland down 22 and 45 per cent respectively **(Chart 4.4)**. The decreases in exports to Ireland are due in part to new indigenous production coming on line in Ireland in late 2015 whilst the decrease in Belgium exports is related to the maintenance on the interconnector in June 2016.

UK gas demand was up 16.4 per cent compared to Q2 2015, with a notable increase in demand for electricity generation, which was up 47 per cent on the same quarter last year. The principal driver for this increase is the reduction in coal generation capacity which is described in further detail in Section 5. **(Chart 4.6)**.

Chart 4.1 Production and imports and exports of natural gas

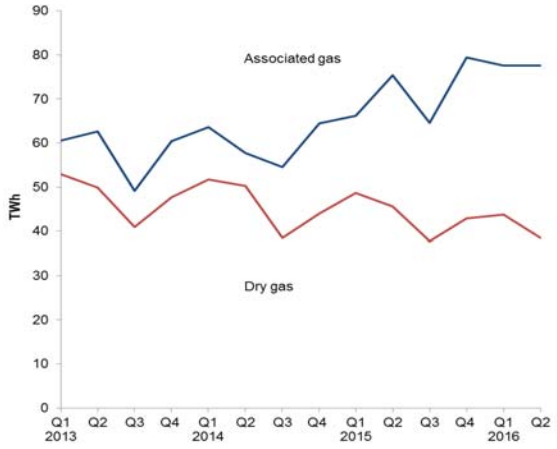


In the second quarter of 2016, gross production of natural gas was 4.0 per cent down on Q2 2015.This contrasts with the recent upwards trend since the beginning of 2014, but is more in line with the general decline since 2000.

UKCS production has decreased by 6.5 per cent on average per annum since production peaked in 2000.

Imports were significantly up in comparison to Q2 2015, by 20 per cent, this was driven by a 34 per cent increase in imports from Norway. Exports decreased significantly, down 27 per cent, driven by a decrease in exports to Belgium (down 22 per cent) and Ireland (45 per cent). The decrease in Irish exports is due in part to the Corrib gas field off the North West coast of Ireland entering production in late 2015. Belgian exports were reduced in June of this year due to maintenance on the interconnector.

Chart 4.2 Production of dry gas and associated gas



In Q2 2016 associated gas production which includes gas production from oil fields increased by 3.0 per cent versus Q2 2015.This increase partly reflects steady production from a number of new, relatively large condensate fields in the North Sea.

Dry gas production which is extracted from gas fields only was 15.5 per cent lower in Q2 2016 than Q2 2015.

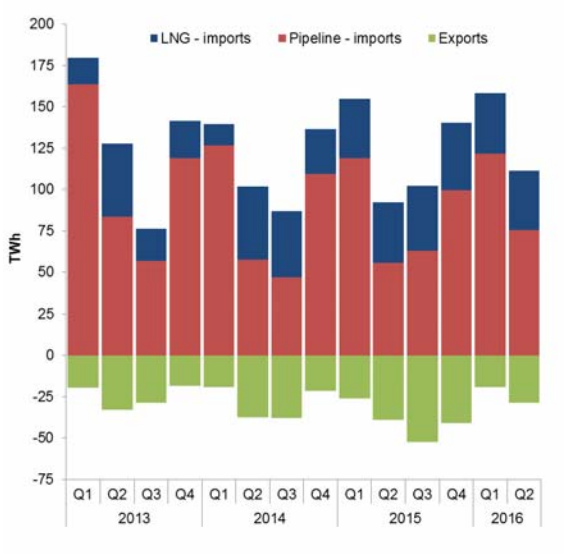
Chart 4.3 Gas availability

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 Q2 2016 increased by 16.7 per cent compared to Q2 2015 to 190 TWh. This was driven by an increase 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.

Chart 4.4 Import and exports

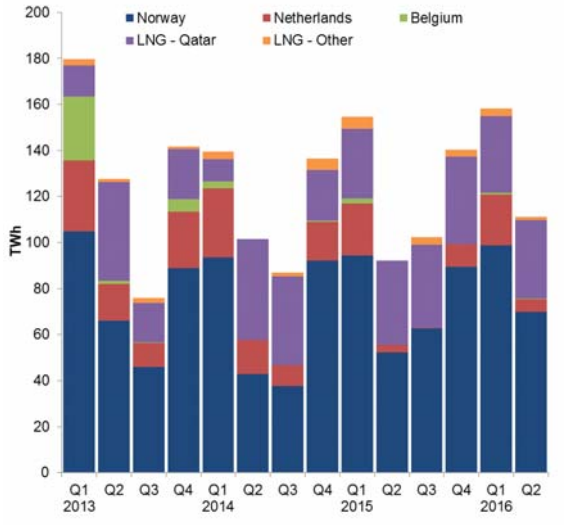


Net imports increased significantly, up 56 per cent in comparison to Q2 2015. This was driven by a significant increase in imports and a significant decrease in exports.

Imports in Q2 2016 were up 20 per cent in comparison to the same quarter in 2015. This was largely driven by imports from Norway, which were up just over a third.

Exports decreased by 27 per cent over the same time frame, driven by decreases in exports to Belgium via the interconnector and Ireland down 22 and 45 per cent respectively. The decrease in exports to Ireland is at least partially due to production from the Corrib gas field in Ireland which commenced in late 2015.

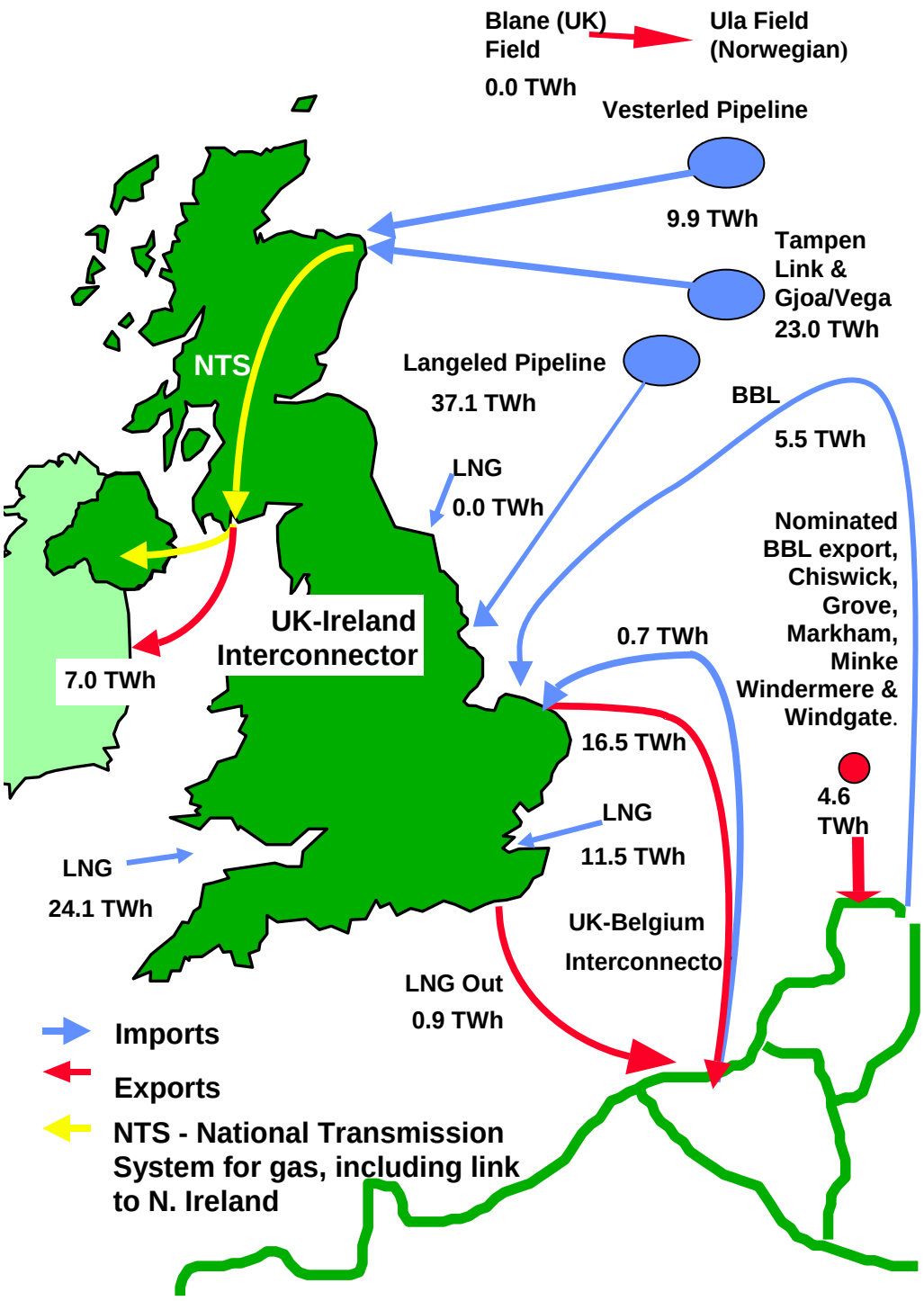
Chart 4.5 Imports by origin



Imports were significantly higher than in comparison to Q2 2015, up by 20 per cent. The rise was largely driven by imports from Norway, which were up 34 per cent, and made up 63 per cent of all imports. A further 31 per cent of imports were sourced as LNG from Qatar.

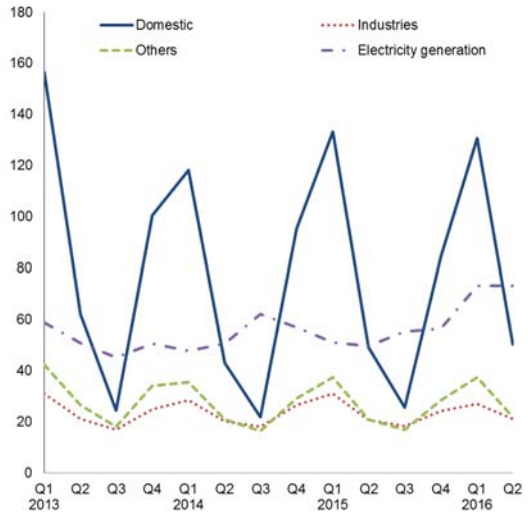
Norway remains the biggest supplier of gas to the UK, with Norwegian imports comprising 63 per cent of total imports, up from 57 per cent in the same quarter of the previous year. The share of gas received as LNG decreased from 40 per cent to 32 per cent over the same period.

Map: UK imports and exports of gas Q2 2016[1]



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

Chart 4.6 UK demand for natural gas



UK Overall demand in Q2 2016 increased by 16.4 per cent compared to Q2 2015. Within this:

Gas use for electricity generation rose by 47 per cent compared to the same quarter last year. This is in line with the recent trend this year as coal fired power plants have been taken off line (see section 5 for further information).

Final consumption increased by 2.8 per cent, with domestic consumption up 2.4 per cent. Whilst temperatures were broadly comparable with the same period last year, April in particular was notably colder than the same period last year (7.5 degrees Celsius against 9.1 degrees Celsius in 2015).

Relevant table

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4 GAS

Table 4.1. Natural gas supply and consumption

GWh

	2014	2015	*per cent change*	2014 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [1]
SUPPLY													
Indigenous production	427,784	460,268	*+7.6*	109,085	93,850	109,116	114,776	120,931	102,315	122,246	121,392r	116,129	*-4.0*
Imports	476,837	492,382	*+3.3*	105,079	89,405	139,141	156,690	92,828	102,270	140,594	159,314r	111,624	*+20.2*
of which LNG	*124,081*	*152,397*	*+22.8*	*43,973*	*40,151*	*27,046*	*35,602*	*36,565*	*39,242*	*40,988*	*36,466r*	*35,523*	*-2.9*
Exports	128,076	161,575	*+26.2*	41,063	40,102	24,049	28,105	39,789	52,520	41,161	20,141r	28,993	*-27.1*
Stock change [2]	-2,383	+3,515		-18,072	-7,057	5,754	34,500	-11,042	-15,919	-4,024	31,688	-8,669	
Transfers	-140	-420		-25	-40	-66	-92	-96	-99	-132	-127	-106	
Total supply	774,022	794,170	*+2.6*	155,004	136,056	229,896	277,768	162,832	136,047	217,523	292,125r	189,985	*+16.7*
Statistical difference	-1,269	1,823		-320	-496	-422	649	170	258	746	-1,124r	655	
Total demand	775,291	792,346	*+2.2*	155,324	136,552	230,318	277,119	162,661	135,789	216,777	293,249r	189,329	*+16.4*
TRANSFORMATION	243,022	237,957	*-2.1*	56,191	67,012	64,173	59,266	55,370	60,259	63,063	81,213r	78,790	*+42.3*
Electricity generation	217,392	212,556	*-2.2*	50,616	62,105	56,961	51,144	49,713	55,338	56,361	73,091r	73,133	*+47.1*
Heat generation3	25,631	25,401	*-0.9*	5,576	4,906	7,212	8,122	5,656	4,921	6,702	8,122	5,656	-
Energy industry use	52,172	57,580	*+10.4*	13,489	11,694	13,482	14,651	15,534	13,079	14,315	15,652r	15,969	*+2.8*
Losses	6,856	6,500	*-5.2*	1,574	1,656	1,667	1,438	1,115	1,834	2,114	1,164r	1,398	*+25.4*
FINAL CONSUMPTION	473,241	490,309	*+3.6*	84,070	56,190	150,995	201,763	90,643	60,618	137,285	195,220r	93,172	*+2.8*
Iron & steel	5,454	5,374	*-1.5*	1,329	1,270	1,375	1,589	1,454	1,224	1,108	1,191r	1,016	*-30.1*
Other industries	87,878	89,088	*+1.4*	18,903	16,764	25,204	29,532	19,291	17,118	23,146	25,849r	20,132	*+4.4*
Domestic	278,101	292,417	*+5.1*	42,954	21,842	95,204	133,307	49,034	25,510	84,565	130,714r	50,209	*+2.4*
Other final users	96,378	98,163	*+1.9*	19,526	14,956	27,854	36,019	19,547	15,448	27,149	36,149r	20,499	*+4.9*
Non energy use [3]	5,430	5,267	*-3.0*	1,357	1,357	1,357	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 Q2, total electricity generated fell by 0.3 per cent to 78.3 TWh compared to a year earlier. (**Chart 5.1**)

There has been a large switch in generation from coal to gas, which will have reduced carbon dioxide emissions. **(Chart 5.2)**

Renewables' share of electricity decreased from 25.4 per cent in 2015 Q2 to 24.9 per cent in 2016 Q2 due to reduced wind speed and rainfall. **(Chart 5.2)**

Coal's share of generation decreased from 20.3 per cent in 2015 Q2 to a record low of 5.8 per cent in 2016 Q2, whilst gas' share of generation increased from 29.9 per cent to 45.2 per cent. (**Chart 5.2**)

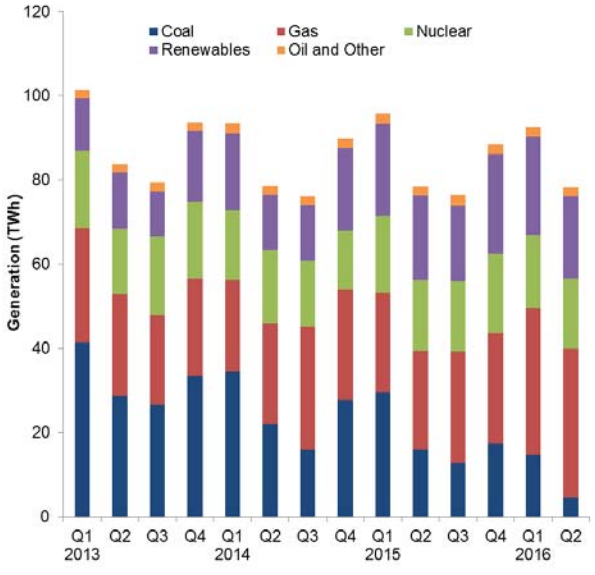
Nuclear's share of generation remained broadly unchanged from 21.5 per cent in the second quarter of 2015 to 21.3 per cent in the second quarter of 2016. (**Chart 5.2**)

Low carbon electricity's share of generation fell from 47.0 per cent in the second quarter of 2015 to 46.2 per cent in the second quarter of 2016. **(Chart 5.3)**

The UK remains a net importer with 6.4 per cent of electricity supplied from net imports in the second quarter of 2016. (**Chart 5.4**)

Final consumption of electricity during the second quarter of 2016, at 71.0 TWh, was provisionally 0.6 per cent lower than in the same period last year. Domestic consumption fell by 3.0 per cent. (**Chart 5.5**).

Chart 5.1 Electricity generated by fuel type



Despite a 1.3 per cent fall in MPP generation in the second quarter of 2016 overall generation only dropped by 0.3 per cent from 2015 Q2. This was due to a 5.5 per cent increase in generation from other generators, primarily as a result of increased wind and solar capacity.

Coal fired generation fell by 71 per cent from 15.9 TWh in 2015 Q2 to 4.6 TWh in 2016 Q2, due to reduced capacity caused by the closure of Ferrybridge C and Longannet and the conversion of a unit at Drax from coal to biomass during the previous year.

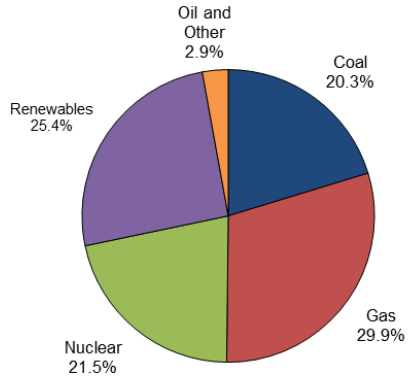
In 2016 Q2, gas fired generation increased by 51 per cent from 2015 Q2, up 11.9 TWh to 35.4 TWh.

Nuclear generation fell by 1.5 per cent from 16.9 TWh in 2015 Q2 to 16.7 TWh in 2016 Q2.

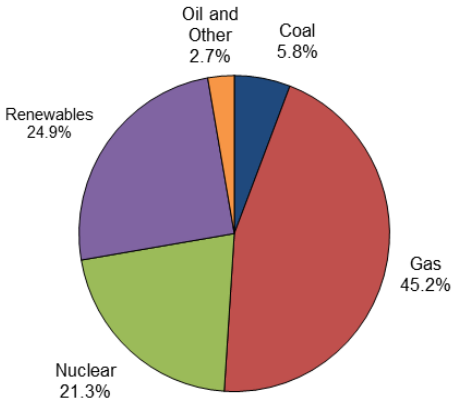
In 2016 Q2, wind and PV generation fell by 5.2 per cent from 11.5 TWh to 10.9 TWh. Wind generation was down by 14.7 per cent compared with a year ago, due to lower wind speeds (down by 1.0 knots compared to the same quarter a year earlier). Solar generation increased by 20 per cent due to increased capacity. Hydro generation fell 35 per cent from 1.4 TWh to 0.9 TWh due to a sharp decrease in average monthly rainfall.

Chart 5.2 Shares of electricity generation

Q2 2015



Q2 2016



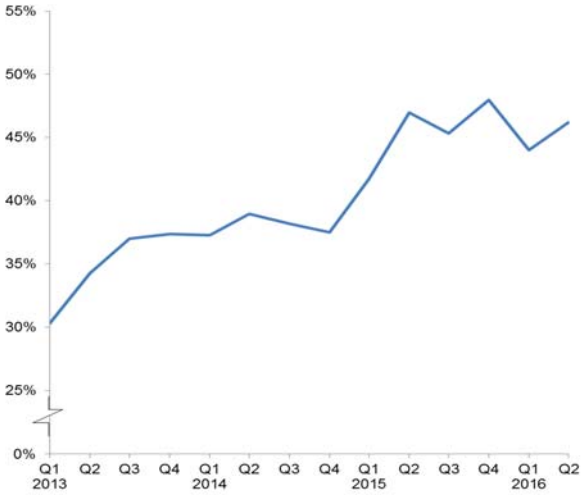
The share of generation from coal decreased from 20.3 per cent in 2015 Q2 to a record low of 5.8 per cent in 2016 Q2.

Gas' share of generation increased from 29.9 per cent in 2015 Q2 to 45.2 per cent in 2016 Q2.

Nuclear's share of generation remained broadly unchanged from 21.5 per cent in 2015 Q2 to 21.3 per cent in 2016 Q2.

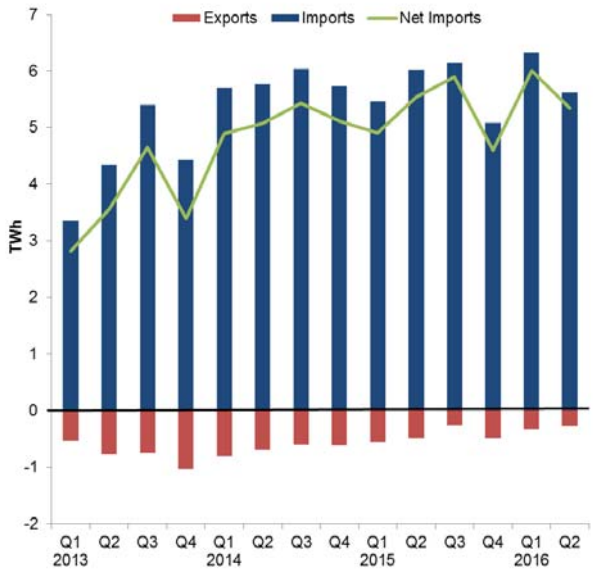
The share of renewables (hydro, wind and other renewables) fell from 25.4 per cent in 2015 Q2 to 24.9 per cent in 2016 Q2. This was due to a fall of 1.0 knots in the average wind speeds, a decrease in rainfall levels of 83.2 mm and a 1.2 hours per day drop in average daily sun hours. Despite the reduction in average daily sun hours, generation from solar actually increased by 20 per cent on 2015 Q2 due to a 29 per cent increase in capacity.

Chart 5.3 Low Carbon Electricity's share of generation



Despite the general upward trend in low carbon electricity's share of generation, the share dropped from 47.0 per cent in 2015 Q2 to 46.2 per cent in 2016 Q2, due to lower renewables and nuclear generation.

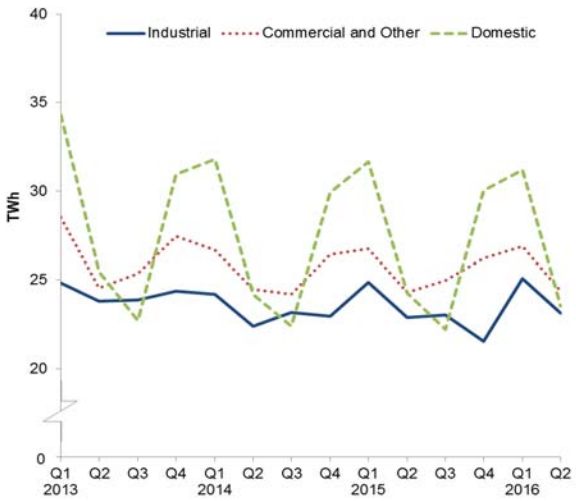
Chart 5.4 UK trade in electricity



In 2016 Q2, compared with the same period in 2015, imports of electricity fell by 6.7 per cent (-0.4 TWh), whilst exports fell by 43 per cent (-0.2 TWh). Following two quarters of being a net exporter (2009 Q4 and 2010 Q1), the UK has remained a net importer in each quarter since.

Net imports of electricity dropped by 3.5 per cent from 5.5 TWh in 2015 Q2 to 5.3 TWh in 2016 Q2. Net imports represented 6.4 per cent of electricity supplied in 2016 Q2.

Chart 5.5 Electricity final consumption



Final consumption of electricity fell by 0.6 per cent in 2016 Q2, from 71.4 TWh in 2015 Q2, to 71.0 TWh.

Domestic use fell by 3.0 per cent, from 24.3 TWh to 23.5 TWh, due to a slight increase in the average temperature compared to the same period in the previous year, as well as the positive impact of improved energy efficiency measures.

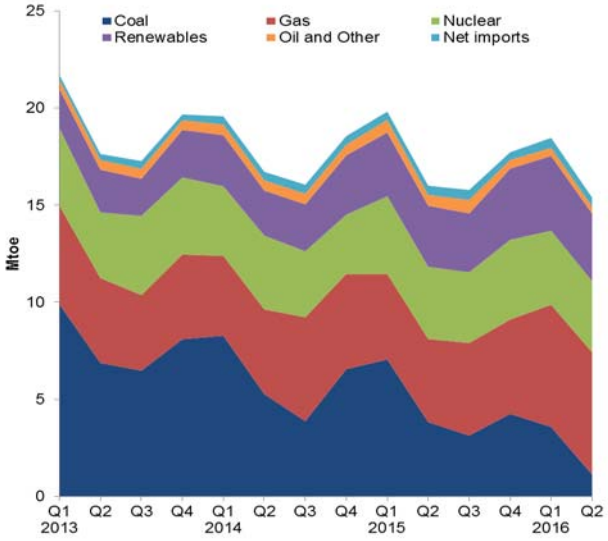
Industrial use of electricity, including iron and steel, rose by 1.1 per cent, from 22.9 TWh to 23.1 TWh, and consumption by commercial and other users [1] increased by 0.3 per cent, from 24.3 TWh to 24.4 TWh.

In 2016 Q2, temperatures were on average 0.2 degrees higher than in 2015 Q2.[2]

[1] Includes commercial, transport and other final users.

[2] Temperature data comes from ET 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 in 2016 Q2 fell by 3.8 per cent, from 16.0 mtoe in 2015 Q2 to 15.4 mtoe in 2016 Q2[3].

In 2016 Q2, gas use was 47 per cent higher than in 2015 Q2. Coal use during the quarter was 71 per cent lower than a year earlier, and nuclear sources were 1.5 per cent lower.

[3] 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.

Relevant tables

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5 ELECTRICITY

Table 5.1. Fuel used in electricity generation and electricity supplied

	2014	2015	*per cent change*	2014 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd 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*	5.27	3.88	6.55	7.05	3.82	3.13	4.25	3.57	1.12	*-70.7*
Oil	0.55	0.62	*+11.9*	0.16	0.13	0.12	0.16	0.12	0.18	0.16	0.15	0.11	*-9.5*
Gas	18.73	18.31	*-2.2*	4.36	5.35	4.91	4.41	4.28	4.77	4.86	6.29r	6.30	*+47.0*
Nuclear	13.85	15.48	*+11.8*	3.80	3.40	3.05	4.00	3.72	3.64	4.11	3.82	3.67	*-1.5*
Hydro	0.51	0.54	*+6.7*	0.10	0.07	0.15	0.17	0.12	0.09	0.16	0.18	0.08	*-35.0*
Wind and Solar [2]	3.10	4.12	*+32.9*	0.56	0.58	0.97	1.10	0.99	0.85	1.17	1.12	0.94	*-5.2*
Bioenergy [3]	6.82	8.46	*+24.2*	1.66	1.77	1.94	2.01	2.03	2.09	2.33	2.55r	2.46	*+20.9*
Other fuels	1.63	1.75	*+7.4*	0.37	0.42	0.43	0.50	0.44	0.52	0.29	0.27r	0.27	*-39.2*
Net imports	1.76	1.80	*+2.0*	0.44	0.47	0.44	0.42	0.48	0.51	0.40	0.52	0.46	*-3.5*
Total all generating companies	70.91	69.33	*-2.2*	16.72	16.05	18.56	19.82	16.00	15.78	17.73	18.47r	15.39	*-3.8*
ELECTRICITY GENERATED													
All generating companies												**TWh**	
Coal	100.23	75.63	*-24.5*	22.10	15.89	27.69	29.54	15.92	12.77	17.40	14.73r	4.57	*-71.3*
Oil	1.90	2.13	*+12.5*	0.50	0.44	0.41	0.62	0.43	0.58	0.50	0.45	0.40	*-8.3*
Gas	100.89	100.03	*-0.9*	23.77	29.15	26.23	23.70	23.47	26.58	26.29	34.83r	35.39	*+50.8*
Nuclear	63.75	70.34	*+10.3*	17.50	15.66	14.06	18.17	16.92	16.56	18.69	17.34	16.66	*-1.5*
Hydro (natural flow)	5.89	6.29	*+6.7*	1.11	0.78	1.75	2.01	1.43	1.03	1.82	2.08r	0.93	*-35.0*
Wind and Solar [2]	36.01	47.87	*+33.0*	6.56	6.70	11.22	12.81	11.48	9.93	13.66	13.00r	10.88	*-5.2*
- of which, Offshore [6]	13.40	17.42	*+30.0*	2.09	2.24	4.69	4.68	3.58	3.41	5.76	5.15r	3.25	*-9.1*
Bioenergy [3]	22.68	29.39	*+29.6*	5.47	5.94	6.69	7.00	7.06	7.10	8.24	8.37r	7.71	*+9.2*
Pumped Storage	2.88	2.74	*-5.0*	0.67	0.63	0.79	0.72	0.65	0.65	0.71	0.76	0.69	*+6.1*
Other fuels	3.94	4.66	*+18.4*	0.95	0.99	1.01	1.20	1.16r	1.18r	1.12r	1.14	1.07	*-8.1*
Total all generating companies	338.17	339.10	*+0.3*	78.65	76.17	89.85	95.78	78.52	76.37	88.43	92.68r	78.28	*-0.3*
ELECTRICITY SUPPLIED [4]													
All generating companies												**TWh**	
Coal	95.07	71.75	*-24.5*	20.96	15.07	26.26	28.03	15.11	12.11	16.50	13.97r	4.33	*-71.3*
Oil	1.72	1.94	*+12.5*	0.46	0.40	0.37	0.57	0.39	0.53	0.45	0.40	0.36	*-8.8*
Gas	99.00	98.16	*-0.9*	23.33	28.62	25.74	23.26	23.01	26.08	25.81	34.26r	34.74	*+51.0*
Nuclear	57.90	63.89	*+10.3*	15.90	14.22	12.77	16.51	15.37	15.04	16.98	15.75	15.13	*-1.5*
Hydro	5.84	6.24	*+6.9*	1.10	0.77	1.74	2.00	1.41	1.02	1.81	2.06r	0.92	*-35.1*
Wind and Solar [2]	36.01	47.87	*+32.9*	6.56	6.70	11.22	12.81	11.48	9.93	13.66	13.00r	10.88	*-5.2*
- of which, Offshore [6]	13.40	17.42	*+30.0*	2.09	2.24	4.69	4.68	3.58	3.41	5.76	5.15r	3.25	*-9.2*
Bioenergy [3]	19.59	25.53	*+30.3*	4.72	5.14	5.80	6.07	6.12	6.16	7.17	7.28r	6.69	*+9.3*
Pumped Storage (net supply) [5]	-1.01	-0.98	*-3.0*	-0.25	-0.24	-0.26	-0.25	-0.23	-0.25	-0.25	-0.27r	-0.26	*+11.7*
Other fuels	3.68	4.32	*+17.3*	0.89	0.92	0.94	1.11	1.07	1.09	1.04	1.05r	0.99	*-8.2*
Net imports	20.52	20.94	*+2.0*	5.08	5.43	5.12	4.91	5.54	5.89	4.60	6.00	5.35	*-3.5*
Total all generating companies	338.33	339.65	*+0.4*	78.75	77.04	89.71	95.00	79.28	77.60	87.77	93.51r	79.12	*-0.2*

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 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	*Per cent change*[1]
SUPPLY													
Indigenous production	338,175	339,095	*+0.3*	78,649	76,171	89,851	95,782	78,518	76,371	88,425	92,684r	78,277	*-0.3*
Major power producers[2 3]	297,939	293,003	*-1.7*	68,844	66,368	79,522	84,255	66,555	64,840	77,353	80,598r	65,651	*-1.4*
Auto producers	37,352	43,353	*+16.1*	9,134	9,175	9,535	10,805	11,313	10,878	10,358	11,322	11,937	*+5.5*
Other sources[4]	2,883	2,739	*-5.0*	671	628	793	723	650	653	714	764	689	*+6.1*
Imports	23,243	22,716	*-2.3*	5,770	6,036	5,737	5,462	6,023	6,152	5,080	6,334	5,622	*-6.7*
Exports	2,723	1,778	*-34.7*	694	604	618	555	484	259	480	331	275	*-43.1*
Transfers	-	-		-	-	-	-	-	-	-	-	-	
Total supply	358,694	360,034	*+0.4*	83,725	81,604	94,970	100,689	84,056	82,263	93,025	98,688r	83,623	*-0.5*
Statistical difference	-1,210	1,671		-477	-334	-153	504	419	284	464	-123r	317	
Total demand	359,905	358,363	*-0.4*	84,201	81,938	95,123	100,186	83,637	81,979	92,560	98,811r	83,306	*-0.4*
TRANSFORMATION	-	-		-	-	-	-	-	-	-	-	-	
Energy industry use[5]	28,387	28,160	*-0.8*	6,972	6,503	7,278	7,603	6,677	6,662	7,218	7,086r	6,371	*-4.6*
Losses	28,651	27,458	*-4.2*	6,168	5,621	8,521	9,307	5,525	5,088	7,538	8,580r	5,901	*+6.8*
FINAL CONSUMPTION	302,867	302,745	-	71,061	69,813	79,324	83,276	71,436	70,229	77,805	83,144r	71,033	*-0.6*
Iron & steel	3,787	3,688	*-2.6*	945	937	949	990	935	887	875	868	864	*-7.7*
Other industries	88,978	88,659	*-0.4*	21,447	22,251	22,027	23,872	21,951	22,143	20,693	24,205r	22,275	*+1.5*
Transport	4,504	4,476	*-0.6*	1,126	1,126	1,126	1,119	1,119	1,119	1,119	1,119	1,119	-
Domestic	108,324	108,157	*-0.2*	24,192	22,407	29,929	31,657	24,257	22,214	30,029	31,199r	23,530	*-3.0*
Other final users	97,274	97,765	*+0.5*	23,350	23,093	25,293	25,637	23,173	23,866	25,089	25,754r	23,245	*+0.3*
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

Section 6 – Renewables

Key results show:

Renewables' share of electricity generation was 24.9 per cent in 2016 Q2, down by 0.5 percentage points on the share in 2015 Q2. This was despite increased renewable capacity and was largely due to less favourable weather conditions for renewable generation (lower wind speeds and rainfall). **(Chart 6.1)**

Renewable electricity generation was 19.5 TWh in 2016 Q2, a decrease of 2.2 per cent on the 20.0 TWh in 2015 Q2, and 17.7 per cent lower than the peak quarterly generation of 2015 Q4 (23.7 TWh). **(Chart 6.2)**

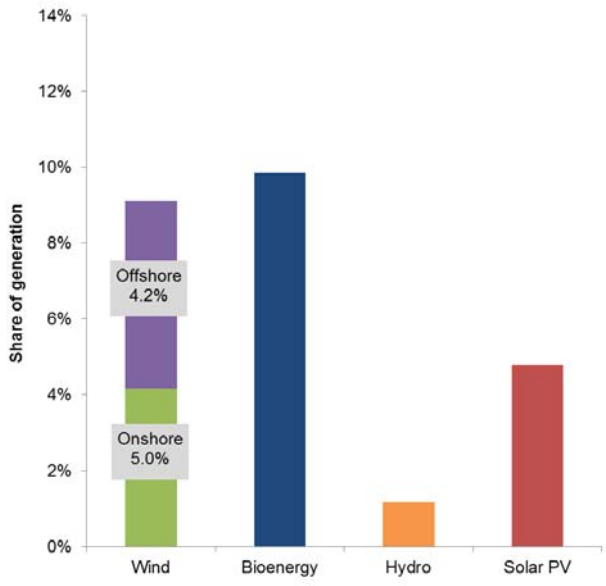
Onshore wind generation decreased by 18.8 per cent, from 4.8 TWh in 2015 Q2 to 3.9 TWh in 2016 Q2. Offshore wind decreased from 3.6 TWh to 3.3 TWh, a decrease of 9.1 per cent. Solar PV generation increased by 20 per cent, from 3.1 TWh to 3.8 TWh due to increased capacity **(Chart 6.2)**

Renewable electricity capacity was 32.5 GW at the end of 2016 Q2, a 13.8 per cent increase (3.9 GW) on a year earlier, and a 1.0 per cent (0.3 GW) increase on the previous quarter, with high annual growth in solar photovoltaics, onshore wind and plant biomass capacity. **(Chart 6.3)**

By the end of 2016 Q2, 5,328 MW 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 16 per cent of all renewable installed capacity. **(Chart 6.5)**

Liquid biofuels consumption rose by 16.3 per cent, from 355 million litres in 2015 Q2 to 413 million litres in 2016 Q2, with a 44 per cent increase in biodiesel consumption. In 2016 Q2, liquid biofuels represented 3.4 per cent of petrol and diesel consumed in road transport, up from 3.0 per cent a year earlier. **(Chart 6.6)**

Chart 6.1 Renewables' share of electricity generation



Renewables' share of electricity generation decreased from 25.4 per cent in 2015 Q2 to 24.9 per cent in 2016 Q2.[1] Compared to 2016 Q1, renewables share was 0.4 percentage points lower.

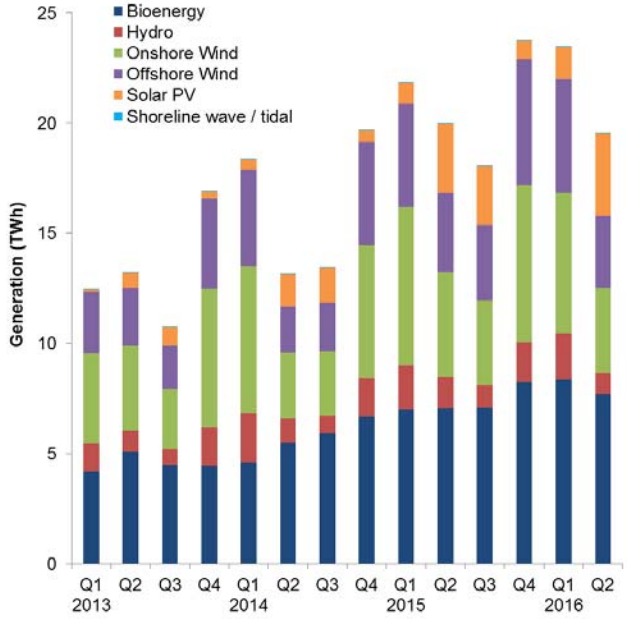
The decreased share on a year earlier mostly reflects less favourable weather conditions for renewable generation in 2016 Q2 compared to a year before.

Total electricity generated from renewables in 2016 Q2 was 19.5 TWh, a decrease of 0.4 TWh (2.2 per cent) compared to 2015 Q2. This is 4.2 TWh (17.7 per cent) lower than the record of 23.7 TWh in 2015 Q4.

Overall electricity generation was slightly lower in 2016 Q2 (78.3 TWh) compared to 2015 Q2 (78.5 TWh). This small decrease had a negligible impact on the share of renewable generation.

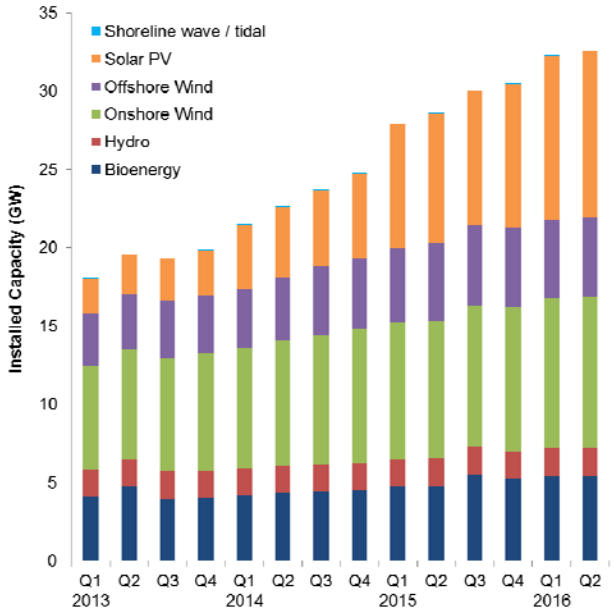
[1] Total electricity generation figures (all generating companies) can be found in table ET 5.1, at: www.gov.uk/government/statistics/electricity-section-5-energy-trends

Chart 6.2 Renewable electricity generation



To note that the solar PV (and onshore wind) figures not only include installations confirmed on the FiTs scheme, but also any sub 50 kW installations commissioned, and registered on the Microgeneration Certification Scheme, that are awaiting confirmation on FiTs (as well as any capacity not supported by FiTs).

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



Electricity generated from onshore wind decreased by 0.9 TWh (18.8 per cent) between 2015 Q2 and 2016 Q2, from 4.8 TWh to 3.9 TWh, while generation from offshore wind decreased by 9.1 per cent on a year earlier, from 3.6 TWh to 3.3 TWh. This is due to lower wind speeds compared to last year, with increased wind capacity failing to offset the less favourable weather conditions.

Average wind speeds in 2016 Q2 were 7.7 knots, 0.7 knots lower than the ten year mean for quarter two (at 8.4 knots), and 1.0 knots lower than a year earlier.[2]

Generation from solar photovoltaics (PV) showed the largest percentage increase of all renewables in 2016 Q2 compared to a year before, increasing by 20 per cent from 3.1 TWh to 3.8 TWh. This was largely due to increased capacity, which offset the lower average sun hours. Average sun hours amounted to 5.6 hours per day in 2016 Q2, 0.9 hours lower than the ten year mean for quarter two (6.5 hours).

In 2016 Q2, hydro generation fell by 35 per cent on a year earlier, from 1.4 TWh to 0.9 TWh, with average rainfall (in the main hydro areas) down by 26 per cent on a year earlier, following a 52 per cent fall in March 2016.

Generation from bioenergy[3] increased by 9.2 per cent, from 7.1 TWh in 2015 Q2 to 7.7 TWh in 2016 Q2. The main contributor to this was plant biomass, which increased from 4.4 TWh to 5.0 TWh, largely due to an increase in capacity, including the conversion of a third unit at Drax, to high-range co-firing, in July 2015.

In 2016 Q2, bioenergy had a 40 per cent share of generation, with 20 per cent from onshore wind, 17 per cent from offshore wind, and 19 per cent from solar.

At the end of 2016 Q2, the UK's renewable electricity capacity totalled 32.5 GW, an increase of 0.9 per cent (0.3 GW) on that installed at the end of 2016 Q1, and 13.8 per cent (3.9 GW) on that installed a year earlier.

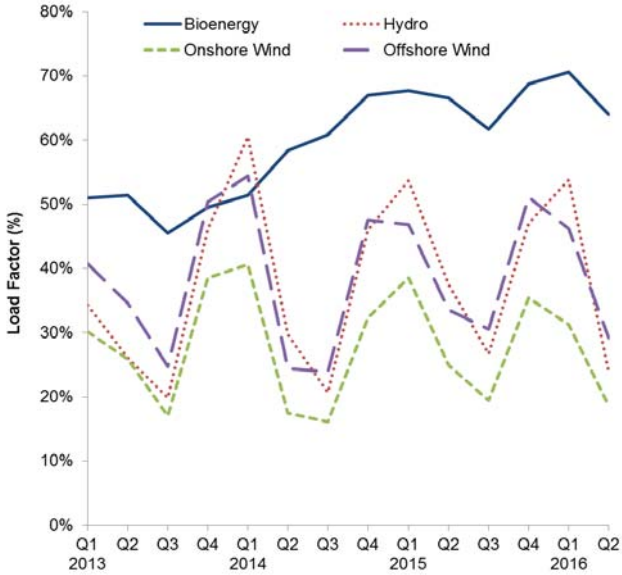
Of the 0.3 GW increase in capacity during 2016 Q2, 226 MW came from solar PV, with the remainder from new onshore wind installations, including the first capacity at the Black Law extension. Around 152 MW of solar came from large-scale schemes accredited (or awaiting accreditation) under the Renewables Obligation, with 74 MW from smaller-scale Feed in Tariff eligible schemes. At the end of 2016 Q2, solar PV represented 33 per cent of all renewable capacity.

At the end of 2016 Q2, solar PV had the largest share of capacity (33 per cent), followed by onshore wind (30 per cent), bioenergy (17 per cent) and offshore wind (16 per cent).

[2] Statistics on weather (temperature, wind speeds, rainfall and sun levels) can be found in tables ET 7.1 – 7.4, at: www.gov.uk/government/statistics/energy-trends-section-7-weather

[3] Bioenergy consists of: landfill gas, sewage gas, biodegradable municipal solid waste, plant biomass, animal biomass, anaerobic digestion and co-firing (generation only)

Chart 6.4 Renewable electricity load factors



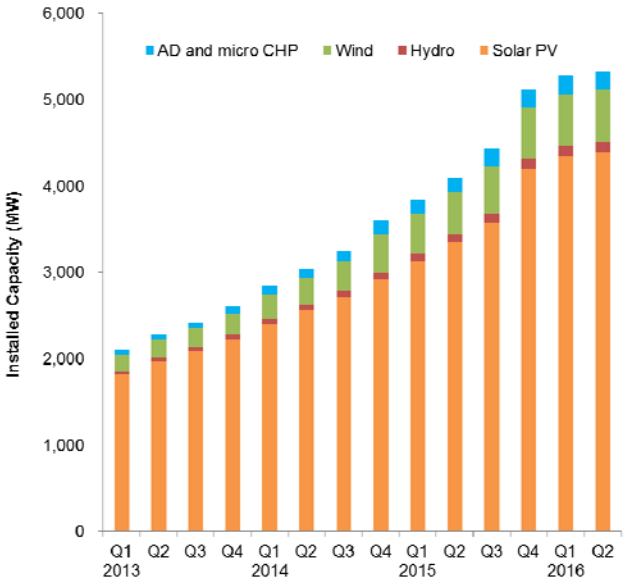
In 2016 Q2, onshore wind's load factor fell by 6.4 percentage points, from 25.0 per cent in 2015 Q2 to 18.6 per cent, due to the lower wind speeds. Offshore wind's load factor decreased by 4.3 percentage points, from 33.5 per cent in 2015 Q2 to 29.2 in 2016 Q2. [4]

Compared with the record high levels [5] of 2016 Q1, onshore wind's load factor was down by 12.7 percentage points, while offshore wind's load factor was 17.0 percentage points lower, with wind speeds 2.1 knots lower.

Hydro's load factor in 2016 Q2 decreased by 13.6 percentage points, from 37.5 per cent in 2015 Q2 to 23.9 per cent, the lowest since 2014 Q3, due to lower rainfall. Compared with 2016 Q1, hydro's load factor in 2016 Q2 was 30 percentage points lower, with 50 per cent less rainfall in the main hydro areas.

For bioenergy, the load factor in 2016 Q2, at 64 per cent, was down by 2.6 percentage points on a year earlier, and down by 6.6 percentage points on 2016 Q1. This was due to several biomass sites being on outage for maintenance in 2016 Q2.

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



At the end of 2016 Q2, 5,328 MW of capacity was installed and eligible for the GB Feed in Tariff (FiT) scheme[6]. This was a 30 per cent increase on that at the end of 2015 Q2. [7]

In terms of number of installations, at the end of 2016 Q2, there were over 876,000 installed and eligible for the FiT scheme, a 21 per cent increase on the number installed a year earlier.

Solar photovoltaics (PVs) represent the majority of both installations and installed capacity on FiTs, with, respectively, 99 per cent and 82 per cent of the total. The majority of FiT-eligible PV installations are sub-4 kW retrofitted schemes, 2,386 MW (54 per cent) in 2016 Q2.

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

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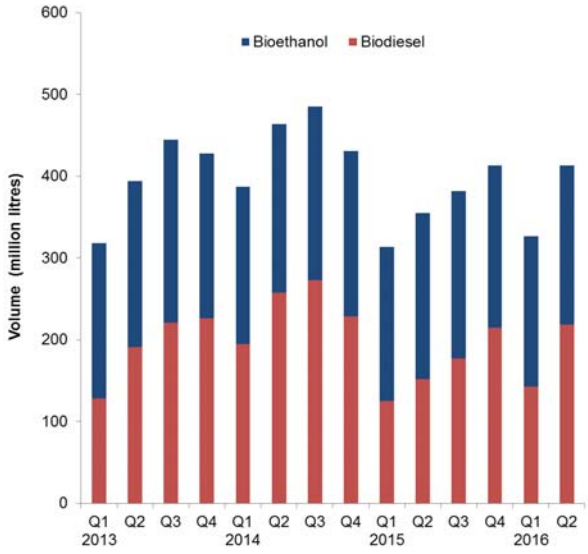
[4] Load Factors are calculated using an average of capacity at the start and end of the quarter. Therefore, they can be influenced by the time in the quarter when any new capacity came online.

[5] Quarterly load factors for renewables have been calculated since 2010 Q1.

[6] The data are taken from the MCS and ROOFIT database which is the first stage towards registering for the FIT scheme. Not all installations will eventually be confirmed onto the FIT scheme.

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

Chart 6.6 Liquid biofuels for transport consumption



In 2016 Q2, 413 million litres of liquid biofuels were consumed in transport, a rise of 16.3 per cent on the total in 2015 Q2 (355 million litres). This was mostly due to a rise in biodiesel consumption.

In 2016 Q2, biodiesel accounted for 2.9 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, 0.4 percentage points higher than 2015 Q2's share.

Bioethanol consumption fell by 4.4 per cent, from 203 million litres in 2015 Q2 to 194 million litres in 2016 Q2. Biodiesel consumption rose by 67 million litres (44 per cent), to 219 million litres in the same period and increased from 2016 Q1 by 76 million litres (53 per cent).

In 2016 Q2, biodiesel contributed the largest share of biofuels consumption, with 53 per cent. Bioethanol represented 47 per cent of biofuels consumption.

Relevant tables

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6 RENEWABLES

Table 6.1. Renewable electricity capacity and generation

	2014	2015	per cent change	2014 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd quarter	2015 4th quarter	2016 1st quarter	2016 2nd quarter p	per cent change [11]
Cumulative Installed Capacity [1]												**MW**	
Onshore Wind	8,536r	9,188	*+7.6*	8,003	8,263	8,536	8,708	8,807	9,003	9,188	9,498r	9,558	*+8.5*
Offshore Wind	4,501	5,104	*+13.4*	4,084	4,420	4,501	4,749	5,024	5,104	5,104	5,095r	5,095	*+1.4*
Shoreline wave / tidal	9	9	*+2.9*	9	9	9	9	9	9	9	8	8	*-9.2*
Solar photovoltaics	5,424	9,188	*+69.4*	4,429	4,841	5,424	7,930	8,224	8,581	9,188	10,413	10,638	*+29.4*
Small scale Hydro	252r	282	*+12.0*	242	245	252	261	267	272	282	302r	303	*+13.5*
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*	1,054	1,057	1,058	1,061	1,061	1,061	1,061	1,061r	1,061	-
Sewage sludge digestion	215r	216	*+0.4*	212	212	215	216	216	216	216	235	235	*+8.9*
Energy from waste	681r	925	*+35.9*	621	630	681	826	834	902	925	980r	980	*+17.4*
Animal Biomass (non-AD) [2]	111	111	-	111	111	111	111	111	111	111	111	111	-
Anaerobic Digestion	238r	286	*+20.2*	197	207	238	260	263	284	286	315r	315	*+19.7*
Plant Biomass [3]	2,245r	2,619	*+16.7*	2,145	2,225	2,245	2,297	2,298	2,976	2,619	2,749r	2,749	*+19.6*
Total	24,746r	30,465	*+23.1*	22,583	23,695	24,746	27,904	28,592	29,994	30,465	32,243r	32,529	*+13.8*
Co-firing [4]	15	21	*+37.6*	15	15	15	21	21	21	21	7	7	*-66.5*
Generation [5]												**GWh**	
Onshore Wind [6]	18,562	22,887	*+23.3*	2,994	2,897	6,002	7,182	4,775	3,825	7,106	6,394r	3,877	*-18.8*
Offshore Wind [6, 7]	13,404	17,423	*+30.0*	2,092	2,242	4,686	4,676	3,578	3,412	5,757	5,147r	3,251	*-9.1*
Shoreline wave / tidal [6]	2	2	*-10.0*	1	0	1	1	0	0	0	0	0	-
Solar photovoltaics [6]	4,040	7,561	*+87.2*	1,475	1,558	536	951	3,125	2,690	795	1,454r	3,751	*+20.0*
Hydro [6]	5,893	6,289	*+6.7*	1,114	784	1,753	2,012	1,426	1,028	1,823	2,079r	927	*-35.0*
Landfill gas [6]	5,045	4,872	*-3.4*	1,266	1,245	1,266	1,240	1,212	1,201	1,220	1,191r	1,170	*-3.5*
Sewage sludge digestion [6]	846	888	*+4.9*	228	212	211	223	231	215	219	223r	236	*+2.0*
Energy from waste [8]	1,923	2,782	*+44.7*	471	491	486	656	653	736	737	731r	669	*+2.5*
Co-firing with fossil fuels	133	183	*+37.6*	37	37	34	36	36	57	55	51r	11	*-70.5*
Animal Biomass (non-AD) [2, 6]	614	648	*+5.5*	161	132	162	170	171	142	165	170r	166	*-3.2*
Anaerobic Digestion	1,019	1,429	*+40.2*	245	258	286	323	346	364	396	411r	416	*+20.3*
Plant Biomass [3, 6]	13,105	18,587	*+41.8*	3,064	3,565	4,242	4,351	4,409	4,383	5,443	5,589r	5,043	*+14.4*
Total	64,584	83,550	*+29.4*	13,150	13,420	19,665	21,819	19,961	18,053	23,717	23,440r	19,517	*-2.2*
Non-biodegradable wastes [9]	1,923	2,784	*+44.7*	471	491	486	656	653	737	738	731r	669	*+2.4*
Load Factors [10]													
Onshore Wind	26.4%	29.5%		17.5%	16.1%	32.4%	38.6%	25.0%	19.5%	35.4%	31.3%	18.6%	
Offshore Wind	37.3%	41.4%		24.4%	23.9%	47.6%	46.8%	33.5%	30.5%	51.1%	46.2%	29.2%r	
Solar photovoltaics	11.1%	11.8%		15.8%	15.2%	4.7%	6.6%	17.7%	14.5%	4.1%	6.8%	16.3%	
Hydro	39.1%	41.2%		29.7%	20.6%	46.0%	53.7%	37.5%	26.7%	47.1%	53.8%	23.9%r	
Landfill gas	54.8%	52.5%		55.0%	53.4%	54.3%	54.2%	52.3%	51.2%	52.1%	51.4%	50.5%r	
Sewage sludge digestion	46.6%	46.9%		49.4%	45.2%	44.7%	47.8%	48.9%	45.0%	45.8%	45.3%	45.8%r	
Energy from waste	35.8%	39.6%		35.5%	35.5%	33.6%	40.3%	36.0%	38.4%	36.5%	35.1%	31.3%r	
Animal Biomass (non-AD)	63.4%	66.9%		66.7%	54.1%	66.4%	71.1%	70.9%	58.1%	67.7%	70.4%	68.7%r	
Anaerobic Digestion	58.0%	62.2%		58.2%	57.8%	58.1%	59.9%	60.5%	60.3%	63.0%	62.6%	60.5%r	
Plant Biomass	71.2%	87.2%		67.2%	73.9%	86.0%	88.7%	87.9%	75.3%	88.1%	95.3%	84.0%r	
Total (excluding co-firing and non-biodegradable wastes)	33.0%	34.5%		27.2%	26.2%	36.7%	38.3%	32.3%	27.8%	35.5%	34.2%	27.6%r	

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 2nd quarter	2014 3rd quarter	2014 4th quarter	2015 1st quarter	2015 2nd quarter	2015 3rd Quarter	2015 4th Quarter	2016 1st quarter	2016 2nd quarter p	*per cent change* [1]
Volume (million litres)												**Million litres**	
Bioethanol	812	795	*-2.1*	206	212	202	189	203	205	198	184	194	*-4.4%*
Biodiesel	955	669	*-29.9*	258	273	229	125	152	177	215	143	219	*44.1%*
Total biofuels for transport	1,767	1,464	*-17.1*	464	485	431	314	355	382	413	327	413	*16.3%*
Energy (thousand toe)													
Bioethanol	458	448	*-2.1*	116	120	114	107	114	116	112	104	109	*-4.4%*
Biodiesel	785	550	*-29.9*	212	224	188	103	125	145	177	117	180	*44.1%*
Total biofuels for transport	1,242	998	*-19.7*	328	344	302	209	239	261	288	221	289	*20.9%*
Shares of road fuels													
Bioethanol as per cent of Motor Spirit	4.6%	4.6%		4.5%	4.8%	4.6%	4.6%	4.6%	4.7%	4.5%	4.5%	4.4%	
Biodiesel as per cent of DERV	3.4%	2.3%		3.7%	3.9%	3.1%	1.8%	2.1%	2.4%	2.9%	2.0%	2.9%	
Total biofuels as per cent of road fuels	3.9%	3.2%		4.0%	4.2%	3.7%	2.9%	3.0%	3.3%	3.5%	2.9%	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 - percentage point change on previous year (-ve value is decrease)												
Bioethanol as per cent of Motor Spirit	0.0%	0.0%	0.2%	-0.1%	0.1%	0.1%	0.1%	-0.1%	0.0%	-0.1%	-0.2%	
Biodiesel as per cent of DERV	0.6%	-1.1%	0.9%	0.6%	-0.1%	-1.1%	-1.6%	-1.4%	-0.3%	0.2%	0.8%	
Total biofuels as per cent of road fuels	0.4%	-0.7%	0.6%	0.3%	0.0%	-0.7%	-1.0%	-0.9%	-0.2%	0.0%	0.4%	

Renewable electricity in Scotland, Wales, Northern Ireland and the regions of England in 2015

Introduction

This article updates that published in the September 2015 edition of *Energy Trends* on the amount of electricity from renewable sources, disaggregated below UK level. It includes information on capacity, generation and number of operational sites, as well as derived load factors, for the four UK countries, and the nine English regions.[1] In addition, from 2014, statistics are also available at Local Authority level. [2] [3]

The data are consistent with that published for the UK as a whole in Table 6.4 of the Digest of United Kingdom Energy Statistics 2016 (DUKES), and use similar categories. [4] The data covers all renewable electricity schemes, including those accredited under the Renewables Obligation (RO) and Feed in Tariff (FiT) support mechanisms, as well as those not eligible, such as large-scale hydro (commissioned before 1 April 2002), and Energy from Waste (non-CHP) schemes.

The tables in this, and previous *Energy Trends* articles, show snapshots of the position as at the time of publication, for the latest year (2015 in this case). Consistent time-series data for each year from 2003 (comparable to the data shown in Tables 1 to 3) are available as Excel spreadsheets at: www.gov.uk/government/statistics/regional-renewable-statistics.

Key points – 2015:

- England had the most renewable capacity and generation, largely due to the three biomass units (including one high-range co-firing) at Drax in Yorkshire and the Humber.
- Scotland had the highest capacity and generation per £ of GVA.
- The highest technology growth in capacity was solar PV, notably in South-West England, driven by large-scale schemes (supported by the Renewables Obligation).
- For the first time (in 16 years), England had the highest onshore wind load factor (and Scotland the lowest).

UK country summary

Table 1 and Chart 1 show that there were 4,945 non-PV sites in England generating electricity from renewable sources, with 3,611 non-PV sites in Scotland, 812 in Wales and 902 in Northern Ireland. In addition, there were 639,979 PV sites reported for England, 49,913 for Scotland, 48,850 for Wales and 18,712 for Northern Ireland. No geographical information was available for a further 85,383 PV schemes, 488 wind schemes, 80 hydro schemes and 44 other bioenergy (including anaerobic digestion) schemes.

In capacity terms, England had almost two and a half times more renewable electricity capacity than Scotland (Table 2 and Chart 3). This is mainly because of England's considerable bioenergy (90 per cent of the UK's bioenergy capacity) and PV capacity (85 per cent of the UK's PV capacity). Generation from renewable sources in England during 2015 was similarly higher than Scotland, with the higher utilisation rates of bioenergy offset by the lower rates of, the more intermittent, solar PV (which accounted for 12 per cent of English renewable generation).

[1] Offshore wind is allocated to the region to which its output is connected. The exception is Robin Rigg which comes ashore at Seaton, Cumbria but whose generation is associated with Scotland.
[2] Part of the tables published by BEIS that show a range of renewable electricity data for the devolved administrations and the regions of England: www.gov.uk/government/statistics/regional-renewable-statistics
[3] Where disclosure of confidential generation data was likely at the site level, this has been addressed, where possible, by replacing this with data from publicly available sources. Where this is not possible, the data has been removed, and added to the unallocated row at the bottom of the Local Authority listings.
[4] On occasion, it has been necessary to combine some renewable sources into categories so that information about individual sites provided in confidence (rather than from publicly available sources) to Ricardo Energy & Environment and the Department for Business, Energy & Industrial Strategy (BEIS) is not disclosed.

Table 1: Number of sites generating electricity from renewable sources, 2015[1]

	Wind[2]	Wave and tidal	Solar PV	Hydro	Landfill gas	Sewage gas	Other bioenergy[3]	Total excluding PV	**Total**
England	**3,726**	**2**	**639,979**	**276**	**361**	**161**	**419**	**4,945**	**644,924**
East Midlands	378	-	74,784	25	39	15	59	516	**75,300**
East of England	848	-	90,318	6	69	14	50	987	**91,305**
North East	254	-	41,600	11	19	7	16	307	**41,907**
North West	464	-	74,856	51	49	24	60	648	**75,504**
London	31	-	19,943	-	5	8	16	60	**20,003**
South East	105	-	96,814	18	70	32	42	267	**97,081**
South West	744	1	107,726	106	39	17	57	964	**108,690**
West Midlands	164	-	60,757	20	30	19	67	300	**61,057**
Yorkshire and the Humber	738	1	73,181	39	41	25	52	896	**74,077**
Northern Ireland	**780**	**1**	**18,712**	**61**	**15**	**2**	**43**	**902**	**19,614**
Scotland	**3,041**	**10**	**49,913**	**459**	**46**	**8**	**47**	**3,611**	**53,524**
Wales	**564**	**-**	**48,850**	**189**	**24**	**16**	**19**	**812**	**49,662**
Other Sites	488	-	85,383	80	-	-	44	612	**85,995**
UK Total	**8,599**	**13**	**842,837**	**1,065**	**446**	**187**	**572**	**10,882**	**853,719**

Table 2: Installed capacity of sites generating electricity from renewable sources, 2015[1]

	Wind[2]	Wave and tidal	Solar PV	Hydro	Landfill gas	Sewage gas	Other bioenergy	**MW Total**
England	**6,559.5**	**0.1**	**7,775.0**	**33.5**	**878.8**	**196.1**	**3,531.4**	**18,974.4**
East Midlands	786.6	-	1,004.7	4.5	67.9	20.2	135.0	**2,018.9**
East of England	1,461.7	-	1,499.7	0.1	185.5	17.4	177.0	**3,341.5**
North East	433.6	-	142.4	7.8	44.6	11.5	167.8	**807.8**
North West	1,449.1	-	326.2	6.4	134.8	27.0	201.3	**2,144.9**
London	11.2	-	82.1	-	25.8	38.6	191.7	**349.4**
South East	1,161.9	-	1,516.7	0.7	166.6	28.7	274.1	**3,148.8**
South West	283.5	-	2,334.8	9.9	100.5	13.6	81.4	**2,823.7**
West Midlands	7.6	-	493.7	1.1	60.9	22.8	155.3	**741.3**
Yorkshire and the Humber	964.5	0.1	374.6	2.9	92.1	16.3	2,147.7	**3,598.2**
Northern Ireland	**730.7**	**1.2**	**105.3**	**9.1**	**18.9**	**0.2**	**58.1**	**923.6**
Scotland	**5,564.9**	**7.6**	**213.1**	**1,531.9**	**116.3**	**7.0**	**234.5**	**7,675.3**
Wales	**1,358.0**	**-**	**626.4**	**161.1**	**47.2**	**13.1**	**90.8**	**2,296.5**
Other Sites	78.0	0.0	467.6	23.0	0.0	0.0	26.5	**595.2**
UK Total	**14,291.1**	**8.9**	**9,187.4**	**1,758.7**	**1,061.3**	**216.3**	**3,941.2**	**30,465.0**
Co-firing[4]							20.9	**20.9**

For notes to Table 1 and 2, see below Table 3.

Table 3: Generation of electricity from renewable sources, 2015[1]

	Wind[2]	Wave and tidal	Solar PV	Hydro	Landfill gas	Sewage gas	Other bioenergy[5]	GWh Total
England	**20,917.0**	**-**	**6,570.3**	**102.5**	**4,106.4**	**808.7**	**21,487.6**	**53,992.5**
East Midlands	2,478.9	-	826.5	13.5	299.5	86.9	680.0	**4,385.3**
East of England	4,999.0	-	1,282.6	0.3	852.3	76.4	1,041.2	**8,251.8**
North East	1,196.7	-	111.7	33.6	159.1	47.7	742.5	**2,291.3**
North West	5,032.7	-	259.1	19.3	493.7	132.5	819.7	**6,757.0**
London	20.1	-	70.0	-	169.0	81.3	648.2	**988.7**
South East	4,009.7	-	1,332.7	1.9	888.8	136.1	947.8	**7,317.0**
South West	670.5	-	2,000.0	23.2	473.4	49.6	268.7	**3,485.4**
West Midlands	15.7	-	395.6	3.1	334.0	121.0	2,669.9	**3,539.3**
Yorkshire and the Humber	2,493.9	-	292.1	7.4	436.6	77.1	13,669.6	**16,976.7**
Northern Ireland	**1,859.6**	**0.0**	**78.7**	**29.0**	**83.2**	**0.6**	**185.8**	**2,236.9**
Scotland	**13,833.5**	**2.0**	**173.9**	**5,757.1**	**503.4**	**26.2**	**1,331.4**	**21,627.4**
Wales	**3,546.9**	**-**	**524.9**	**351.6**	**179.2**	**52.1**	**527.9**	**5,182.6**
Other Sites	152.7	-	213.0	48.6	-	-	95.9	**510.2**
UK Total	**40,309.7**	**2.0**	**7,560.8**	**6,288.8**	**4,872.2**	**887.6**	**23,628.6**	**83,549.6**

Notes to Tables 1 to 3
Components may not add exactly to totals because of rounding.
1 As at 31 December 2015.
2 Offshore Wind is allocated to regions/countries according to where the cabling comes ashore.
3 Six of these sites are sites that co-fire renewables with fossil fuels (see also note 4, below).
4 This is the proportion of non-fossil fuelled capacity used for co-firing of renewables based on the proportion of generation accounted for by the renewable source. This estimate has not been disaggregated into regional values since the figure will vary annually, and is not dedicated renewable capacity.
5 Includes bioenergy sources co-fired with fossil fuels.

Regional analysis

In England, the number of sites (excluding PV) in each region varies from 60 in London to 987 in the East of England (Table 1 and Chart 2). The highest capacity in England (including PV) is in Yorkshire and the Humber, followed by East of England and the South East (Table 2 and Chart 4). In Yorkshire and the Humber, 60 per cent of capacity is from other bioenergy (mostly from Drax dedicated biomass), 27 per cent from wind and 10 per cent is from PV. In the East of England, 44 per cent of capacity is from wind (mostly offshore), 45 per cent from PV, and 6 per cent from landfill gas. In the South East, 48 per cent of capacity is from PV, 37 per cent from wind and 9 per cent from other bioenergy.

The East of England has 17 per cent of the UK's landfill gas capacity. The South East (with 16 per cent of the UK's landfill gas capacity), and the North West (with 13 per cent of the UK's landfill gas capacity), are the other English regions with notably large shares. The East of England, North West and the South East regions together accounted for 46 per cent of UK generation from landfill gas.

England has 85 per cent of the total UK solar capacity and 87 per cent of the total UK generation. The South West accounts for 25 per cent of the total UK solar capacity (26 per cent of the generation), the South East 17 per cent (18 per cent of the generation) and the East of England 16 per cent (17 per cent of the generation), reflecting the increased solar irradiance in these areas[5].

[5] JRC Solar radiation and photovoltaic electricity potential http://re.jrc.ec.europa.eu/pvgis/cmaps/eu_cmsaf_opt/G_opt_UK.png. More detailed analysis also available from Met Office www.metoffice.gov.uk/renewables/solar

Chart 1: Number of sites by country[1]

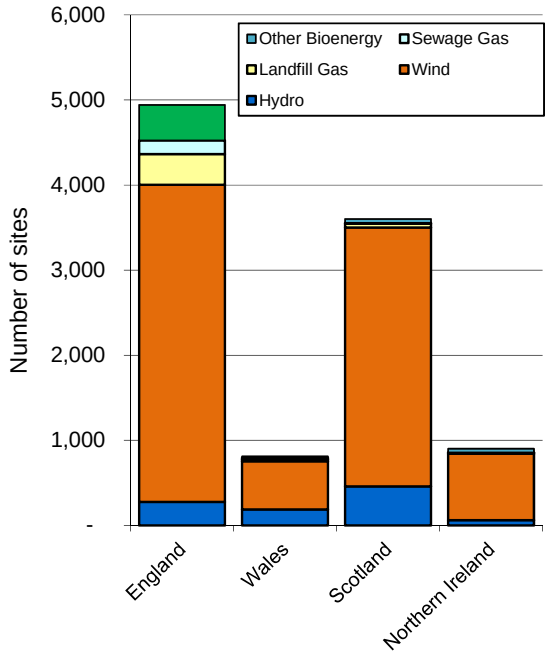
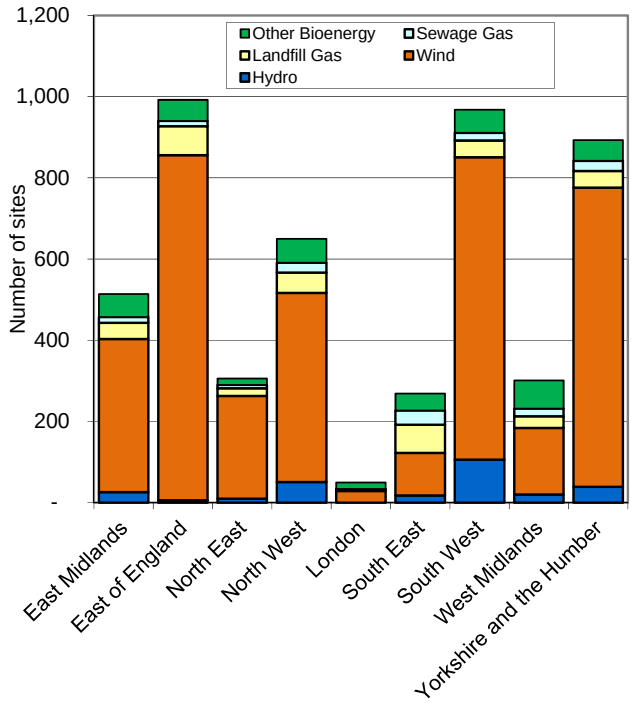


Chart 2: Number of sites by English region[1]



1. Excludes Solar PV, due to the high numbers of small-scale schemes, disproportionate to all other technologies. Wave and Tidal are included with offshore wind.

In 2015, Scotland had 39 per cent of the UK's wind capacity and produced 34 per cent of the output (Tables 2 and 3; Charts 5 and 9). 3,037 Scottish onshore wind sites (including the UK's largest, Whitelee, at 539 MW) represent 96 per cent of its total wind capacity, and 38 per cent of total UK wind capacity. After Scotland, the East of England has the next largest share of both wind capacity and generation (10.2 per cent and 12 per cent, respectively), largely due to Greater Gabbard (504 MW) and Sheringham Shoal (316 MW) offshore wind farms. This is followed closely by the North West (10.1 per cent of the capacity and 12 per cent of generation) and Wales (9.5 per cent of capacity and 9 per cent of generation) and the South East (8 per cent of capacity and 10 per cent of generation) (Tables 2 and 3; Charts 4, 6, 8 and 10)[6]. England, as a whole, accounts for 46 per cent of wind capacity and 52 per cent of generation. Almost two-thirds of England's wind capacity is offshore (4.2 GW); this also represents 82 per cent of the UK's 5.1 GW of offshore capacity. [7]

[6] A map of wind farm installed capacities in the UK at the end of 2015 was published in the renewables chapter of the 2016 edition of the Digest of UK Energy Statistics www.gov.uk/government/statistics/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes

[7] Wind capacity figures, disaggregated by onshore and offshore, are available in quarterly Energy Trends table, ET 6.1, available at: https://www.gov.uk/government/statistics/energy-trends-section-6-renewables

Chart 3: Renewable capacity by country

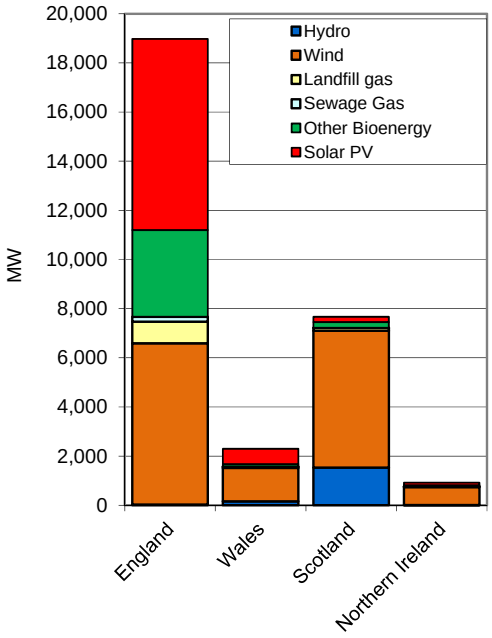


Chart 4: Renewable capacity by English region

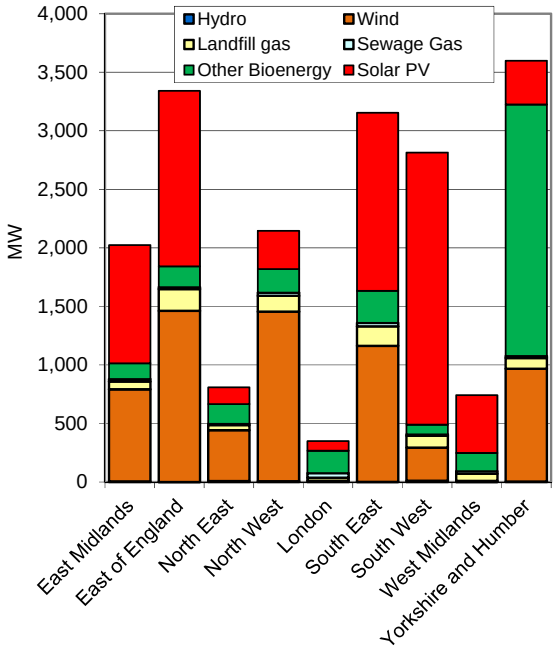


Chart 5: Wind capacity by country

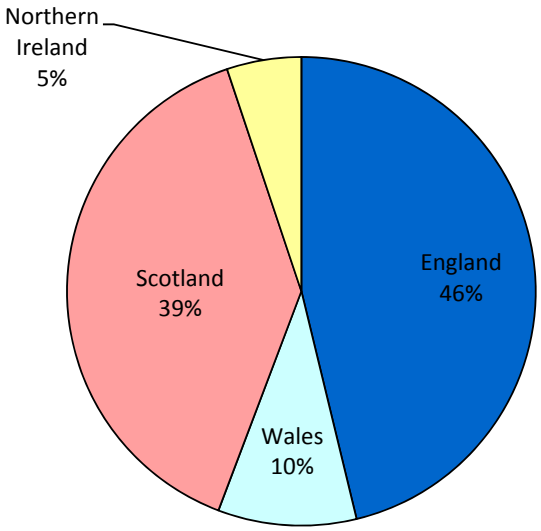


Chart 6: Wind capacity by English region

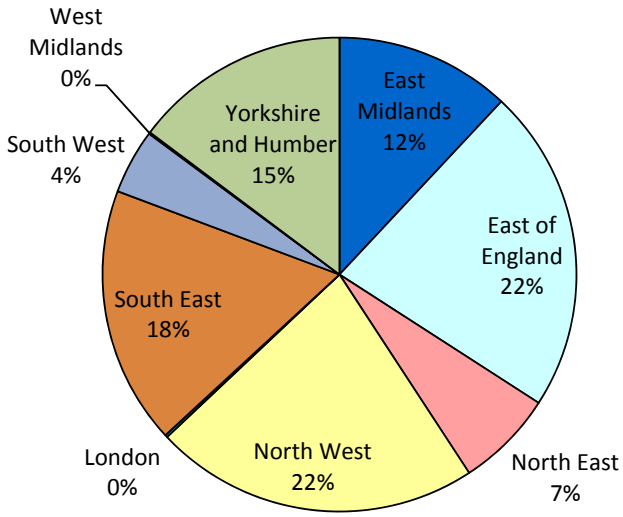


Chart 7: Renewable generation by country

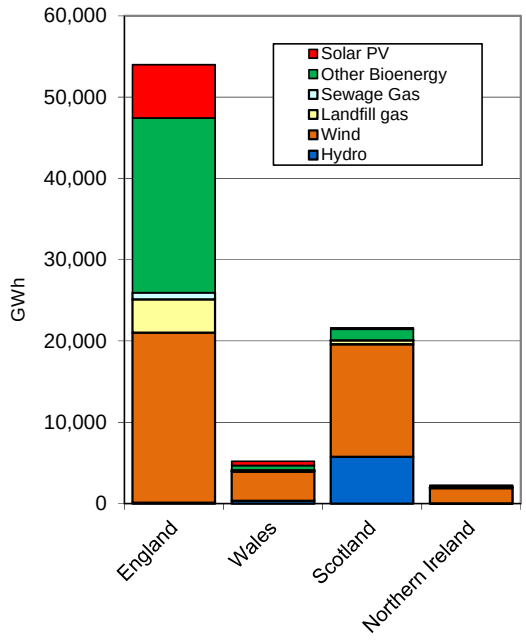


Chart 8: Renewable generation by English region

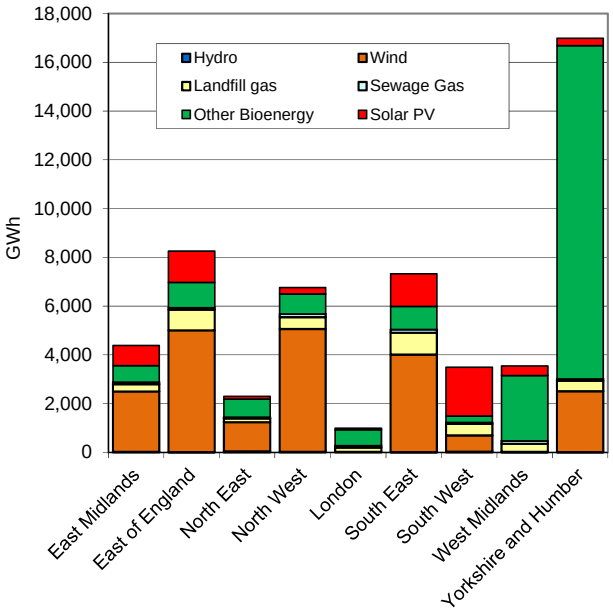


Chart 9: Wind generation by country

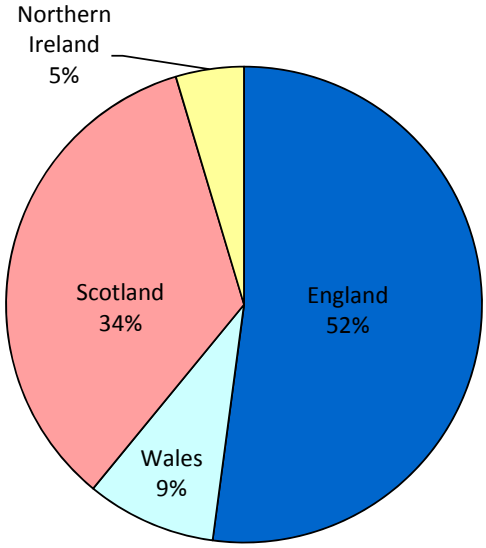
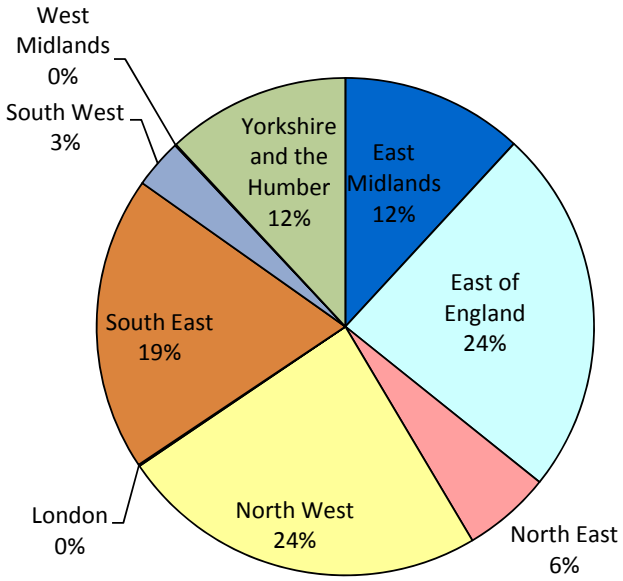


Chart 10: Wind generation by English region



Regional trends: 2015

Ninety-one per cent of the UK generation from sewage and 91 per cent of the UK generation from other bioenergy (including that used for co-firing) took place in England. The major sewage gas generating regions were the North West jointly with the South East (15 per cent each), the West Midlands (14 per cent) and the East Midlands (10 per cent). London was the highest in terms of sewage gas capacity (18 per cent), followed by the South East (13 per cent), the North West (12 per cent) and the West Midlands (11 per cent).

In the other bioenergy category, Yorkshire and the Humber (58 per cent) had the largest share of the generation, (mostly from Drax, where a third 645 MW biomass conversion unit became operational as high-range co-firing, in 2015), followed by West Midlands (11 per cent) and Scotland (6 per cent). Excluding bioenergy sources used for standard co-firing (which cannot be allocated to regions – see note 4 to Table 2), Yorkshire and the Humber has the largest capacity to generate from bioenergy (54 per cent of the UK total), mostly from the three 645 MW converted units at Drax. This is followed by the South East (7 per cent) and Scotland (6 per cent).

The rapid uptake of solar dominated renewables in 2015, accounting for almost two thirds of the growth in capacity, driven by the RO and FiT financial support mechanisms as well as decreasing technology costs. Biomass has also grown in capacity as the result of the further Drax unit conversion, while offshore wind capacity has increased due to new schemes and extensions to existing schemes.

In terms of change to total renewables generating capacity, Yorkshire and the Humber (+1289 MW), South West (+900 MW), East of England (+689 MW), South East (+683 MW), East Midlands (+534 MW) and Wales (+473 MW) have all shown considerable growth this year. The growth in overall renewables capacity in these regions has primarily come from solar, biomass and offshore wind. Table 4 below summarises the schemes that accounted for the majority of capacity growth in 2015. Capacity in all areas increased, with the exception of the West Midlands, which fell by 113 MW, a result of the closure of the Ironbridge biomass conversion plant (360 MW).

Table 4: Regional capacity growth

Region	Key Technology	Growth (MW)	Key Schemes
Yorkshire and the Humber	Biomass	720	Additional Drax unit conversion (to high range co-firing)
	Offshore wind	405	Westermost Rough, Humber Gateway
	Solar PV	127	Raventhorpe Farm
South West	Solar PV	833	Bradenstoke Solar Park, Orta Port Farms Solar, Hill House Solar Farm
East of England	Solar PV	628	Waterloo Solar Farm, Daisy No 1 Limited, Melbourn,West Raynham
South East	Solar PV	623	Owls Hatch Road, Southwick Solar Farm, Elms Farm
East Midlands	Solar PV	488	Chelveston Renewable Energy Park Extension, Morton Solar
Wales	Offshore wind	148	Gwynt y Mor
	Solar PV	253	Mainly medium and small-scale projects

Comparison with economic activity

Economic activity in each country or region can be measured in terms of Gross Value Added (GVA). Table 5 shows that Scotland continues to show the largest generating capacity from renewables in terms of capacity per unit of GVA and generation per unit of GVA. Among the English regions, Yorkshire and the Humber is highest in generating capacity per unit of GVA terms followed by the East of England, with the South West very close behind, and then the East Midlands. In terms of Generation/GVA, Yorkshire and the Humber is the highest, followed by the East of England and the North East, with the East Midlands and the North West very close behind.

Table 5: Density of renewables generation in different areas

	Electrical generating capacity from renewable sources kW/GVA (£million)[1,2]	Electricity generated from renewable sources kWh/GVA (£million)[1]
England	**13.77**	**39,186**
East Midlands	21.21	46,074
East of England	24.07	59,450
North East	16.93	48,034
North West	14.31	45,086
London	0.96	2,714
South East	13.14	30,526
South West	23.32	28,789
West Midlands	6.46	30,843
Yorkshire and the Humber	33.80	159,455
Northern Ireland	**26.86**	**65,057**
Scotland	**62.13**	**175,060**
Wales	**42.26**	**95,380**
UK average	**18.46**	**51,311**

1. GVA is Gross Value Added as published as Total GVA in Regional Gross Value Added (Income Approach), December 2015 at: www.ons.gov.uk/file?uri=/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedincomeapproach/december2015/00a9b4de.xls

2. Excludes capacity attributable to co-firing of bioenergy which has not been allocated to regions (see footnote 4 to Table 2).

Regional trends: 2003-2015

Between 2003 and 2015, there was a 688 per cent increase in generation from renewables in the UK, but faster rates of growth were recorded in Yorkshire and the Humber (2,507 per cent), Northern Ireland (2,045 per cent), the East Midlands (914 per cent) and the South East (823 per cent) (see charts 11 and 12). The reason for these differences in growth rates is not only dependent on the local resource (such as wind and solar), but also (notably in the case of Drax), the availability of existing fossil fuel capacity suitable for conversion to biomass. Furthermore, there was very little use of some technologies in various regions.

Chart 11: Trends in generation from renewables by country

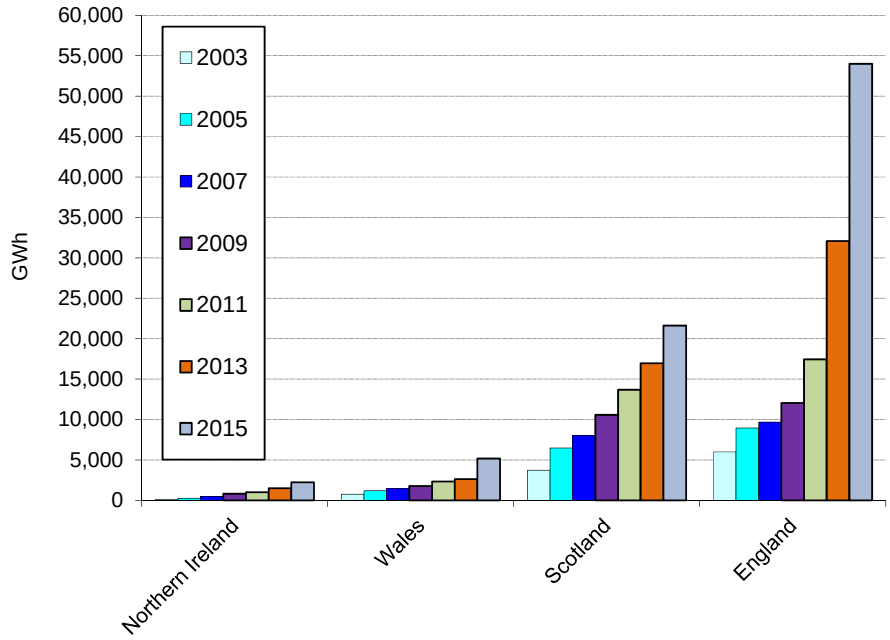
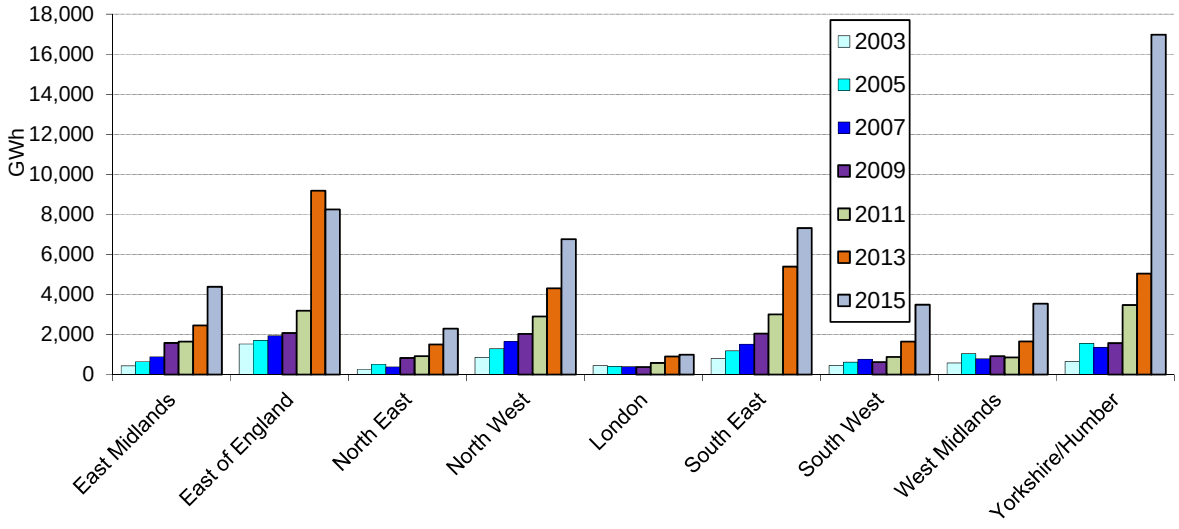


Chart 12: Trends in generation from renewables by English region



Load factor analysis

Load factors for the various technologies are shown in Table 6 from data provided in Tables 2 and 3 of this article. These are presented on an unchanged configuration basis [8] [9].

The load factors for hydro range from 44.3 per cent in the North East to 17.6 per cent in the South East, with the UK average (mean) and median values for the UK overall of 39.5 and 33.1 per cent respectively. Rainfall for 2015 was the highest since 2011, and this is reflected in the highest load factor for large-scale hydro since 1999 and the highest load factor ever recorded for small-scale hydro.

Load factors for solar PV range from 8.8 per cent in Scotland to 11.6 per cent in the South East, reflecting solar irradiance levels in the UK. The UK average is 11.2 per cent, with Yorkshire and the Humber and West Midlands jointly occupying the median of 10.6 per cent.

For landfill gas, the load factors vary from 79.2 per cent for London to 40.7 per cent in the North East, with UK mean and median values of 52.6 and 51.4 per cent respectively. For England, Wales and Scotland, the landfill gas load factor has been steadily decreasing each year and this could be attributed to reductions in the quantity of waste landfilled since the early 2000s leading to less efficient gas abstraction. In the case of Northern Ireland, there has been a growth in capacity and load factors as new sites have been exploited but this has now settled down to similar values to the rest of the UK.

[8] Previously, load factors were presented in terms of installed capacity and express the average hourly quantity of electricity generated as a percentage of the average capacity at the beginning and end of the year. These can still be found in the load factor time-series spreadsheets, available at: *www.gov.uk/government/collections/renewables-statistics*. However, this method does not take into account the impact of new schemes being constructed but not operating fully in the year. This can result in a distorted picture, depending on the timing and magnitude of new capacity coming on stream, and can even result in values >100%. The *unchanged configuration* basis for load factor calculations has therefore been used in this article.

The term "load factor on an unchanged configuration basis" describes the amount of electricity generated from schemes that have been operating throughout the whole of the calendar year with the same installed capacity configuration. The formula for calculating this is:

$$\frac{\text{Electricity generated during the year (MWh)}}{\text{Installed capacity of schemes operating throughout the year with an unchanged capacity configuration (MW)} \times \text{hours in year}}$$

In view of the interest shown nationally in this measure, this is now calculated for several renewable technologies. These data are only reported where the region contains three or more operational schemes. The England figure includes data from all English schemes regardless of how many were operational within each region of England.

[9] A limitation of this analysis is the availability of Renewables Obligation Certificates (ROCs) data, which may not be complete when DUKES is compiled (April 2016), when 2015 data were still provisional. In particular, this can have an impact on the schemes included in the unchanged configuration definition as new data could include or remove particular schemes.

Table 6: Regional load factors on an unchanged configuration basis, 2015

	Onshore Wind	Offshore Wind	Solar PV	Hydro	Hydro (small scale)	Hydro (large scale)	Landfill gas	Sewage gas	Other bioenergy (excofiring, sewage, LFG)
England	**30.5%**	**41.7%**	**11.2%**	**36.1%**	**32.0%**	**43.9%**	**53.5%**	**48.5%**	**74.0%**
East Midlands	30.4%	41.5%	10.8%	40.2%	40.2%		50.3%	48.8%	58.3%
East of England	30.8%	42.7%	11.1%				52.5%	50.2%	76.5%
North East	30.9%	38.6%	9.4%	44.3%	53.2%	43.9%	40.7%	47.7%	74.4%
North West	32.0%	43.3%	10.1%	34.8%	34.8%		41.5%	56.3%	59.1%
London	19.9%		8.9%				79.2%	23.4%	74.8%
South East	29.9%	41.4%	11.6%	17.6%	17.6%		61.9%	55.8%	76.4%
South West	28.4%		11.3%	26.5%	26.5%		54.0%	41.8%	37.9%
West Midlands			10.8%	28.2%	28.2%		62.8%	60.8%	81.6%
Yorkshire and the Humber	30.3%	31.8%	10.4%	31.4%	31.4%		54.5%	54.2%	75.0%
Northern Ireland	**29.8%**		**10.2%**	**37.0%**	**37.0%**		**50.2%**		**72.5%**
Scotland	**28.9%**	**31.3%**	**8.8%**	**40.9%**	**44.5%**	**40.6%**	**50.2%**	**43.6%**	**66.8%**
Wales	**29.4%**	**30.7%**	**11.1%**	**24.7%**	**34.8%**	**22.9%**	**43.2%**	**46.1%**	**70.7%**
UK AVERAGE	**29.4%**	**39.7%**	**11.2%**	**39.5%**	**41.8%**	**39.2%**	**52.6%**	**48.2%**	**73.5%**
MEDIAN	29.9%	40.0%	10.6%	33.1%	34.8%	40.6%	51.4%	48.8%	73.4%

The regional variation in load factors for other bioenergy ranges from 81.6 per cent in the West Midlands (primarily due to the high utilisation rates of a number of municipal solid waste (MSW) schemes), to 37.9 per cent in the South West (due to the lower rates of a number of Advanced Combustion Technology (ACT) schemes in the region).

Offshore wind load factors ranged from 30.7 per cent in Wales to 41.7 per cent in England, with the North West acheiving 43.3 per cent, driven by high-performing sites, including Walney, Ormonde, and West of Duddon Sands (in its first year of operation at full capacity, following completion in late 2014).

For onshore wind, the unchanged configuration load factors range from 19.9 per cent in London, to 32 per cent in the North West, with the South East occupying the median position at 29.9 per cent. For offshore wind, load factors varied from 30.7 per cent in Wales to 43.3 per cent in the North West, with the South East and North East jointly occupying the median position at 40 per cent.

Chart 13 shows the annual variation in load factor compared to the UK's average wind speed. [10] Over the 15-year period from 2001 to 2015, 2015 was the windiest, slightly exceeding 2008; the least windy year was 2010. As a result, 2015's load factors for both onshore and offshore wind were the highest in that time-period.

Chart 14 shows how the onshore wind load factor has compared between the four UK countries. For most of the 16 years, the highest load factors have been experienced in the windier countries, Northern Ireland (averaging 31.0%) followed by Scotland (averaging 27.9%). However, in 2014 and 2015, Scotland's load factor fell beneath that of the other three countries, due to outages and curtailments at some of Scotland's largest wind farms. Meanwhile, in 2015, English onshore wind farms achieved the highest load factor (30.5%) for the first time in the time-series, with the North West the highest of the English regions, at 32.0%.

[10] Source: Energy Trends table ET 7.2, available at: *www.gov.uk/government/statistics/energy-trends-section-7-weather*. Further information on the methodology used is given in Energy Trends Special feature article,
Dagnall, S.P., Janes, M. and Tipping, A, March 2006, 'UK Onshore Wind capacity factors 1998-2004', Energy Trends, p28

Chart 13: Annual variation in UK onshore wind load factor on an unchanged configuration basis and wind speed

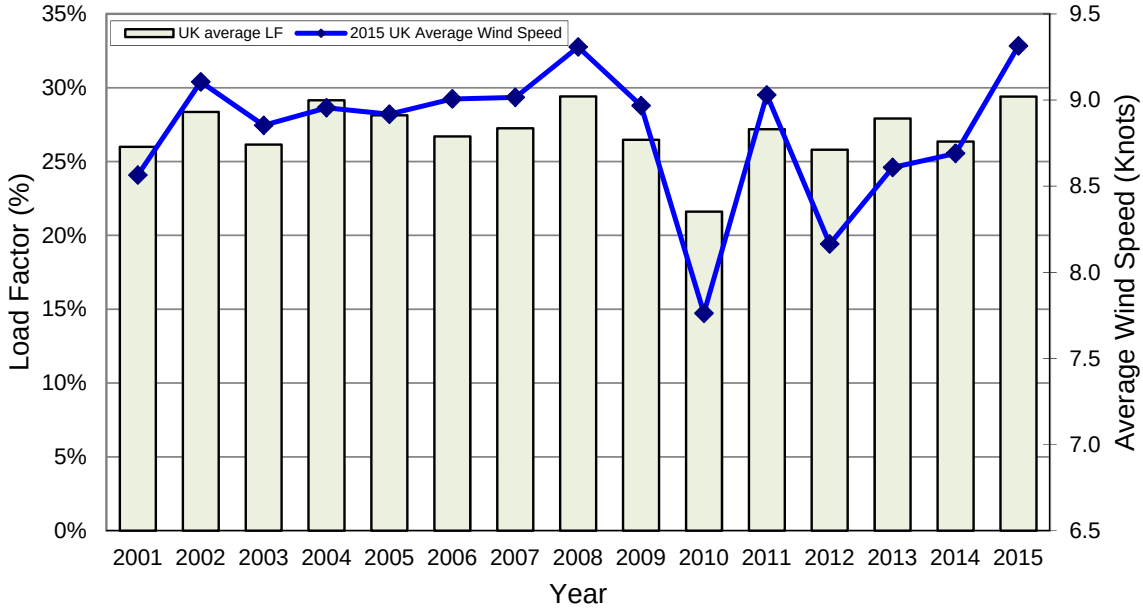
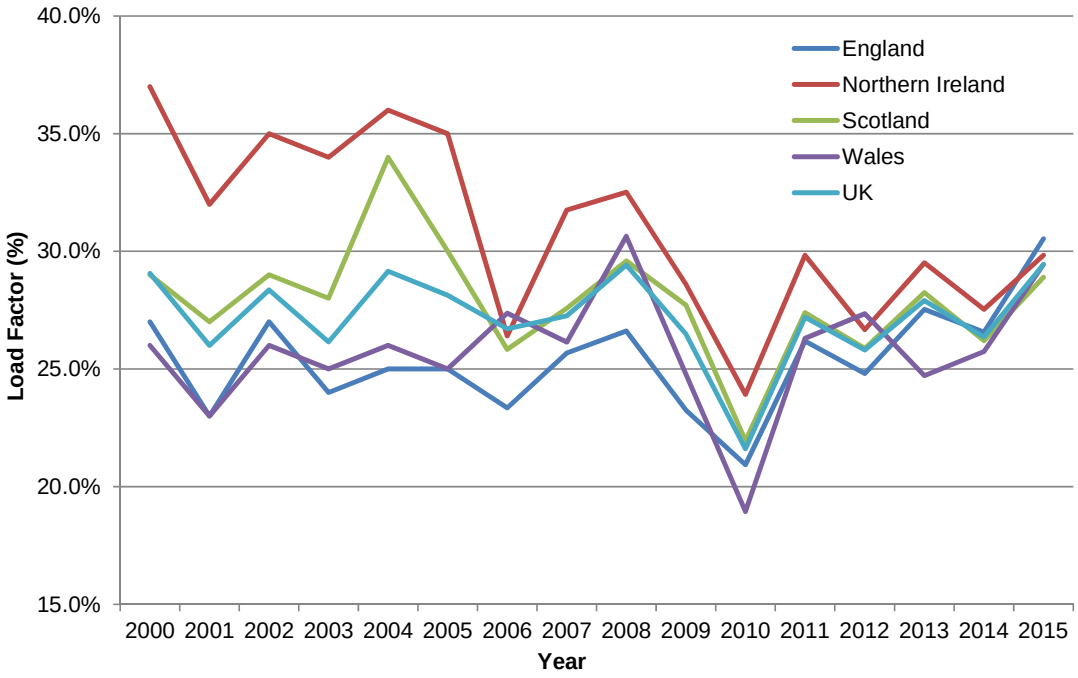


Chart 14: Onshore wind load factor on an unchanged configuration basis, by UK country



Local authority analysis

Tables 7 to 9 rank the top five Local Authorities (LA), according to: number of installations, installed capacity, and generation for key technologies. In terms of the number of installations, the top ranking LAs for onshore wind, PV, hydro, landfill gas, anaerobic digestion and plant biomass are, respectively: The Orkney Islands, Cornwall, Highland, Thurrock, Shropshire and Dumfries and Galloway. For overall number of sites, Cornwall is the top ranked, reflecting the large number of solar PV schemes installed in the South West.

In terms of installed capacity, the top ranking LAs for onshore wind, PV, hydro, landfill gas, anaerobic digestion and plant biomass are, respectively: Highland, Cornwall, Highland, Thurrock, Shropshire and Selby. Selby is the top ranked for overall capacity, since this LA contains the Drax power station (including three 645 MW biomass units). Highland's overall capacity is driven by the construction of large-scale wind farms. The order of top ranked LAs is also reflected in the generation figures.

Table 7: Local Authority: Number of sites generating electricity from renewable sources, 2015[1]

Onshore Wind		Solar PV		Hydro		Landfill gas		Anaerobic Digestion		Plant Biomass		Total [2]	
Orkney Islands	731	Cornwall	15,490	Highland	158	Thurrock	10	Shropshire	22	Dumfries & Galloway	9	Cornwall	15,899
Aberdeenshire	485	Wiltshire	8,454	Argyll & Bute	75	North Lanarkshire	9	Herefordshire County of	14	Tameside	7	Wiltshire	8,475
Cornwall	383	Peterborough	8,355	Dumfries & Galloway	67	Doncaster	8	Dumfries & Galloway	6	Oldham	6	Peterborough	8,359
Dumfries & Galloway	267	Sunderland	7,979	Perth & Kinross	61	Warrington	8	East Lindsey	6	Highland	4	Sunderland	7,988
Highland	232	County Durham	7,485	Gwynedd	55	Wiltshire	8	Selby	6	Manchester	4	County Durham	7,593
								West Dorset	6	Derry	4		
								West Lindsey	6				
UK Total	8,568		842,830		1,065		446		351		160		853,712

Table 8: Local Authority: Installed capacity of sites generating electricity from renewable sources, 2015[1]

MW

Onshore Wind		Solar PV		Hydro		Landfill gas		Anaerobic Digestion		Plant Biomass		Total [2]	
Highland	962	Cornwall	486	Highland	732	Thurrock	44	Shropshire	11	Selby	1,957	Selby	2,014
South Lanarkshire	689	Wiltshire	387	Argyll & Bute	282	Central Bedfordshire	33	Herefordshire County of	8	Fife	71	Highland	1,727
Scottish Borders	562	South Cambridgeshire	217	Perth & Kinross	267	Warrington	32	South Ayrshire	7	Allerdale	49	Lancaster	848
Aberdeenshire	510	Pembrokeshire	174	Dumfries & Galloway	151	North Lanarkshire	27	East Lindsey	7	Dumfries & Galloway	48	Dumfries & Galloway	737
East Renfrewshire	371	North Norfolk	149	Stirling	69	Aylesbury Vale	21	Fife	7	Slough	47	South Lanarkshire	730
UK Total	9,188		9,202		1,760		1,061		286		2,619		30,501

Table 9: Local Authority: Generation of electricity from renewable sources, 2015[1]

GWh

Onshore Wind		Solar PV		Hydro		Landfill gas		Anaerobic Digestion		Plant Biomass		Total [2]	
Highland	2,383	Cornwall	446	Highland	3,244	Thurrock	210	Shropshire	58	Selby	11,479	Selby	11,639
South Lanarkshire	1,753	Wiltshire	278	Perth & Kinross	996	Warrington	155	Cannock Chase	45	Shropshire	1,728	Highland	5,751
Scottish Borders	1,492	South Cambridgeshire	196	Argyll & Bute	560	Aylesbury Vale	149	Herefordshire County of	42	Allerdale	350	Lancaster	3,180
Aberdeenshire	1,333	Pembrokeshire	151	Dumfries & Galloway	492	Central Bedfordshire	128	Fife	35	Dumfries & Galloway	333	Swale	2,548
Dumfries & Galloway	803	Vale of White Horse	139	Stirling	332	Havering	126	Doncaster	30	Fife	321	Dumfries & Galloway	2,170
UK Total	228,897		7,561		6,284		4,872		1,429		18,587		83,545

1 Top five ranked Local Authorities (LAs). Where more than five schemes are listed, this indicates that more than one LA has the same ranking.
2 Totals include offshore wind sites allocated to nearest Local Authority.

Revisions

The use of improved georeferenced data has resulted in reallocation of some historic capacity and generation records for landfill gas and sewage gas projects bordering London, the South East, East of England and the East Midlands. This has primarily affected data for London, which shows capacity revisions (increases) for landfill gas and sewage gas of around 25 and 15 MW, respectively. For each of these regions, the time series has been revised back to 2008.

Further information

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Combined Heat and Power in Scotland, Wales, Northern Ireland and the regions of England in 2015

Background

Combined Heat and Power (CHP) is the simultaneous generation of usable heat and power (usually electricity) in a single process. CHP data for the UK as a whole are updated annually and published in the Digest of United Kingdom Energy Statistics (DUKES), the latest edition of which was published in July 2016. This article updates statistics published in the September 2015 edition of Energy Trends and provides a breakdown of CHP in the Devolved Administrations and English regions in 2015[1].

The data presented originates from a CHP database maintained by Ricardo Energy & Environment on behalf of The Department of Business Energy and Industrial Strategy (BEIS). Data relating to the overwhelming majority of CHP electrical capacity (98 per cent of total capacity) is received annually from the reliable sources of the Combined Heat and Power Quality Assurance (CHPQA) programme, the Iron and Steel Statistics Bureau (ISSB) and from Ofgem's Renewable Obligations Certificates (ROCs) returns. Another source of data is the sales databases of the Association for Decentralised Energy (ADE). Data from CHP schemes not covered by the above sources are extrapolated from historic data. There is an ongoing data quality assurance exercise in respect of these schemes.

Between 2014 and 2015 there was a net increase of 21 CHP schemes in the database (50 new schemes and the removal of 29 schemes), but a net decrease of 202 MWe in capacity. Good Quality CHP[2] capacity in the UK fell from 5,894 MWe (revised 2014 figure) to 5,692 MWe in 2015.

Regional Trends[3]

Tables 1 and 1B show a comparison of the number of schemes, electrical capacity, electricity generated and heat generated in the regions[4] for the period 2013 to 2015. During this time, the total number of schemes increased from 2,032 to 2,102, however the capacity decreased from 5,925 MWe to 5,692 MWe. With the exception of Wales, the North East and Eastern regions, the number of schemes increased in all regions over the period 2013 to 2015. Over this period, the electrical capacity decreased in the North East, South East, Wales and North West regions and increased in all other areas. The largest fall in capacity in the period 2013-2015 was in the North East, substantially due to capacity serving an oil terminal ceasing to operate as a CHP plant and a significant downgrading of capacity at a site in the chemical sector. The falls seen in the other regions were also substantially due to losses of capacity in the industrial sectors, with loss of capacity in the chemicals sector in the South East and North West regions and the loss of capacity at an oil refinery in Wales.

[1] Similar articles on CHP have appeared in previous Energy Trends publications from 2001 to 2015. The figures within any one article are a snapshot of the position as seen at the time and therefore figures between articles do not constitute a time series. For example, up to date information on the status of a few significant schemes has resulted in a revision down in the capacity for 2015 and some of the earlier years. This was especially the case for the North East region.

[2] Good Quality CHP denotes schemes that have been certified as being highly efficient through the UK's CHP Quality Assurance (CHPQA) programme.

[3] Note: The figures for previous years are revised on an annual basis to account for late information submitted after the publication date of the article. This is to ensure that the true trends are captured in the data. The figures herein therefore supersede the previous articles published.

[4] These regions are the Government Office Regions of England and Devolved Administrations of Scotland, Wales and Northern Ireland.

Table 1: Trend in number of CHP schemes and their electrical capacity over the period 2013-2015

	Number of Schemes			Electrical Capacity (MWe)		
	2013	**2014**	**2015**	**2013**	**2014**	**2015**
England	**1,712**	**1,753**	**1,773**	**5,140**	**5,077**	**4,906**
East Midlands	107	109	115	105	111	128
Eastern	169	166	169	291	304	319
London	271	291	298	177	199	199
North East	112	110	110	637	538	373
North West	268	280	282	796	780	780
South East	292	292	295	948	948	891
South West	139	142	141	86	82	88
West Midlands	170	175	174	107	112	111
Yorkshire/Humberside	184	188	189	1,995	2,004	2,016
Scotland	130	135	137	512	546	525
Wales	122	119	117	214	208	183
Northern Ireland	68	74	75	59	62	78
UK Total	**2,032**	**2,081**	**2,102**	**5,925**	**5,894**	**5,692**

Table 1B: Trend in CHP electricity and heat generated over the period 2013-2015

	Electricity Generated (GWh)			Heat Generated (GWh)		
	2013	**2014**	**2015**	**2013**	**2014**	**2015**
England	**16,144**	**16,233**	**16,503**	**35,472**	**33,192**	**32,064**
East Midlands	569	579	588	1,387	1,323	1,343
Eastern	1,218	1,327	1,417	1,975	1,984	2,078
London	491	585	584	1,187	1,221	1,225
North East	1,080	1,223	1,177	5,045	4,690	4,042
North West	3,226	2,772	2,580	9,018	8,026	7,725
South East	3,338	3,200	2,919	7,251	6,704	6,449
South West	365	377	387	638	470	474
West Midlands	414	443	450	731	764	745
Yorkshire/Humberside	5,442	5,726	6,401	8,239	8,010	7,984
Scotland	2,357	2,503	2,426	5,802	5,893	5,750
Wales	882	738	609	2,571	2,361	1,929
Northern Ireland	210	224	363	508	515	582
UK Total	**19,593**	**19,698**	**19,900**	**44,353**	**41,962**	**40,325**

The region with the highest proportion of the UK's electrical capacity is still the Yorkshire and Humberside region with a 35 per cent share. Also, the average capacity of CHP schemes in this region was higher than in any other region.

The proportion of electricity generated in the North East in 2015 was just 5.9 per cent of the total, which is lower than in previous editions of this paper, owing to more up to date information on the status of one scheme in that region.

Regarding heat generation, as with electricity generation, more up to date information on the status of a scheme in the North East means that the share of total heat generated for that region (10 per cent) is lower than in previous editions of this paper.

Chart 1: CHP generation by area in 2015

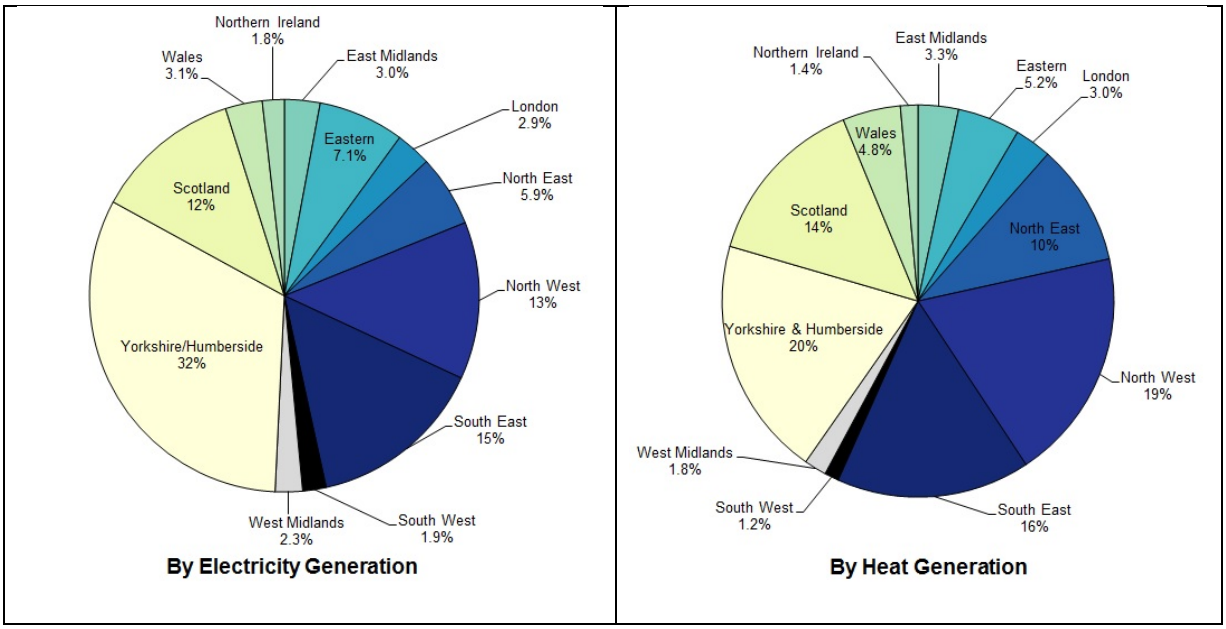


Table 2 shows an overview of CHP plant data broken down between the English regions and devolved administrations. CHP capacity utilisation can be expressed by the Load Factor (LF). LF is the actual generation as a proportion of the theoretical maximum power that can be generated for a given total installed capacity (TPC). The power output that is actually generated is the total power output (TPO). For 2015, the TPC was 8,441 MWe[5] and the TPO was 37,940 GWh, giving a LF of 51.3 per cent, which is one percentage point lower than in 2014 (revised).

Higher LF values tend to be found in industrial uses where the demand for heat extends over a greater proportion of the year than is the case for space heating applications (where the heat demanded from the CHP is mostly confined to the heating season). This is exemplified by the high LF. in some regions where industrial CHP capacity and power generated is a significant proportion of the total, such as the following regions (dominant industrial sectors in each region given in parentheses): Eastern region (Food and Drink), Wales (Iron and Steel) and Scotland (Refineries). Conversely, the LF. is lowest of all in London, where non-industrial CHP capacity and power generated is a large proportion of the total.

Over time the LF. has decreased in industry and the proportion of total capacity and power generation coming from the non-industrial sectors has increased. These two factors have acted to reduce the overall LF. of all CHP in the UK.

[5] The Total Power Capacity (TPC) is the registered maximum power generating capacity of a CHP scheme. It should be distinguished from Qualifying Power Capacity (QPC). QPC is defined under the CHPQA Standard and is also known as Good Quality capacity. QPC is the registered power generation capacity that achieves a QI of 100 or more under conditions of Maximum Heat Output under Normal Operating Conditions, as defined in the CHPQA Standard. Where a CHP scheme does achieve a QI of 100 or more under these conditions, its TPC and QPC are the same. Where it does not, then the capacity considered Good Quality is scaled- back and under these circumstances TPC>QPC. Unless otherwise stated, QPC is the basis of all power capacities quoted in this article.

Table 2: Overview of CHP schemes in 2015

	Number of Schemes	Electrical Capacity (QPC)* MWe	Electrical Capacity (TPC) MWe	Heat Capacity MWth	Fuel Used* GWh	Electricity Generated (QPO)* GWh	Electricity Generated (TPO) GWh	Heat Generated GWh	Load Factor** (%)
England	**1,773**	**4,906**	**7,410**	**16,171**	**66,860**	**16,503**	**32,540**	**32,064**	50.1%
East Midlands	115	128	173	604	2,754	588	972	1,343	64.2%
Eastern	169	319	319	884	4,711	1,417	1,457	2,078	52.1%
London	298	199	231	966	2,718	584	796	1,225	39.3%
North East	110	373	468	1,116	7,571	1,177	1,994	4,042	48.6%
North West	282	780	884	4,086	13,112	2,580	3,712	7,725	47.9%
South East	295	891	2,093	3,295	13,114	2,919	7,698	6,449	42.0%
South West	141	88	88	190	1,299	387	410	474	53.2%
West Midlands	174	111	126	501	1,991	450	597	745	54.1%
Yorkshire/Humberside	189	2,016	3,027	4,529	19,590	6,401	14,903	7,984	56.2%
Scotland	137	525	678	2,523	11,234	2,426	3,528	5,750	59.4%
Wales	117	183	275	827	3,924	609	1,497	1,929	62.2%
Northern Ireland	75	78	78	189	1,160	363	376	582	54.7%
UK Total	**2,102**	**5,692**	**8,441**	**19,711**	**83,178**	**19,900**	**37,940**	**40,325**	**51.3%**

*This represents Good Quality CHP capacity (QPC), Good Quality CHP power output (QPO) and the fuel associated with the Good Quality CHP outputs. For further details on how these are defined, see Dukes 2016 Chapter 7 and the Combined Heat and Power Quality Assurance (CHPQA) Standard Issue 5):
www.gov.uk/government/uploads/system/uploads/attachment_data/file/335471/CHPQAStandardIssue5.pdf

** These load factors are based on the total power output (TPO) and total power capacity (TPC) of the CHP (for partially and fully qualified schemes). This gives the true utilisation of the power generating plant.

Importance of CHP in the Regional Economies

Chart 1 shows the CHP outputs of each region and is derived from the data contained in Table 1B. It portrays only a limited picture as it does not account for the varying size of each region's economy. To allow for this, CHP heat capacity and electrical capacity have been compared with the level of economic activity in each region as measured by Gross Value Added (in £ million) in Table 3. Chart 2 maps the heat capacity per unit of GVA for the different regions.

CHP continues to be a very important part of the economies of the Yorkshire/Humber, North West, and North East regions, as evidenced by the large heat capacities per unit of GVA in these regions. This is due to the prominence of the chemicals and oil refining industries in these regions, which are heat intensive sectors. However, there has been a significant decrease in the GVA per unit of heat and electrical capacity in the North East region (41 per cent since 2013), meaning that CHP is a less significant part of this region's economy than was thought in the 2015 edition of this article. This is due to more up to date information coming to light in respect of one large scheme in this region. Consequently, CHP now plays a less significant part of the economy of the North East than in the North West. There have also been notable decreases in the heat capacity per unit of GVA in Scotland and the South East. This is substantially due to the removal of significant boiler capacity at two schemes, one in each of these two regions.

Table 3: Density of CHP in different areas, ordered by heat capacity

	Heat capacity per unit GVA kWt/ (£million)*	Electrical capacity per unit GVA kWe/ (£million)*
Yorkshire/Humberside	42.54	18.93
North West	27.26	5.20
North East	23.40	7.83
Scotland	**20.43**	**4.25**
Wales	15.23	3.38
South East	**13.75**	**3.72**
England	**11.74**	**3.56**
Eastern	6.37	2.30
East Midlands	6.35	1.35
Northern Ireland	5.50	2.28
West Midlands	**4.36**	**0.97**
London	2.65	0.55
South West	1.57	0.73
UK total	**12.18**	**3.52**

*GVA is provisional gross value added in 2014 (workplace based)[6]

The distribution of CHP capacity across the regions and economic sectors is summarised in Table 4, which shows the proportion of total CHP capacity in a particular economic sector in each region.

[6] www.ons.gov.uk/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedincomeapproach/december2015

Special feature - CHP

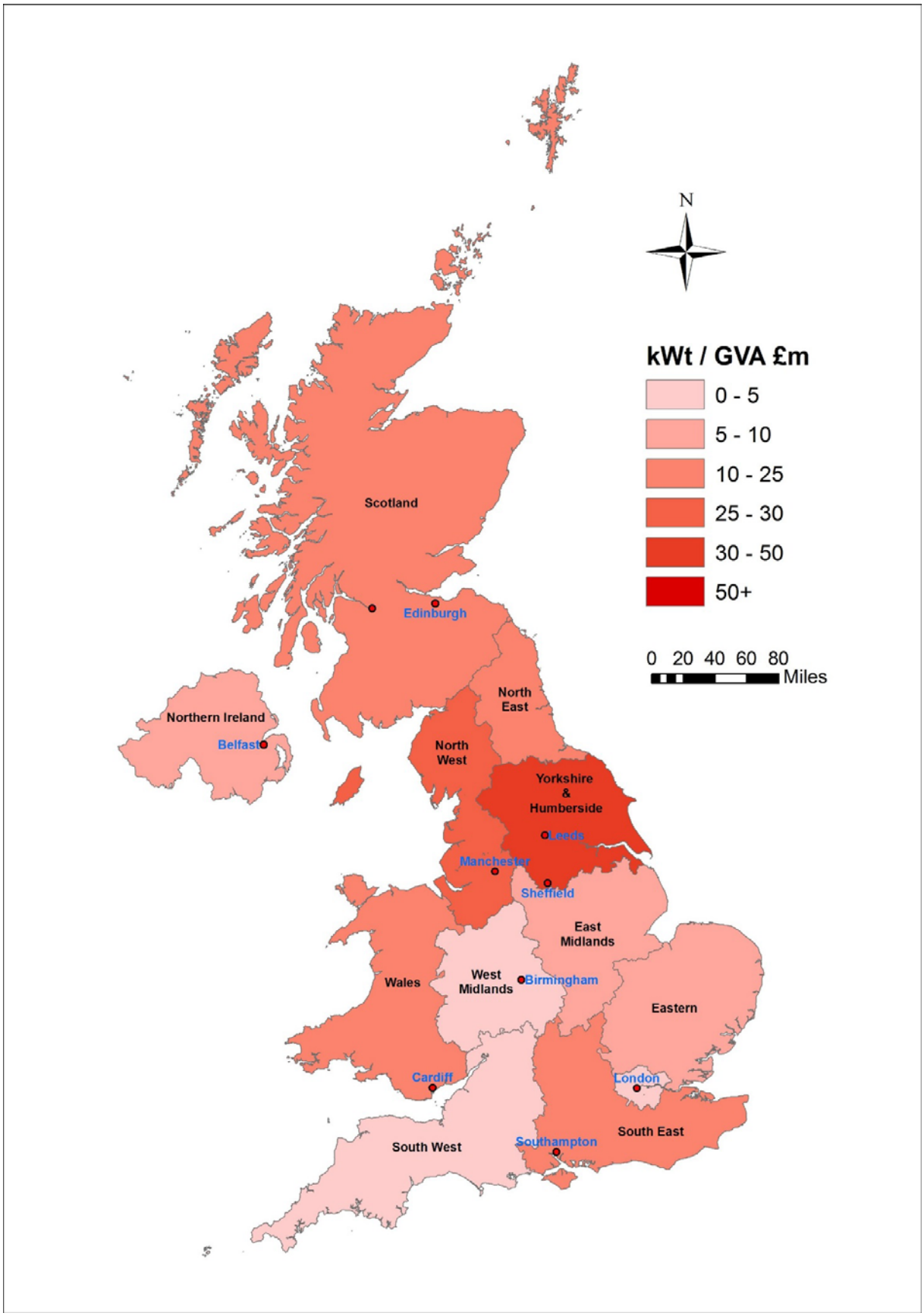
Over 60 per cent of all CHP capacity in the oil refineries and oil and gas terminals sector can be found in the Yorkshire and Humber region and 85 per cent of capacity in the chemicals sector is to be found in three regions: North East, Yorkshire/Humber and the North West. Over half of the capacity in the Paper, Publishing and Printing sector is located in the South East region. The Eastern region is the single largest region for CHP capacity in the Food, Beverages and Tobacco sector, which is substantially explained by the heavy concentration of the heat intensive sugar beet industry in this region. These are longstanding patterns. Points of note arising from this year's statistics are the loss of all metal products capacity in the East Midlands and mineral products capacity in Yorkshire and the Humber. These are due to the closure of one scheme in each of these regions. The Other industrial Branches[7] sector has seen an increase in capacity in Northern Ireland owing to the commissioning of one significant plant in that region.

[7] Other industrial branches includes sewage treatment works, textiles and clothing and footwear

Table 4: Distribution of CHP capacity across the regions and economic sectors in 2015

Region	Sector									
	Iron and Steel and Non-ferrous Metals	Chemicals	Oil Refineries and Oil and Gas Terminals	Paper, Publishing and Printing	Food, Beverages and Tobacco	Metal Products, Machinery and Equipment	Mineral Products	Other Industrial Branches	Transport, Commerce and Administration	Other
England	80.2%	89.7%	86.0%	78.4%	89.2%	80.7%	100.0%	74.4%	84.0%	92.6%
East Midlands	0.0%	1.2%	0.0%	0.0%	6.6%	0.0%	7.2%	8.1%	6.4%	7.1%
Eastern	7.2%	1.3%	0.0%	0.0%	43.8%	0.0%	0.0%	13.8%	5.4%	8.1%
London	3.6%	1.0%	0.0%	0.0%	6.0%	14.3%	0.0%	6.6%	16.2%	14.1%
North East	50.5%	21.6%	0.0%	0.0%	0.0%	0.0%	26.3%	4.4%	8.1%	2.0%
North West	0.0%	29.1%	4.9%	24.2%	17.5%	5.6%	51.5%	10.5%	11.2%	3.9%
South East	0.0%	0.2%	19.3%	50.6%	4.9%	6.5%	0.0%	10.4%	13.4%	26.4%
South West	0.0%	0.7%	0.0%	0.0%	1.8%	6.5%	15.1%	5.5%	4.6%	6.2%
West Midlands	0.0%	0.0%	0.0%	2.1%	0.1%	47.7%	0.0%	9.4%	8.6%	3.5%
Yorkshire and Humber	18.9%	34.7%	61.8%	1.5%	8.5%	0.0%	0.0%	5.8%	10.0%	21.4%
Scotland	0.0%	6.5%	11.9%	15.1%	4.6%	0.8%	0.0%	10.2%	9.4%	4.3%
Wales	18.0%	2.9%	2.1%	6.6%	1.1%	9.2%	0.0%	9.3%	3.8%	1.1%
Northern Ireland	1.7%	1.0%	0.0%	0.0%	5.1%	9.4%	0.0%	6.1%	2.7%	2.0%
UK Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chart 2: Map of CHP density in terms of heat capacity and gross value added



Technology type and size

Tables 5 and 6 show the regional split of installed electrical capacity (that qualifies as Good Quality CHP capacity) by prime mover type and by size range, respectively. In a number of regions, disaggregation of the data by prime mover type or size category could result in the disclosure of confidential information and so, for these areas, only totals are shown. The following conclusions can be drawn from the tables:

- Gas turbines, whether on their own or as part of Combined Cycle Gas Turbines (CCGT), continue to dominate the CHP market. In 2015, gas turbine based schemes accounted for 71 per cent of total CHP capacity but only 6 per cent of the total number of CHP schemes.

- The North West is the region with the largest steam turbine based capacity. All of this capacity is at industrial sites. Scotland is the region with the second largest steam turbine based capacity, followed by the North East.

- Reciprocating Engines constitute the vast majority of all CHP schemes (93 per cent). The region with the largest number of reciprocating engine schemes is London, followed by the South East and the North West. This is consistent with these areas being large population centres and the high incidence of leisure centres, hotels and retail outlets, which are to be found in such areas and which almost exclusively rely on reciprocating engine technology for CHP.

Table 5: CHP electrical capacity (MWe) by area and prime mover in 2015

	Gas Turbines*	Steam Turbines	Gas and Steam Turbines Subtotal	Reciprocating Engines	Total
England	**3,561**	**339**	**3,901**	**1,005**	**4,906**
East Midlands	-	-	59	69	128
East of England	-	-	195	124	319
London	-	-	53	147	199
North East	-	-	311	62	373
North West	-	-	649	131	780
South East	-	-	695	195	891
South West	18	0	18	70	88
West Midlands	-	-	16	95	111
Yorkshire and The Humber	1,848	57	1,905	111	2,016
Scotland	382	81	463	61	**525**
Wales	130	36	141	43	**183**
Northern Ireland	-	-	31	48	**78**
Grand Total	**-**	**-**	**4,536**	**1,157**	**5,692**

*Includes Combined Cycle Gas Turbines (CCGT)

The CHP market continues to be dominated by large-scale (>10MWe) plant, with 77 per cent of all installed capacity being in this size range. The regional distribution of CHP by capacity tranche is given in Table 6. Over time there has been a very gradual fall in the proportion of total capacity falling within the >10 MWe capacity tranche, with all of the other capacity tranches increasing their share of the total over time. The regions with the greatest capacity from schemes with capacity greater than 10 MWe are Yorkshire and The Humber, followed by the South East, North West, Scotland and the North East. Again, this is a reflection of the location of the types of industrial installation requiring especially large capacity CHP. The largest share of capacity greater than 10 MWe is to be found in the oil refineries sector, followed by chemicals and then paper. As already discussed, oil refinery and chemical operators are heavily represented in the Yorkshire and the Humber and North West regions, while paper production is heavily represented in the South East.

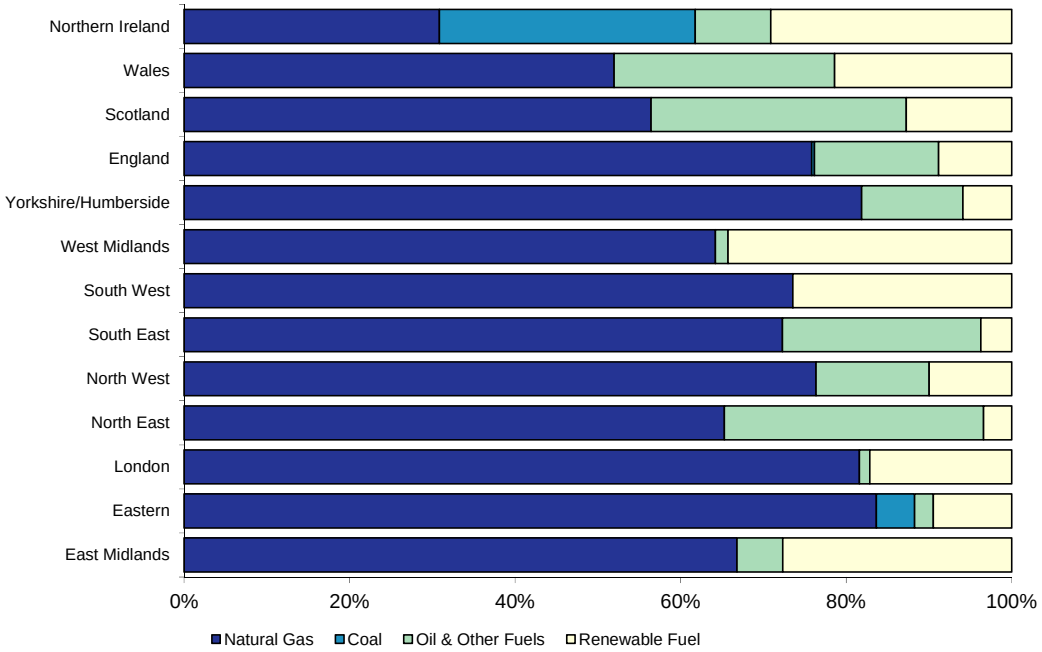
Table 6: CHP electrical capacity (MWe) by area and size in 2015

	<= 100 kWe	> 100 kWe to 1 MWe	>1 MWe to 2 MWe	> 2 MWe to 10 MWe	> 10 MWe +	Total
England	**33**	**242**	**180**	**673**	**3,777**	**4,906**
East Midlands	2	16	19	-	-	128
East of England	3	24	19	-	-	319
London	6	43	17	-	-	199
North East	3	9	8	49	305	373
North West	5	39	32	99	605	780
South East	5	41	34	132	679	891
South West	3	22	15	49	0	88
West Midlands	3	25	14	69	0	111
Yorkshire and The Humber	4	24	23	70	1,895	2,016
Scotland	2	16	16	64	426	525
Wales	3	15	-	-	123	183
Northern Ireland	1	16	-	-	-	78
Grand Total	**39**	**289**	**203**	**792**	**4,369**	**5,692**

The fuel mix

The proportion of coal, gas, renewable fuels and 'oil and other fuels' (comprising oil products, refinery gases, blast furnace gas and other industrial wastes) in the fuel mix for each region is shown in Chart 3.

Chart 3: Proportion of different fuels in the fuel mix for CHP in 2015 for each region



Natural gas represented 71 per cent of all fuel burned in CHP in 2015, which is slightly higher than in 2014 when the share was 70 per cent (revised). Natural gas makes up more than half of the overall fuel consumption in every region except Northern Ireland. Previously, natural gas represented less than half of the fuel consumed in the North East. However, up to date information on one large scheme means that natural gas now represents the majority of fuel consumption in that region. The proportion of fuel consumption that is natural gas remains low in Northern Ireland, reflecting the relatively low penetration of the natural gas network. The availability of natural gas is expected to improve in Northern Ireland as the planned expansions of the transmission and distribution network to the west of the region are implemented.

In 2015, coal was only consumed in Northern Ireland and the Eastern region. In the 2015 edition of this article, coal was also consumed in the North East and South East, but a reconfiguration of plant in these two regions has removed coal as a fuel source. The total number of schemes burning coal and the overall consumption of coal is at an all time low.

Other notable developments regarding fuel types consumed at CHP schemes include:

- An increase in the proportion of renewable fuel consumed in London due to a significant conversion of a power only waste incineration plant to CHP;
- A fall in the proportion of natural gas consumption in Wales due to the closure of oil refinery capacity;
- An appreciable fall in the proportion of renewable fuel consumed in the Eastern region due to a significant fall in the outputs of one renewable scheme that can be considered CHP outputs, with a consequential fall in the renewable fuel consumption included in the CHP statistics.

Summary

The Yorkshire and the Humberside region continues to be the region of the UK with the greatest level of installed CHP capacity, CHP electricity generation and heat generation, accounting for 35 per cent of all capacity and 32 per cent of all electricity generated and 20 per cent of all heat generated. Other regions with high levels of CHP capacity are the South East, North West and Scotland. This is substantially explained by the significant presence of heat intensive industries, such as oil refining, chemicals production and paper in these regions.

Although there has been a steady decline over a number of years, industry still accounts for the overwhelming majority of installed CHP capacity, power and heat generation. With CHP playing a key role in meeting the energy demand of the oil refineries, chemicals and paper sectors, and the tendency of industrial sites in these sectors to concentrate in certain geographical areas, CHP is seen to play an especially important role in the economies of the Yorkshire and the Humber the North West, North East, and Scotland. Other notable examples of the concentration of CHP capacity in the regions include over 50 per cent of capacity in the paper sector being located in the South East and nearly 44 per cent of capacity in the food and drink sector being located in the Eastern region, where the heat intensive manufacture of sugar from sugar beet is concentrated.

London and the South East account for larger than average proportions of capacity installed in the Transport, Commerce and Administration and Other sectors. This is consistent with these regions being large population centers, with large demands placed upon services such as leisure centres, hotels, hospitals and retail outlets.

The region with the largest consumption of renewable fuel consumed in CHP is Scotland, followed by the North West and Yorkshire and the Humber. The region with the largest proportion of renewable fuel consumption is the West Midlands, followed by Northern Ireland and the East Midlands.

Special feature - CHP

For further information on UK CHP statistics, please contact:

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Diversity of supply for oil and oil products in OECD countries in 2015

Introduction and summary

Countries meet their oil needs through a combination of indigenous production and trade. Each year, BEIS updates a comparative assessment of how OECD countries manage their crude oil and transport fuel demand, using data from the IEA database[1]. The aim is to determine how the UK compares with other OECD countries in terms of how it secures oil supplies. Whilst the assessment tends to be stable over time, the analysis provides an overview of the most recent data available.

Within the OECD, only four countries were net exporters of crude oil in 2015: Norway (producing over 5 times its indigenous demand), Canada, Mexico and Denmark. All other OECD countries had to meet their demand through imports with some 10 countries producing no crude oil indigenously- the same figure as in 2014.

The majority of OECD countries met their motor gasoline (petrol) demand through indigenous production, with much of Western Europe being net exporters. Despite motor gasoline having the second lowest average diversity index, it achieved the highest average score in the supply index out of the four products due to high levels of indigenous production in the OECD.

For jet fuel, the position is markedly different with only a third of OECD countries self-sufficient. Norway and the United Kingdom were the top two scorers for diversity of imports within the OECD.

Most OECD countries were not able to support their diesel consumption by indigenous production alone. Greece, Korea and the Netherlands scored highest for self-sufficiency within the OECD, with Greece producing over three times the amount it consumed.

The UK could have met over three quarters of its demand for crude oil through indigenous production, in comparison to two thirds in 2014, and ranked fifth in the supply index with regards to crude oil. The UK was able to meet its demand for motor gasoline through indigenous production and was second only to the United States for diversity of imports. For jet and diesel, the UK was in the lower third of the OECD in terms of its indigenous production scores, but was second for diversity of imports for jet and third for diesel. The overall position is broadly similar to that seen last year.

Charting oil self-sufficiency and diversity of supply

Bubble Charts

The bubble charts demonstrate the relationship between a country's demand, its indigenous production, diversity of its gross imports and the political stability of the countries of import. The profiles show:

- Self-sufficiency: the proportion of a country's demand that could be met through indigenous production is shown on the vertical axis. A score of 1 indicates a country produces as much oil as it uses.
- A diversity score: the diversity and political stability – defined via the World Bank's governance indicators - of a country's gross imports is shown on the horizontal axis (see appendix 2 for a methodological note).
- Consumption: is represented by the circle or bubble, the area of which indicates the level of consumption for 2015 for each OECD country.

[1] http://data.iea.org/

Bar Charts

The bars charts provide a means of comparing OECD countries by self-sufficiency and diversity of imports, creating a 'supply index'. These profiles combine the proportion of demand that could be met through indigenous production (shown in the coloured part of the chart) with the diversity and political stability of import origins (shown in white). Appendix 1 shows the underlying data.

Choropleth Map

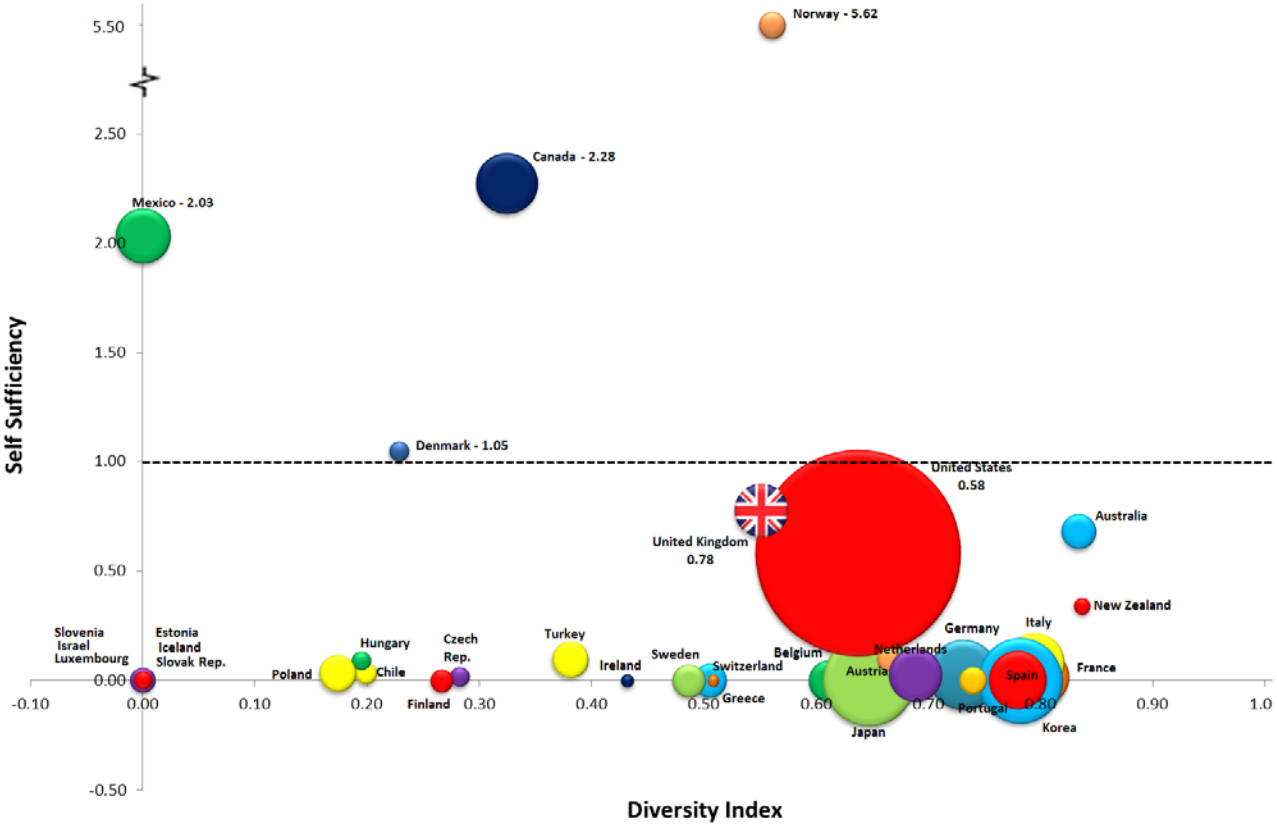
These maps indicate a visual representation of the source countries and quantities of each product's exports. A darker shade represents that a high proportion of the world's exports originated from that particular country, whereas lighter shades indicate that fewer exports originated in that country. Appendix 1 shows the underlying data.

Results

Crude

Only four OECD countries were self-sufficient for crude oil in 2015 (Chart 1). Norway had by far the highest self-sufficiency score, producing over 5 times its own consumption of crude oil. With a self-sufficiency score of 0.78, the UK was above the OECD average of 0.41. Similarly, the UK's diversity score of 0.55 was above the average score of 0.43.

Chart 1: Diversity and self-sufficiency of crude oil for OECD countries, 2015



The majority of OECD countries showed diversity and political stability scores that reflect a strong trading element, with a relatively small contribution from indigenous production (Chart 2). Chart 2 shows that the UK placed highly in the ranking of OECD countries being one of only a few countries with significant oil production.

Chart 2: Supply index of crude oil for OECD countries, 2015

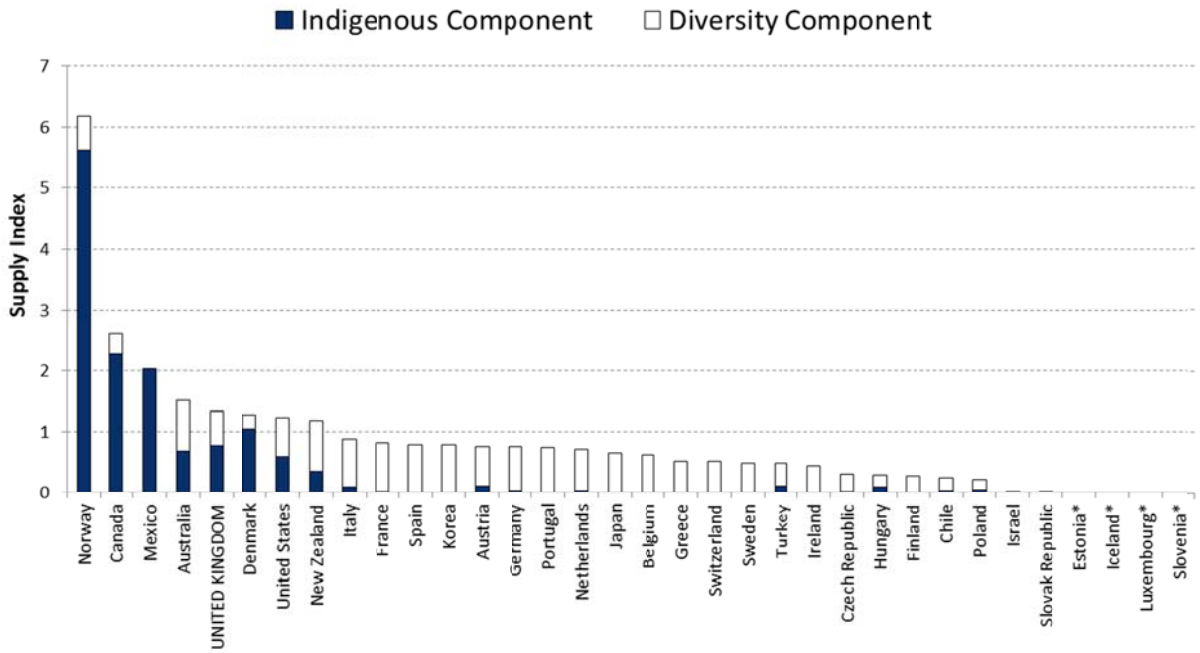
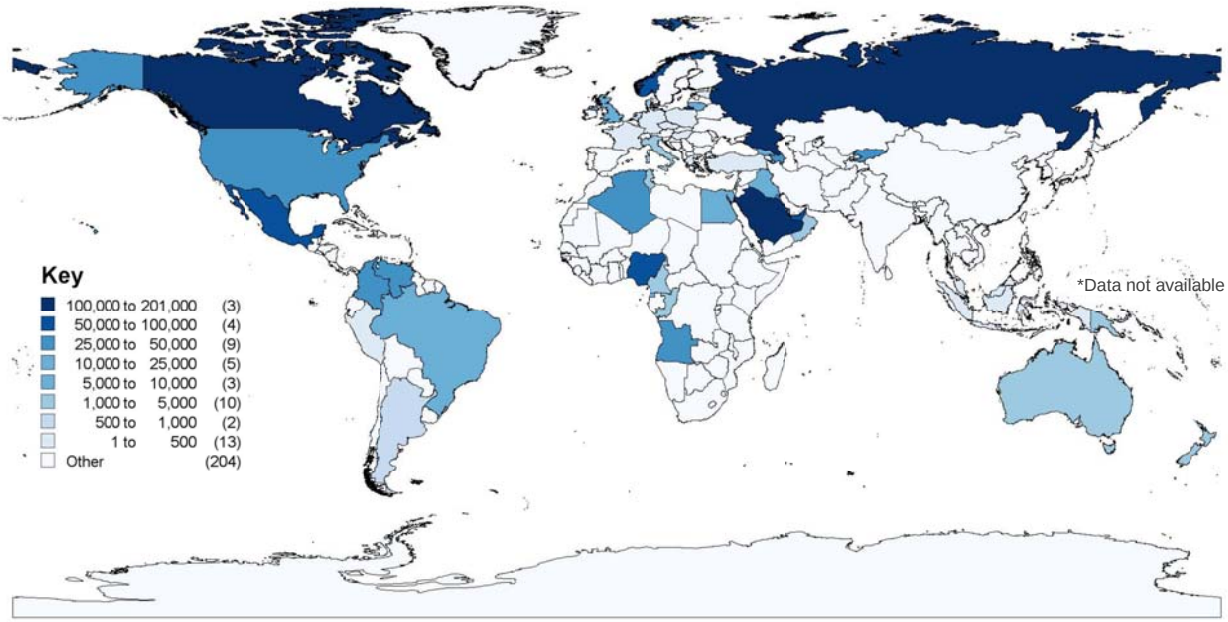


Chart 3 is an illustration of where crude oil exports originated in 2015. Currently, Saudi Arabia, Russia and Canada are by far the biggest exporters of crude in the world. Norway exported the most crude of all European nations; the UK was the 3rd biggest exporter in Europe and placed 18th overall. Although the United States produced over three times as much as any other OECD country, they exported relatively little due to a nationwide ban on almost all crude exports. The 40-year ban was lifted in December 2015, with May 2016 seeing the highest quantity of crude exported from the US on EIA records[2]. The United States has still been exporting comparatively small quantities up to June 2016 despite the lift of the ban, but we may expect to see an increase of crude exports from the US in the future.

Chart 3: Worldwide Crude Oil exports (kt), 2015

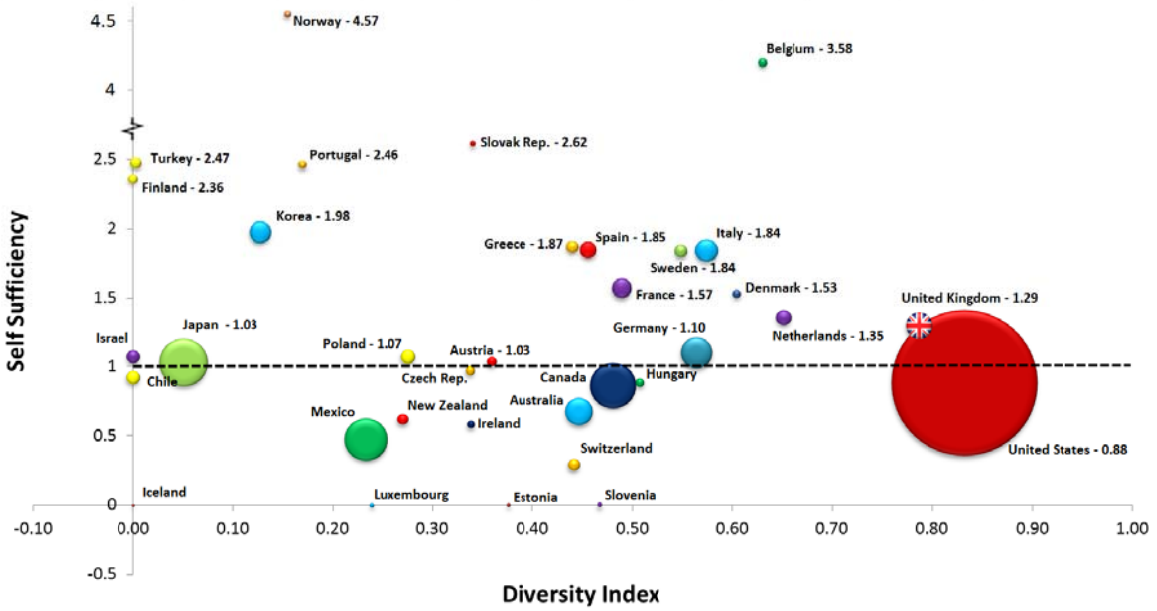


[2] www.eia.gov/dnav/pet/pet_move_exp_dc_NUS-Z00_mbbl_m.htm

Motor Gasoline

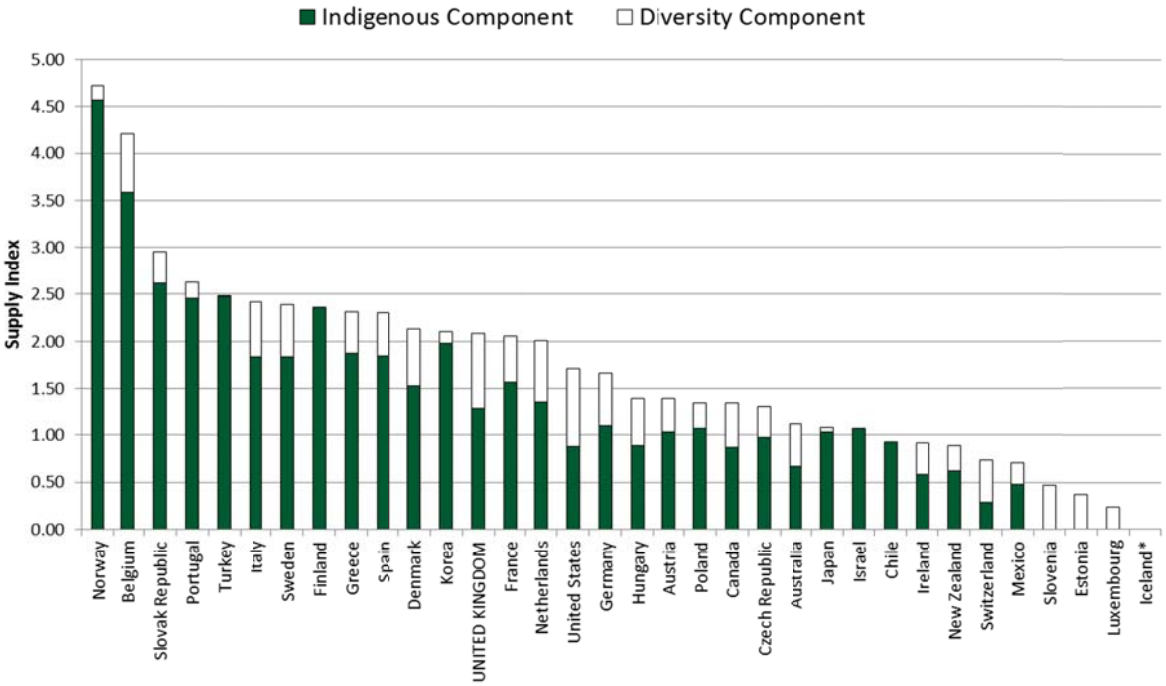
The profiles for motor gasoline are considerably different to that of crude. Over 50 per cent of the 34 OECD countries were self-sufficient in 2015 (Chart 4). Consumption in the US dwarfs that of other OECD countries; equal to 65% of the world total. The UK had a self-sufficiency score of 1.29, which was slightly below than the average across all OECD countries of 1.34. The UK's diversity score of 0.79, however, was higher than the OECD average of 0.36.

Chart 4: Diversity and self-sufficiency of motor gasoline for OECD countries, 2015



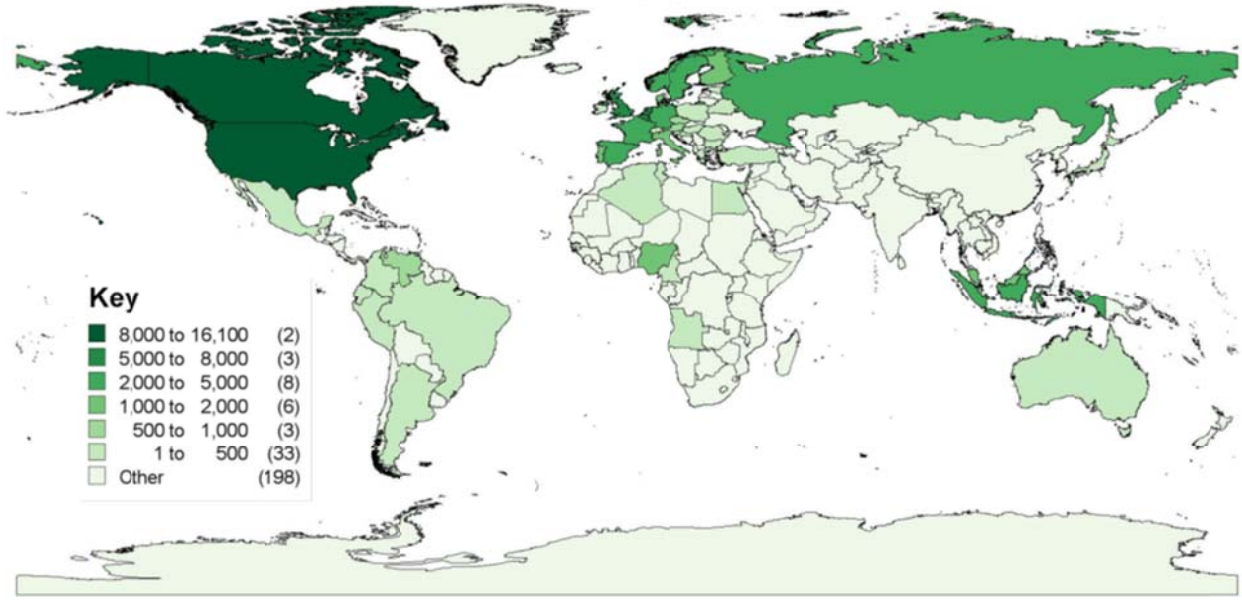
Our supply index (Chart 5) shows how the vast majority of countries produce enough motor gasoline to meet their needs. The UK ranks 14th out of the 34 OECD countries in the supply index of motor gasoline.

Chart 5: Supply index of motor gasoline for OECD countries, 2015



The main area of exports for motor gasoline around the world is North America, with the United States the largest exporter in the world, exporting twice the amount of the next biggest exporter, Canada. Europe is also shown on the map to be a very significant exporter of motor gasoline to the rest of the world with the United Kingdom, the Netherlands and Belgium of particular note. However, many large economies such as Australia, Japan and China export very little quantities of motor gasoline.

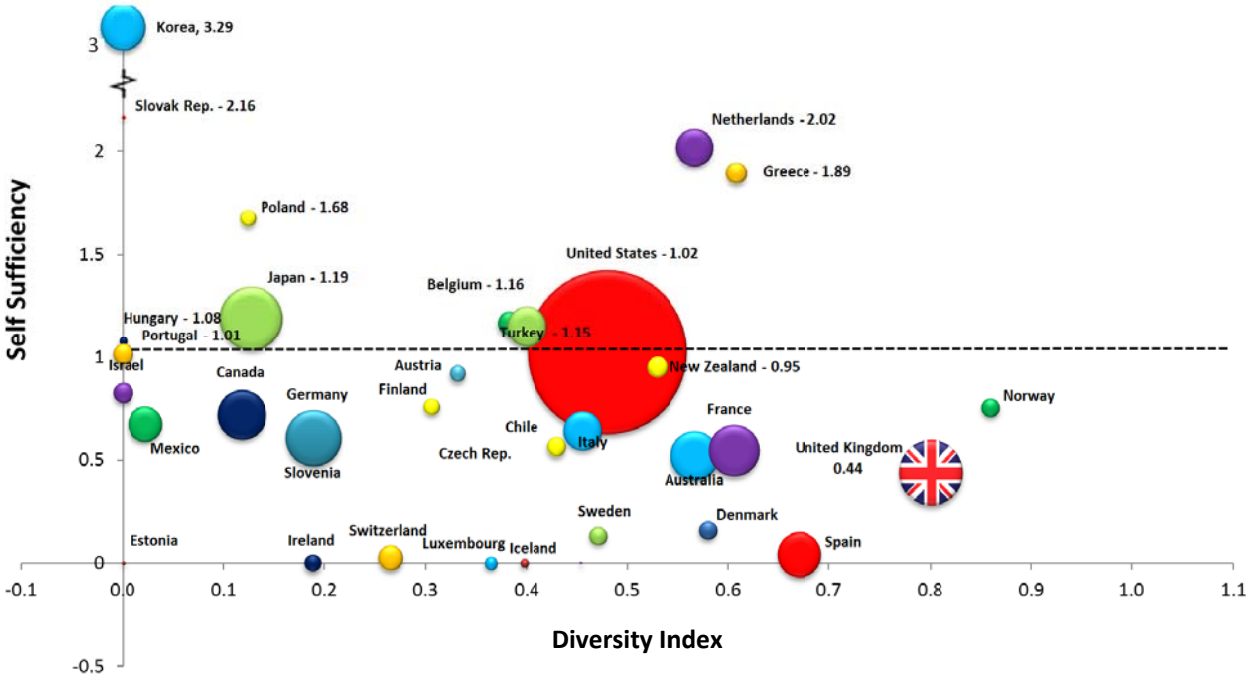
Chart 6: Worldwide Motor Gasoline exports (kt), 2015



Jet Fuel

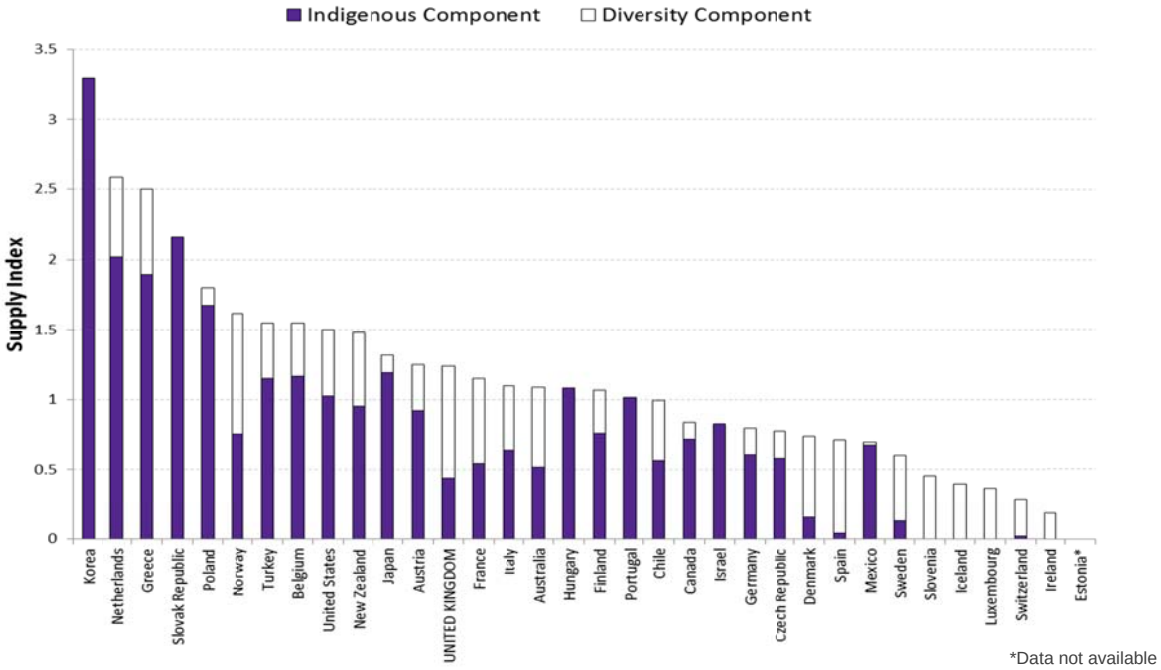
Chart 7 shows that, with a self-sufficiency score of 0.44, the UK was below both the self-sufficient threshold of 1 and the OECD average 0.80 for jet fuel. However, the UK's import diversity score of 0.80 was more than double the average for all OECD countries (0.34) and was the second highest of all OECD countries after Norway.

Chart 7: Diversity and self-sufficiency of jet fuel for OECD countries, 2015



Many OECD countries have significant production capacity of jet fuel. For instance, Korea produces some three times its demand and doesn't require any imports. Despite significant production of jet fuel, the UK met less than half of its demand, one of the largest deficits in the OECD. Demand from Heathrow (the busiest airport in Europe) is a significant factor in this deficit with the UK second only to the United States in demand for jet fuel. The UK is however well placed for diversity of supply and has one of the most diverse and stable import sources within the OECD.

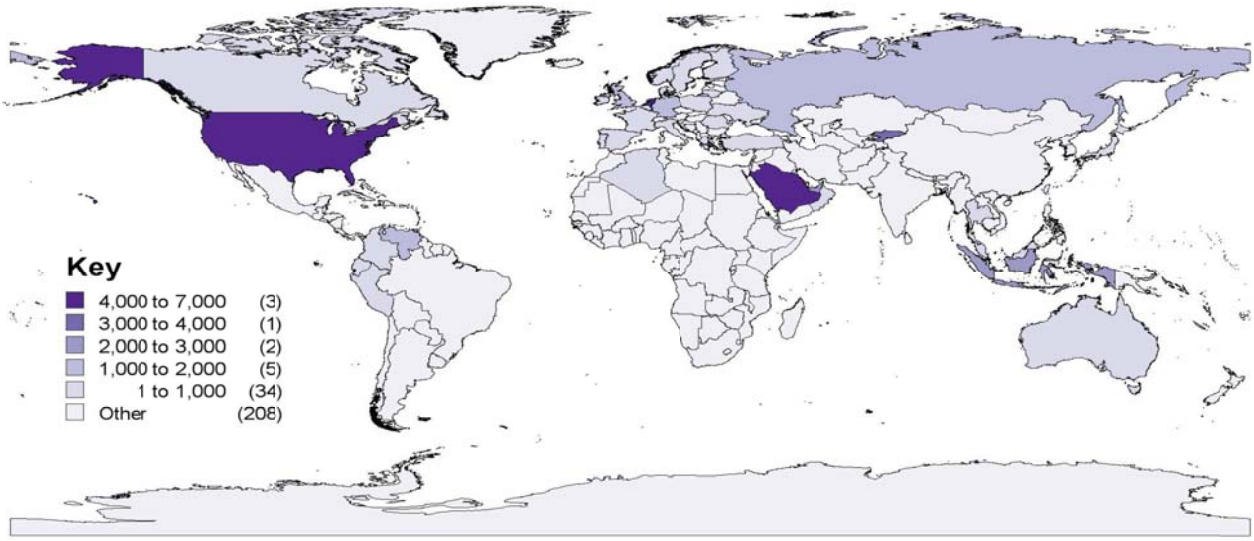
Chart 8: Supply index of jet fuel for OECD countries, 2015



*Data not available

Jet fuel is only exported in significant quantities from a few countries around the world, with Korea, the Netherlands, the United States and Saudi Arabia exporting the most. The Netherlands is a trading hub for many oil products, with large amounts of imports then 're-exported' and not used for the country's own consumption. Europe exports relatively small amounts of jet fuel (excluding the Netherlands) as does Japan, Canada and North Africa.

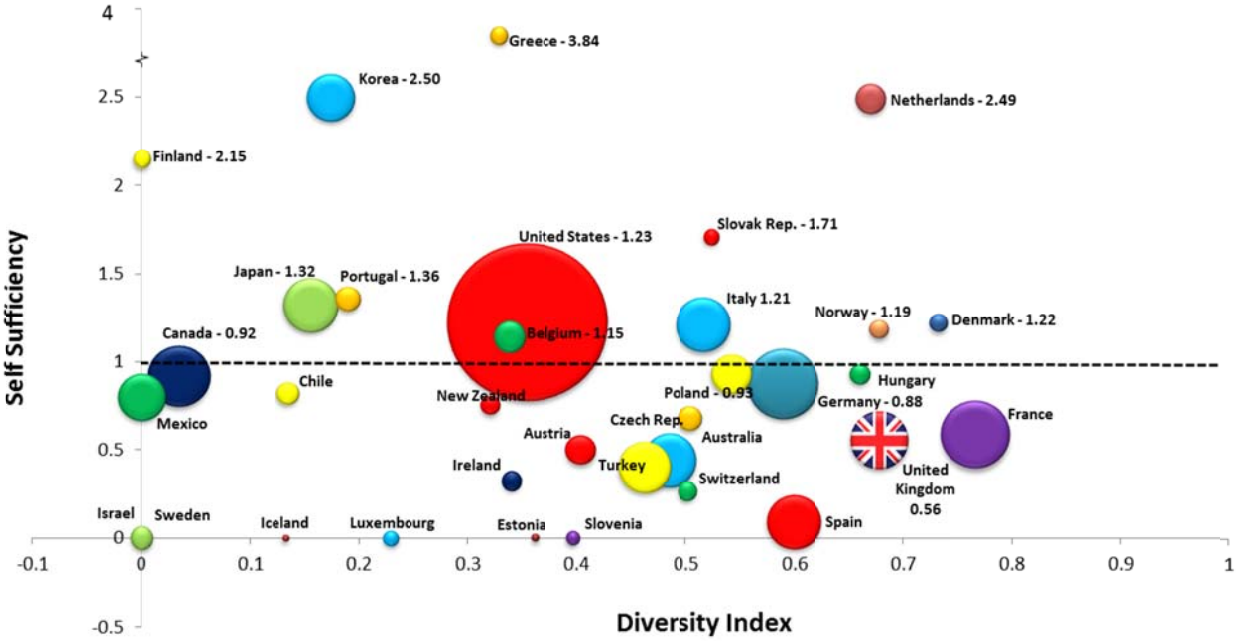
Chart 9: Worldwide Jet Fuel exports (kt), 2015



Diesel Road Fuel

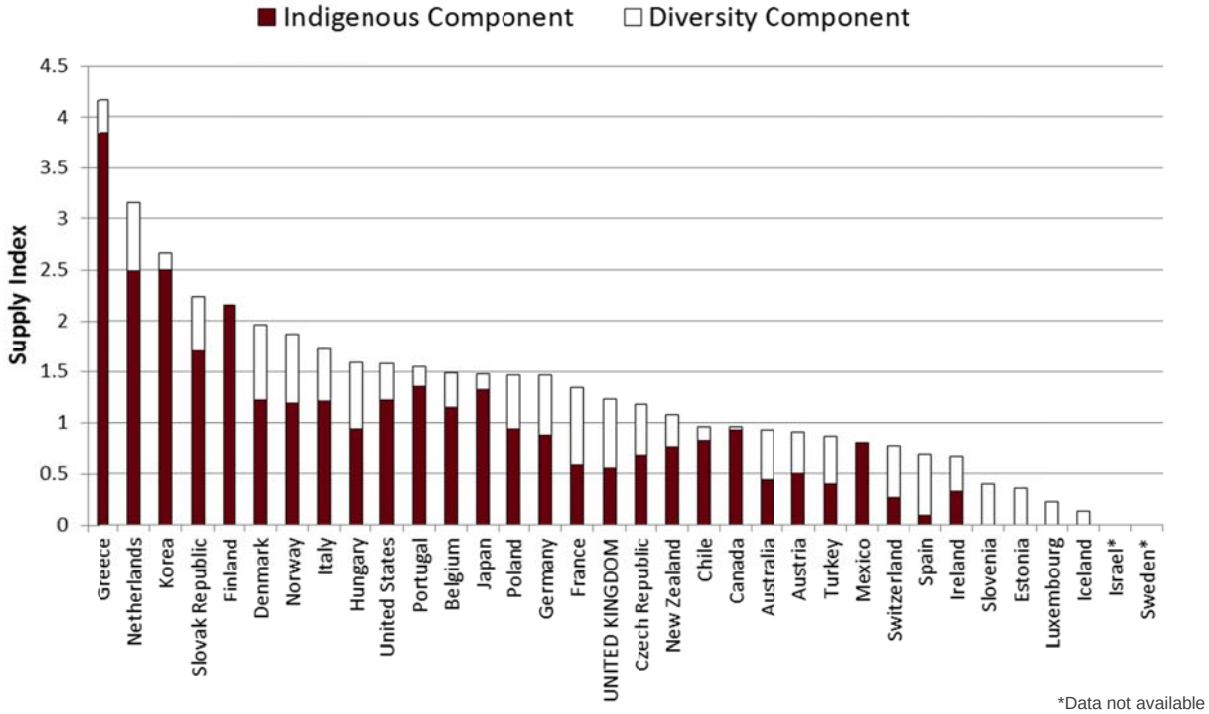
At 0.56 on the self-sufficiency axis, the UK was below the average OECD self-sufficiency score of 0.92 in 2015, producing just over half of the diesel it consumed. However, the UK is in a favourable position in terms of diversity and political stability of imports; the UK's diversity score of 0.68 was higher than the OECD average of 0.38 (Chart 10) and was the third highest out of all 34 countries.

Chart 10: Diversity and self-sufficiency of diesel for OECD countries, 2015



The majority of countries either met demand through indigenous production or by a combination of production and diverse imports. The profile depicts how the UK's supply index was the median value of all of the OECD countries' scores (Chart 11).

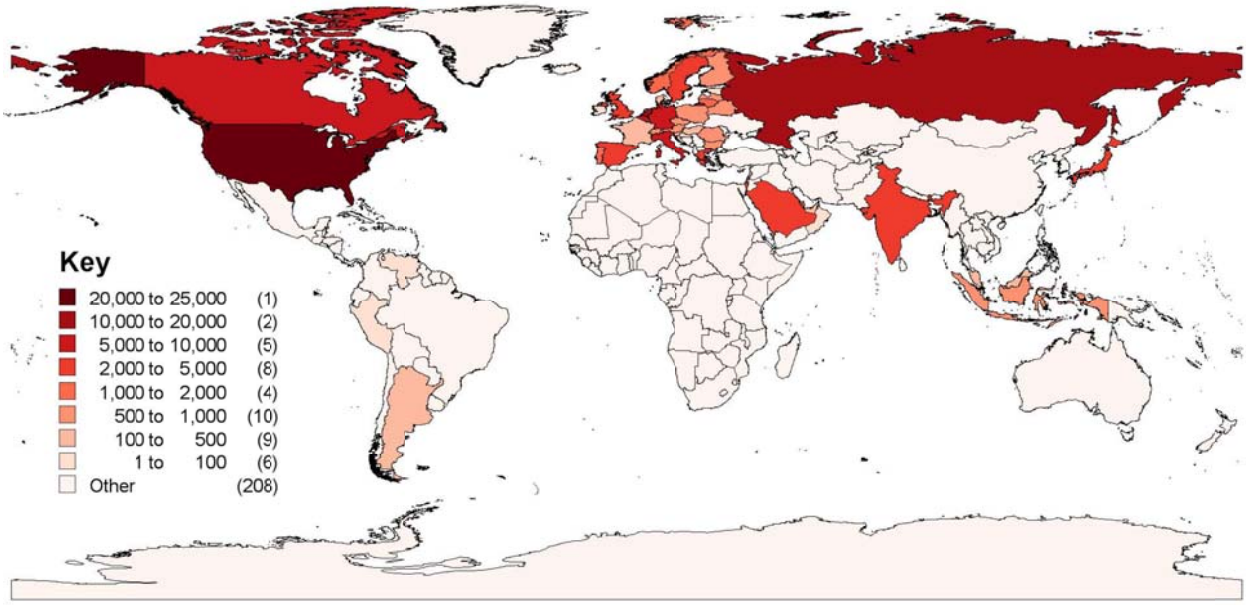
Chart 11: Supply index of diesel for OECD countries, 2015



*Data not available

Chart 12 shows that the United States and Russia are the most significant exporters of diesel. There are limited quantities of exports from Asia and South America, with Europe and Canada exporting diesel in moderate quantities. The UK was the 10th largest exporter out of all 34 OECD countries.

Chart 12: Worldwide Diesel exports (kt), 2015



Summary

Self-Sufficiency and Import Diversity of OECD Countries in 2015

The overall picture of diversity of supply for oil and oil products reflects a higher average supply index score for oil products than for crude oil, primarily driven by higher levels of indigenous production for oil products than for crude itself. With an average self-sufficiency score of 0.41, OECD countries are very much dependent on imports of crude oil to meet refinery demand, compared to average scores of 1.34, 0.80 and 0.92 for motor gasoline, jet fuel and diesel respectively. This is reflected by the fact that crude oil has the highest average diversity score (0.43) out of all products for imports into OECD countries, possibly due to the wide variety of crude products that are available on the market, creating a need to import from a diverse range of sources. Although average self-sufficiency scores for transport fuels were much higher, these scores are dependent on refining crude oil, and as such indigenous production of these products cannot be decoupled easily from crude oil supply.

Historically, motor gasoline production across the OECD has been higher than demand, because the refining profile has been biased towards petrol production. This was not the case in 2015, with the total amount produced in OECD countries 3% lower than total consumption quantities. However, 20 of these 34 countries were self-sufficient; particularly notable were Norway and Belgium, producing much higher quantities than the amounts they consumed. With an average self-sufficiency score of 1.34 and an import diversity score of 0.36, motor gasoline production in the OECD as a whole did not meet demand due to a small quantity of countries with little to no production. Despite this, motor gasoline was still the highest scoring oil product in the overall supply index.

Diesel production across the OECD is around 1% higher than demand, with an average self-sufficiency score of 0.92. Around a third of OECD countries were self-sufficient in 2015, with

Greece producing over three times more than it consumed. This, along with an average diversity and political stability score of 0.38, ranks diesel the second highest oil product in the supply index.

Jet fuel imports had similar diversity scores to motor gasoline, averaging 0.34. This being the lowest diversity score out of the four products, combined with a below average self-sufficiency score of 0.80, put jet fuel as the lowest scoring oil product in the supply index. However the UK, along with a number of north-western European countries, scored much higher than average on the diversity index suggesting that a number of countries have taken steps to maximise the diversity and political stability of jet fuel imports.

Self-Sufficiency and Import Diversity of the UK in 2015

The UK compares well with other OECD countries for both self-sufficiency and diversity; scoring slightly better for diversity by ranking in the top three for jet fuel, motor gasoline and diesel, and in the top half for crude oil. The UK could meet around three quarters of its crude oil consumption via indigenous production and ranks fifth out of all OECD countries, according to its supply index. The UK meets its needs for motor gasoline from indigenous production, depending on its offshore fields for some of the crude oil and the production profiles of its refineries. Conversely, the UK relies on imports to meets its requirements for jet fuel and diesel road fuel as its refineries do not meet demand from increasing air movements and the shift towards diesel cars.

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Appendix 1 – Provisional data for 2015

	Crude Oil			Motor Spirit			Jet Fuel			Diesel Road Fuel		
	Diversity plus Political Stability	Self sufficiency	Demand (KT)	Diversity plus Political Stability	Self sufficiency	Demand (KT)	Diversity plus Political Stability	Self sufficiency	Demand (KT)	Diversity plus Political Stability	Self sufficiency	Demand (KT)
Australia	0.83	0.68	22847	0.45	0.67	13680	0.57	0.52	6509	0.48	0.44	21577
Austria	0.66	0.10	8852	0.36	**1.03**	1665	0.33	0.92	704	0.40	0.50	6516
Belgium	0.61	0.00	32051	0.63	**3.58**	1366	0.38	**1.16**	1447	0.34	**1.15**	7010
Canada	0.32	**2.28**	67919	0.48	0.87	35080	0.12	0.72	6025	0.03	0.92	26259
Chile	0.20	0.03	8905	0.00	0.92	3251	0.43	0.57	1015	0.13	0.83	3674
Czech Republic	0.28	0.02	7223	0.34	0.97	1577	0.19	0.58	319	0.50	0.68	4460
Denmark	0.23	**1.05**	7336	0.60	**1.53**	1280	0.58	0.16	895	0.73	**1.22**	2325
Estonia	0.00	-	0	0.38	0.38	237	0.00	0.00	39	0.36	0.00	444
Finland	0.27	0.00	9808	0.00	**2.36**	1507	0.31	0.76	713	0.00	**2.15**	2406
France	0.80	0.01	57338	0.49	**1.57**	7083	0.61	0.55	6952	0.77	0.58	34519
Germany	0.73	0.03	93344	0.56	**1.10**	18226	0.19	0.61	8537	0.59	0.88	36756
Greece	0.51	0.00	21695	0.44	**1.87**	2463	0.61	**1.89**	1097	0.33	**3.84**	2179
Hungary	0.19	0.09	6454	0.51	0.89	1288	0.00	**1.08**	172	0.66	0.93	3071
Iceland	0.00	-	0	0.00	0.00	133	0.40	0.00	188	0.13	0.00	346
Ireland	0.43	0.00	3367	0.34	0.58	1034	0.19	0.00	802	0.34	0.33	2648
Israel	0.00	0.01	11737	0.00	**1.07**	3027	0.00	0.83	1092	0.00	-	0.00
Italy	0.79	0.08	66771	0.57	**1.84**	9173	0.46	0.64	3971	0.52	**1.21**	21620
Japan	0.65	0.00	153913	0.05	**1.03**	39105	0.13	**1.19**	10359	0.16	**1.32**	20079
Korea	0.78	0.00	137703	0.13	**1.98**	9009	0.00	**3.29**	5830	0.17	**2.50**	16096
Luxembourg	0.00	-	0	0.24	0.00	298	0.36	0.00	428	0.23	0.00	1653
Mexico	0.00	**2.03**	57545	0.23	0.48	33129	0.02	0.68	3229	0.00	0.80	16920
Netherlands	0.69	0.03	52777	0.65	**1.35**	4002	0.57	**2.02**	3692	0.67	**2.49**	6652
New Zealand	0.84	0.34	5428	0.27	0.62	2330	0.53	0.95	1127	0.32	0.76	2676
Norway	0.56	**5.62**	13720	0.15	**4.57**	874	0.86	0.75	908	0.68	**1.19**	2735
Poland	0.17	0.04	26140	0.28	**1.07**	3706	0.12	**1.68**	637	0.54	0.93	11908
Portugal	0.74	0.00	13973	0.17	**2.46**	1114	0.00	**1.01**	1164	0.19	**1.36**	4329
Slovak Republic	0.00	0.00	5931	0.34	**2.62**	599	0.00	**2.16**	43	0.52	**1.71**	1695
Slovenia	0.00	-	0	0.47	0.00	428	0.45	0.00	23	0.40	0.00	1366
Spain	0.78	0.00	64933	0.46	**1.85**	4929	0.67	0.04	5486	0.60	0.09	21780
Sweden	0.49	0.00	19982	0.55	**1.84**	2715	0.47	0.13	847	0.00	0.00	3980
Switzerland	0.51	0.00	2803	0.44	0.29	2516	0.27	0.02	1637	0.50	0.27	2683
Turkey	0.38	0.10	25513	0.00	**2.47**	2068	0.40	**1.15**	4372	0.46	0.40	19570
United Kingdom	0.55	0.78	55147	0.79	**1.29**	12713	0.80	0.44	11353	0.68	0.56	24245
United States	0.64	0.58	799397	0.83	0.88	398871	0.48	**1.02**	71567	0.35	**1.23**	185148
OECD Average	0.43	0.41	54722	0.36	**1.34**	17953	0.34	0.80	4800	0.38	0.92	15274

Source: IEA (http://data.iea.org/)

Items in **bold** highlight those countries where indigenous capacity exceeded domestic consumption.

Appendix 2 – Methodology

Data for crude oil and transport fuel self-sufficiency

Data for crude oil, motor gasoline and jet fuel were extracted from the IEA database. For diesel, data were provided on request from the IEA. Self-sufficiency was determined from data on indigenous production and consumption (production (kt) ÷ consumption (kt)).

Crude oil and transport fuel diversity indices

The diversity index used here is a product of a standard diversity index and an index for political stability. As a basic index for measuring diversity, we used the Shannon-Wiener diversity index. The Shannon-Wiener index is of the form:

$$\sum_{i=1}^{n} -x_i \ln(x_i)$$

Where *x* is the proportion of total fuel supply represented by the i^{th} source country and n represents the final source country. A value below 1 signifies a country that is dependent on a small range of import sources, a value above 2 represents a country with a wide range of import sources. The minimum value of zero denotes a country that has one imported fuel source or relies entirely on indigenous production.

A previous comparative study on import diversities in Energy Trends March 2011 used the Herfindahl Index as the basic diversity index. Although both of these indices have their advantages, the Shannon-Wiener was chosen here as this represents the data with less skew, as well as placing more weight on the diversity of contributions from smaller countries and lessening the impact of larger nations.

Political stability was determined using data from the World Bank worldwide governance indicators. Specifically, the index reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. These data were standardised between 0 and 1.
Source: **World Bank** (http://info.worldbank.org/governance/wgi/index.aspx#home)

Once Shannon-Wiener and political stability indices were determined, these were multiplied and summed:

$$\sum_{i=1}^{n} -x_i \ln(x_i)\, b_i$$

Where *b* is an index of political stability of producing country. This is called the SWNI (Shannon-Weiner-Neumann index), in line with previous work.

Each SWNI index was normalised for each petroleum product between 0 and 1, in order to have a standardised index. This was done by working out a maximum diversity score, by assuming maximum diversity was equivalent to importing products in line with proportional contributions of exporting countries (e.g. if a single country were responsible for exporting 50 per cent of all product, and five other countries were responsible for 10 per cent each, we assumed maximum import diversity at a ratio of 5:1:1:1:1:1). This maximum diversity score then acted as our upper score of 1, with all other scores divided by this maximum to standardise the data.

Competition in gas supply

Introduction

This article includes information relating to competition in the gas market, formerly published as part of UK Energy Sector Indictors. The article describes the number of companies operating, the market concentrations of the domestic, commercial and industrial markets as well as data on the size of the companies operating.

Background to changes in the gas market

Three-quarters of the non-domestic market (customers with demand above 25,000 therms per year) for gas was effectively opened up to competition at the end of 1986. Most of the remainder (between 2,500 and 25,000 therms a year) was opened up in August 1992. The domestic market was opened for competition in between April 1996 and May 1998, with large increases in the number of gas suppliers up to 2000.

After 2000, the number of companies supplying gas decreased by more than 50 per cent from its peak, driven by company mergers. There are effectively four competitive sectors - sales to the electricity generators, the industrial sector, the commercial sector and the domestic sector.

Competition for electricity generation cannot be calculated accurately due to complexities associated with this sector. BEIS collect data on final sales from gas companies; companies who generate electricity from gas are often the same companies who trade gas, therefore at the point of sale, sellers do not know the proportion of gas sold which will be used for generation and that which will be traded on. As such data for electricity generation competition are not presented here.

Number of companies supplying gas at least 1,750 GWh of gas

The table below shows the number of companies supplying gas to final consumption in the domestic, commercial and industrial sectors. The table shows only those companies supplying at least 1,750 GWh of gas to the respective sectors. [1]

Table 1, Number of companies supplying gas.

	1997	1998	2000	2002	2004	2006	2008	2010	2012	2013	2014	2015
Domestic sector	1	9	14	12	7	6	6	7	7	8	9	12
Commercial sector	9	12	10	10	10	7	6	8	8	9	9	9
Industrial sector	12	15	15	15	10	9	8	8	7	10	11	12

(1) Companies can supply into more than one market and are counted in each market they supply. Companies who supply less than 1,750 GWh are excluded. In September 2016 Ofgem data indicate that 117 suppliers were licensed to supply gas to domestic customers but some suppliers have more than one supply licence and own or part own more than one supply company.

The data indicate that the number of companies supplying gas has increased in the domestic and industrial sectors in 2015, with the commercial sector remaining the same. Although data are restricted to companies supplying more than 1,750 GWh within each sector

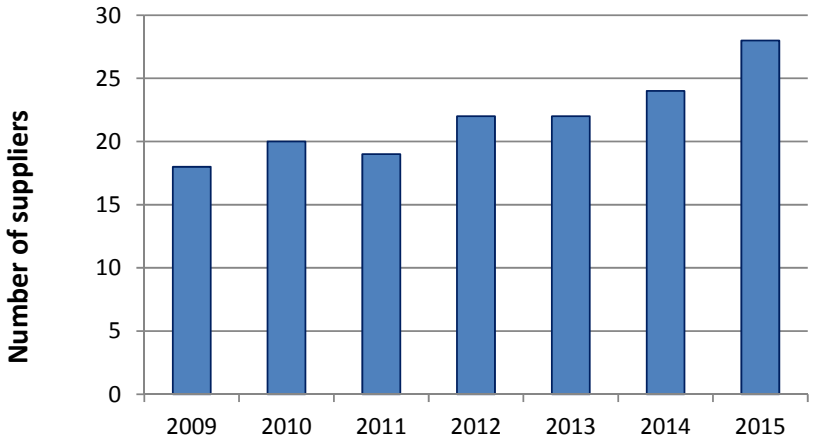
Number of large and small suppliers in the market

New suppliers are continuing to enter the market at an increasing rate. Ofgem data indicates that fourteen new licensed suppliers became active in the domestic segment and nine in the non-domestic segment. These new entrants have business models such as not-for-profit, renewable and local supply schemes.

[1] This represents a methodological change from previous data shown in Energy Sector Indicators where the cut-off was previously 0.25 per cent of the market share for each market. The methodological change brings the table in line with the collection methodology used by BEIS.

The chart below shows the number of companies supplying more than 1,750GWh a year of gas, (excluding gas to electricity generation) and indicates a generally sustained pattern of increase from 17 in 2009 to 25 in 2015.

Total number of companies supplying over 1,750GWh of gas, 2009 to 2015



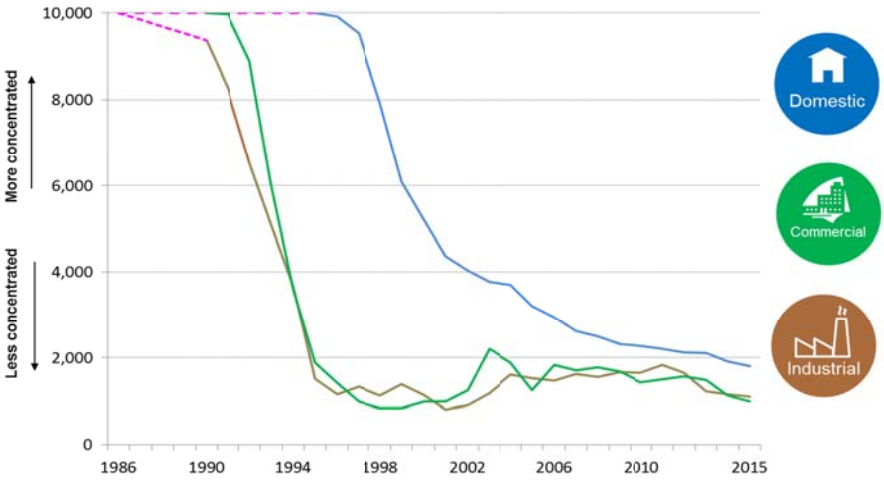
In addition, smaller suppliers continue to enter the market. BEIS collects information from companies licenced to supply gas through two surveys, one a mandatory return for companies supplying more than 1,750 GWh a year of gas (~ 0.5 per cent of final consumption), the other a voluntary return for companies supplying less than that threshold. Returns rates for the survey of companies over the 1,750 GWh threshold is 100 per cent, whilst the return for smaller companies under than threshold was 57 per cent in 2015. In 2015 there were 33 small gas suppliers who returned data compared with 8 returns in 2009. The increase has been broadly steady over that period but differences in survey completion rates will affect this.

Competition in gas sales to the domestic, commercial and industrial sectors, 1986 to 2015

Continuing the trend of recent years the domestic, industrial and commercial markets have all seen their market concentrations decrease in comparison to 2014. This is due to the increasing number of small suppliers joining the market, and taking a larger part of the market share.

The chart below shows the market concentration as expressed through the Herfindahl-Hirschman index, one of the standard metrics for analysing concentration. In the chart higher numbers show more concentration and lower numbers indicate a more diverse market.

Herfindahl-Hirschman Index for market concentration, 1986 to 2015



Whilst each market has seen a decrease in their concentration, it is notable that the all three markets have done so consistently in recent years. Both the industrial and commercial sector became less concentrated through much of the first decade of the new century but both have shown an decrease in concentration in recent years.

The domestic market has become less concentrated due to increasing number of small suppliers taking an increasing percentage of the market share. In 2015 the total number of companies supplying gas to the market was 30, up from 21 in 2014. As Table 1 shows, the number of companies who supplied more than 1,750 GWh was up from 9 in 2014 to 12 in 2015, this figure has been increasing since 2008 as these new companies continue to take market share.

The industrial market has seen a small increase in the number of companies supplying more than 1,750 GWh since 2014, increasing from 11 in 2014 to 12 in 2015 (see Table 1). This coupled with the fact that smaller companies have joined the market (27 companies in total supplying the market in comparison to 20 in 2014) has led to the market becoming less concentrated.

The commercial market has seen a broadly steady picture with regards to the number of companies supplying over 1,750 GWh in recent years. However, the number of small suppliers has increased, up from 21 in 2014 to 31 in 2015, the market has become less concentrated.

Gas supplied to all consumers by aggregated shares.

The table below shows how the market shares of the largest companies have changed over the last 5 years with the largest tending to lose market share to the medium sized and smaller companies. In 2011, the top 9 accounted for 82.2 per cent of the market, which is down to 77.2 per cent in 2015. Figures are based on total gas supplied excluding gas for electricity generation

Table 2: Gas supplied to all consumers by aggregated shares.

	Market share (%)				
Gas suppliers	2011	2012	2013	2014	2015
Aggregated share of top 3 suppliers	47.2	46.9	45.5	43.7	42.3
Aggregated share of next 3 suppliers	21.0	20.2	21.1	20.8	20.6
Aggregated share of next 3 suppliers	14.0	14.3	14.9	15.5	14.3
Aggregated share of top 9 suppliers	**82.2**	**81.4**	**81.5**	**80.0**	**77.2**
Other suppliers	17.8	18.6	18.5	20.0	22.8

Herfindahl-Hirschman

The Herfindahl-Hirschman measure attempts to measure market concentration. It places extra emphasis on the contributions of participants with the largest shares. The measure is commonly used to assess whether mergers should go ahead and whether they will significantly affect the balance of the market in a particular sector.

It is expressed by the following equation:
Herfindahl-Hirschman measure = the square of each participant's market share added together across all participants in the market

Values vary between zero, which signifies a perfectly competitive industry, and ten thousand, for a pure monopoly.

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Competition in UK electricity markets

Introduction

This article includes information relating to competition in the UK electricity market, formerly published as part of UK Energy Sector Indicators. The article examines the two parts of the industry where there is competition for provision: generation and sales. For both markets, the article describes the number of companies operating, and the market concentrations. The Herfindahl-Hirschman measure (see explanation at the end of this article) is used to provide the market concentration as it provides extra emphasis on the contribution of participants with the largest shares. For electricity sales, this includes a breakdown by sector: domestic, commercial and industrial

Key points

- Major electricity suppliers[1] increased in number from 16 in 1989 before privatisation to 37 in 2015.
- Since 2010, electricity market concentration has slowly declined year-on-year across the domestic, commercial and industrial sectors, as more companies entered the market.
- The market share of smaller suppliers (outside the top nine) rose from 2.7% in 2010 to 12.2% in 2015, as new and smaller suppliers took market share from the large companies.
- Major power producers (MPPs) increased in number from 6 in 1989 to 51 in 2015.
- The top nine MPPs' share of generation decreased from 87% in 2012 to 83% in 2015. Their share of capacity decreased from 82% in 2012 to 78% in 2015 as new smaller generators entered the market.

Background to changes in the electricity market

Electricity generation

Following the restructuring of the electricity supply industry in 1990, the former nationalised companies were classified as major generating companies to distinguish them from autogenerators and the new companies set up to generate electricity. However over the next few years, some new independent companies were beginning to make significant contribution to the electricity supply and therefore a new terminology "Major Power Producers" (MPPs) was introduced to signify those companies whose prime purpose is the generation of electricity. The breakup of the nationalised power suppliers into smaller privatised companies immediately increased market competitiveness, with new companies beginning to build their own Combined Cycle Gas Turbine (CCGT) stations from 1992. Major wind farm companies and major solar photovoltaic (PV) operators are now also included in the MPP definition.

Electricity supply

Competition was introduced to the electricity markets in three phases. First the upper tier of the non-domestic market (customers with a maximum demand of over 1 MW, comprising 30 per cent of the market) was opened up to competition in March 1990. Next, the 100 kW to 1 MW tier (15 per cent of the market) was opened up to competition in April 1994. Full competition for the remaining 55 per cent of the market (below 100 kW peak load) was introduced in stages between September 1998 and June 1999. This final phase covered domestic consumers who account for almost a third of electricity consumed in the UK.

Competition in electricity sales

The number of electricity suppliers rapidly increased, from 16 before privatisation in 1989 to 26 in 2005. The concentration measure levelled off between 2000 and 2008 as although new power producers entered the market, others were either taken over or bought additional power stations to add to their portfolios. There were 37 electricity suppliers in 2015.

[1] In this article electricity supplier refers to major suppliers surveyed by BEIS, covering approximately 99% of all UK electricity sales in 2015. Please see the BEIS Electricity statistics data sources and methodologies for more details.

Table 1 shows the number of supplying companies to the domestic, commercial and industrial sectors, 1996 to 2015.

Table 1: Number of companies supplying electricity(1)

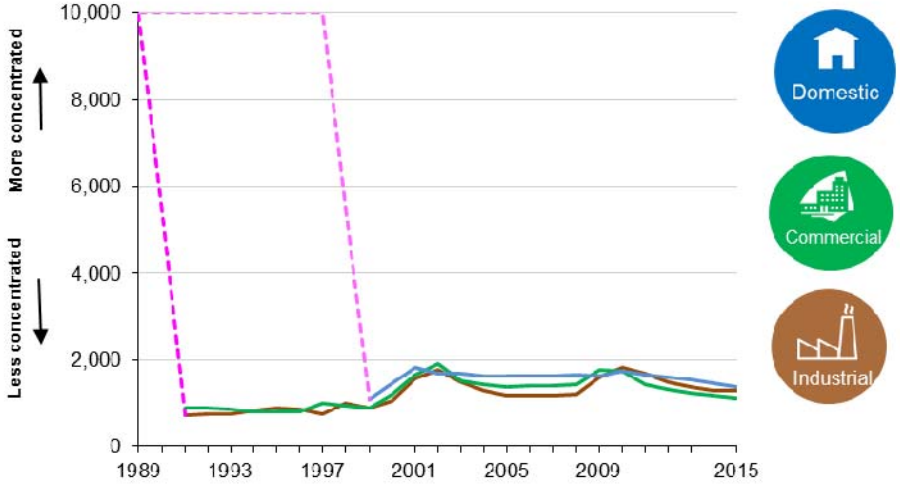
	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2015
Domestic sector	1	1	11	7	11	10	10	11	15	20	22
Commercial sector	17	16	14	14	18	17	14	15	21	26	28
Industrial sector	18	22	20	18	30	21	19	21	25	26	29

(1) Companies can supply into more than one market and are counted in each market they supply to.
Source: BEIS

Chart 1 below shows the market concentration as expressed through the Herfindahl-Hirschman index. In the chart, higher numbers show more concentration while lower numbers indicate a more diverse market.

There was an initial sharp decrease in market concentration following privatisation, then a rise between 1998 and 2002, mainly due to a spate of mergers. The market concentration subsequently fell as the number of industrial and commercial suppliers increased but by 2010 it had increased again as a result of a number of closures. Since 2010, electricity market concentration has slowly declined year-on-year across the domestic, commercial and industrial sectors, as the market became more competitive. This was due to increasing numbers of smaller suppliers entering the market and taking share from bigger companies.

Chart 1: Herfindahl-Hirschman Index for electricity sales market concentration, 1989 to 2015



Source: BEIS

The domestic market was a regional monopoly before 1998, dominated by the Regional Electricity Company (REC). From 1999 to 2002 electricity sales to the domestic sector, as with industry and commercial sales, became more concentrated, with mergers between former RECs, and with other suppliers/generators. Since 2002, there has been less merger activity and the concentration measure has been fairly constant. In 2013 though there were five entrants to the market; however, the low level of customers acquired had little impact on the index.

In 2015, two more suppliers to the domestic sector entered the market, increasing the total to 22. The commercial market had 19 commercial electricity suppliers in 2004/05 but this fell to 15 in 2010, causing an increase in market concentration. Since 2010 the number of suppliers has increased to 28 in 2015, with an accompanying decrease in concentration. With 29 industrial electricity suppliers in 2015, the industrial market has become less concentrated than in 2010 when there were 21 industrial electricity suppliers.

Electricity supplied to all consumers by aggregated shares.
Table 2 shows how the market shares of the largest companies have changed over the last five years. The market share of the top nine suppliers peaked in 2009 and 2010 but since has steadily fallen to 88% in 2015. The share of those outside of the top nine rose from 2.7% in 2010 to 12.2% in 2015, due to the addition of new suppliers and other small suppliers taking market share from the large companies.

Table 2: Percentage of total electricity supplied to all consumers

	Market share (%)				
Electricity suppliers	2011	2012	2013	2014	2015
Aggregated share of top 3 suppliers	51.3	49.1	47.7	47.4	45.1
Aggregated share of next 3 suppliers	36.0	36.7	35.4	33.5	32.7
Aggregated share of next 3 suppliers	6.6	6.2	6.6	8.9	10.1
Aggregated share of top 9 suppliers	**93.8**	**92.0**	**89.7**	**89.8**	**87.8**
Other suppliers	6.2	8.0	10.3	10.2	12.2

Source: BEIS

Electricity generation competition
Table 3 shows the number of companies that are counted as MPPs. The number of companies increased rapidly, from six before privatisation up to a peak of 36 in 2001, before mergers caused numbers to fall back to 29 in 2006. Starting in 2007, several renewable generators were reclassified as MPPs and the addition of new generators saw the number of companies increase to 51 in 2015.

Table 3: Number of Major Power Producers(1)

Year	Number	Year	Number	Number producing at least 5% of total generation
1989	6	2000	34	7
1990	6	2001	36	6
1991	11	2002	36	7
1992	14	2003	34	6
1993	20	2004	32	7
1994	23	2005	30	7
1995	25	2006	29	7
1996	26	2007	34	8
1997	27	2008	34	9
1998	29	2009	34	8
1999	30	2010	39	8
		2011	41	7
		2012	44	7
		2013	32	7
		2014	47	7
		2015	51	6

(1) The full list of Major Power Producers and year of operation is available in Digest of UK Energy Statistics 2016, table 5.10.

Source: BEIS

Table 4 shows the MPPs aggregated share of generation and aggregated share of capacity for 2011 to 2015. The market share of the top 9 generators in this period peaked in 2013 at 87% but has since declined to 83% in 2015 as new companies entered the market and increased generation. The top 9 generators held a lower share of capacity (78% in 2015) compared to generation. This indicates a greater proportion of their generation is from non-renewable sources, which have higher load factors i.e. they operate closer to full capacity.

Table 4: Percentage of total generation and total capacity by Major Power Producers

Generating companies	Share in generation (%)					Share in capacity (%) (1)				
	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Aggregated share of top 3 companies	45.6	51.7	50.9	48.5	54.2	43.7	46.7	41.9	43.5	42.9
Aggregated share of next 3 companies	24.4	23.8	24.0	25.6	20.4	25.4	23.4	24.9	24.2	23.3
Aggregated share of next 3 companies	11.1	11.1	11.8	10.7	8.5	12.6	12.1	12.6	13.1	11.8
Aggregated share of top 9 companies	**81.1**	**86.6**	**86.7**	**84.8**	**83.0**	**81.7**	**82.2**	**79.4**	**80.9**	**78.0**
Other major power producers	18.9	13.4	13.3	15.2	17.0	18.3	17.8	20.6	19.1	22.0

(1) Of the same companies in each band in generation terms
Source: BEIS

User feedback

We welcome all feedback from users; therefore, if you have any comments or queries regarding this analysis, please contact either Stephen Ashcroft or Anwar Annut using the contact details below.

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Herfindahl-Hirschman

The Herfindahl-Hirschman measure attempts to measure market concentration. It places extra emphasis on the contributions of participants with the largest shares. The measure is commonly used to assess whether mergers should go ahead and whether they will significantly affect the balance of the market in a particular sector.

It is expressed by the following equation:
Herfindahl-Hirschman measure = the square of each participant's market share added together across all participants in the market

Values vary between zero, which signifies a perfectly competitive industry, and ten thousand, for a pure monopoly.

New methodology for estimating inland deliveries of road fuels and gas oil

Background

The data for demand of road diesel, motor spirit and gas oil published in Energy Trends and DUKES is matched to tax clearance figures published by HMRC. Historically HMRC have published these data on a monthly basis. However in light of a consultation between November 2015 and February 2016 HMRC took the decision to change the publication frequency of their Indirect Tax statistical bulletins, including the Hydrocarbon Oils Bulletin, to a quarterly schedule[1]. The bulletins will still include monthly data, but will be published up to 3 months in arrears.

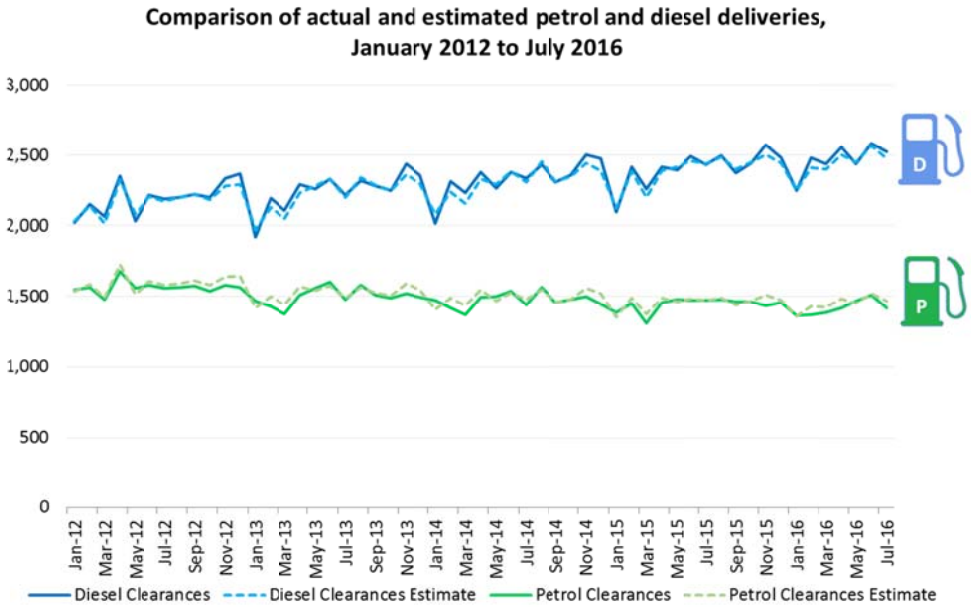
As a result of these changes, monthly demand figures published by BEIS in Energy Trends will be estimated then revised to match HMRC published figures when revisions are undertaken. Estimates will be marked to indicate they are provisional. Quarter 1 will be revised in June each year, Q2 in September, Q3 in December and Q4 in March, as per usual Energy Trends revision policy.

Method 1 Road fuels

Figures for total oil tax receipts will continue to be published on a monthly basis in the HMRC Tax and National Insurance Contributions Receipts (TNR) bulletin. The profile for petrol and diesel clearances strongly correlates with total oil tax receipts because diesel and petrol account for most of this figure, making receipts from the TNR bulletin an accurate predictor for clearances and hence our own figures of deliveries into consumption. To estimate monthly consumption:

- a moving six month average of the ratio of diesel and petrol clearances to total receipts will be calculated;
- that average ratio will be applied to monthly total receipts taken from the TNR bulletin to estimate road diesel and petrol consumption until the next quarterly Hydrocarbon Oils bulletin is released.

The chart below indicates the result of these estimates as applied to historic data. The chart indicates the methodology is expected to yield good indicative results; the maximum error in estimates is 5 per cent for petrol and 5 per cent for diesel but the average error (in absolute terms) is 2 per cent for petrol and 1 per cent for diesel.



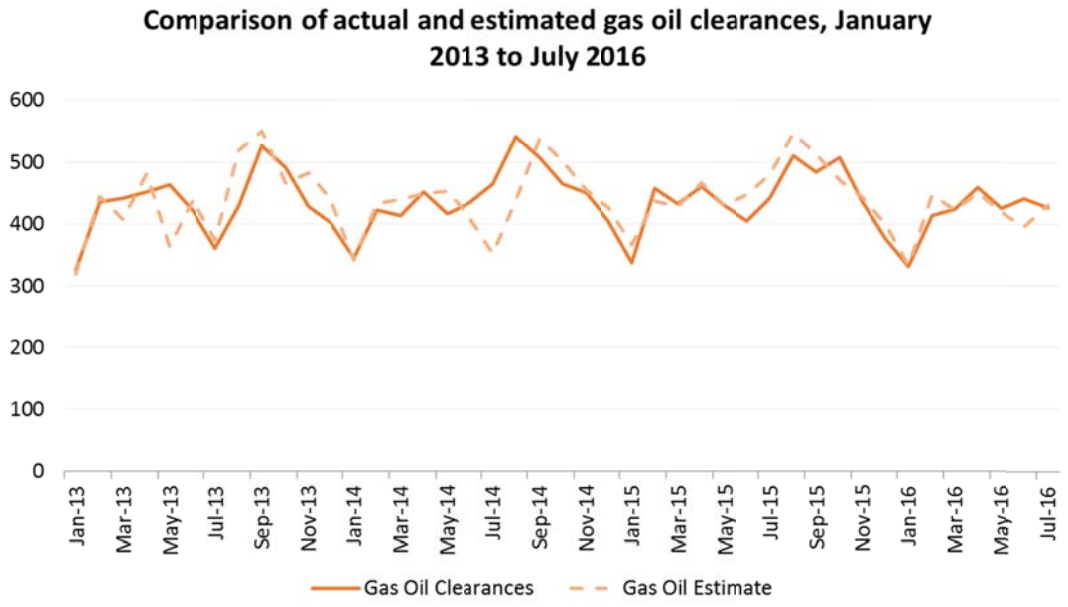
[1] For the full response to the consultation please see www.gov.uk/government/publications/user-consultation-hmrc-indirect-tax-receipts-statistics

Method 2 Gas oil

The methodology used by BEIS for road fuels is not as accurate for estimating gas oil consumption because gas oil accounts for a smaller proportion of overall receipts (approximately one-fifth of diesel clearances), and follows a more seasonal pattern. A second methodology has been developed to estimate gas oil, which makes use of historic data to estimate current consumption. To estimate the monthly consumption:

- the percentage change in gas oil clearances from the same month in the previous year will be calculated using the most recent six months of data;
- the average percentage change over those six data points will be applied to the previous year's data to estimate gas oil consumption until the next quarterly Hydrocarbon Oils Bulletin is released.

The methodology used to estimate gas oil is more prone to error; the maximum error is as much as 24 per cent, due to predictions of peaks in consumption sometimes being one month different. This is caused by differences in average monthly temperatures from year to year, which will be taken into consideration when estimating gas oil consumption each month. The average error (absolute figure) is 6 per cent for gas oil.



Future review

We acknowledge with thanks engagement and advice from HMRC colleagues with regards to the estimation methodology. BEIS will keep the methodology under review and welcome thoughts on improvements from our user community.

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Coal in 2015

Introduction

This article gives an overview of UK coal production and consumption up to the end of 2015.

Key points

- In 2015 UK coal production fell to an all-time low of 9 million tonnes.
- UK imports also fell and were 24 million tonnes, a decrease of 43 per cent on 2014.
- This was due to lower demand for coal, which decreased by 23 per cent compared to 2014 as demand for coal used in electricity generation fell.
- 8GW of coal fired electricity generation capacity have closed since December 2012 due to the Large Combustion Plant Directive (LCPD), with further closures anticipated by the end of 2023 under the Industrial Emissions Directive (IED).

Background

Until the late 1960s, coal was the main source of energy produced in the UK, peaking at 228 million tonnes in 1952. Ninety-five per cent of this came from around 1,334 deep-mines that were operational at the time, with the rest from around 92 surface mines. As UK energy started to become more diverse from the early 1970s (initially, through primary electricity via hydro schemes followed by natural gas and crude oil and renewable & waste in later years), production of home-produced coal has significantly declined. However, there remains a significant demand for coal in this country. Before 1970, it was used as a fuel source in the industrial sector, for fuelling trains and used within households for cooking and heating. Since then, it has mainly been used by electricity generators, who on average consume around 80 per cent of total UK coal supply[1] each year. Therefore, to meet this demand during the last 40 years the UK has become increasingly reliant on coal imported from other countries, specifically steam coal, which is used at coal-fired power stations to generate electricity.

Coal-fired power stations capacity

Coal use has remained significant in the electricity generation sector due to fluctuations in gas prices; where these fell coal-fired stations generated electricity at a lower cost than some gas-fired stations. In 2006, coal use by electricity generators peaked at 57 million tonnes, representing 85 per cent of total coal demand. Coal use gradually fell between 2007 and 2010 before increasing again in 2011. In 2012 coal use rose to 55 million tonnes, just below the 2006 peak. Since then coal used for electricity generation fell again and was 29 million tonnes in 2015 (a new record low). Electricity generation represented 78 per cent of total coal demand in 2015.

In 2015 the UK had 19 GW of coal fired capacity. There have been a number of coal plant closures (totalling 8 GW of coal capacity) since December 2012 due to the Large Combustion Plant Directive (LCPD), which came to an end in December 2015. The only station to opt out of the LCPD that closed in 2015 was Ironbridge, although this had converted to biomass after opting out and closed for reasons unrelated to the LCPD. 2015 also saw the conversion of a third unit at Drax from coal to high-range co-firing (85% to <100% biomass), taking total coal capacity converted at Drax to 1.9 GW. 2016 has seen a further reduction of 3 GW of coal capacity due to the closures of Ferrybridge units 3 and 4[2] (1GW) and Longannet (2.3 GW).

The LCPD was superseded by the Industrial Emissions Directive (IED) from the 1st January 2016. The IED places more stringent emissions requirements on power plants between 1st January 2016 and 31st December 2020, and affects all coal and oil plants (including those that opted in to the LCPD), as well as other combustion plants, such as gas and biomass. One coal plant, operational

[1] Coal Supply is calculated as sum of production, net imports and stock

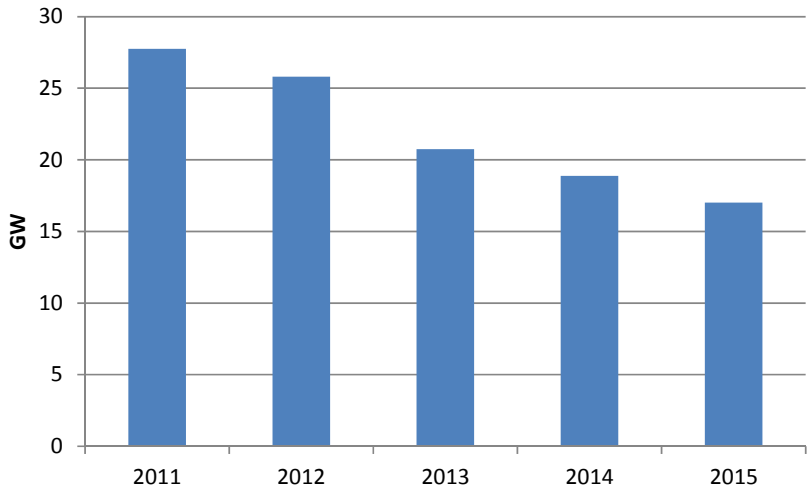
[2] Ferrybridge units 3 and 4 were opted in to LCPD and closed for reasons unrelated to the LCPD. Ferrybridge units 1 and 2 were opted out and closed in winter 2013/14 after exhausting the running hours available under the scheme

as of September 2016 with a capacity of 2 GW, opted out of the IED and must therefore close after 17,500 running hours or by the end of December 2023, whichever is reached first.

Details of the LCPD, the IED and the remaining coal plants subject to the IED can be found in the September 2015 article 'Large Combustion Plant Directive (LCPD): Running hours during winter 2014/15 and capacity for 2015/16', available at :
www.gov.uk/government/uploads/system/uploads/attachment_data/file/462364/LCPD.pdf

Please note that Aberthaw, Cottam, Uskmouth and West Burton A ultimately opted into the IED under the Transitional National Plan after that article was published.

Chart 1: Installed coal-fired capacity of UK transmission network 2011 to 2015



Deep mined production

Generally, since the peak levels reported in 1954 (217 million tonnes), deep mined production fell by an average of 2.6 per cent each year between 1954 and 1983 (102 million tonnes)[3]. Although the 1984 miners' strike had a substantial effect on the amount of coal produced in the UK, which saw deep-mined production falling by 66 million tonnes (65 per cent) between 1983 and 1984, the UK coal industry recovered and returned to the long term trend in 1985 producing more than double the levels of 1984 (an increase of 40 million tonnes). Thereafter, deep-mined production decreased on average by 11 per cent a year with figures in 2015, showing a record low of 2.8 million tonnes, 99 per cent less than the post-war peak during 1954 and a 24 per cent decrease on 2014 (3.6 million tonnes). This was due mainly to the closure of Hatfield and Thoresby in July 2015. In addition Kellingley, the last remaining large deep mine closed on 18 December 2015. **(Chart 1)**

Surface mine production

Surface mine production (including recovered coal) increased on average by 3 per cent a year between the late 1940s and late 1980s, with production peaking in 1991, to stand at 21 million tonnes. Thereafter, although surface mine production declined by an average of 5 per cent between 1991 and 2005, it exceeded deep-mined production for the first time in 2005, accounting for 53 per cent of total production (21 million tonnes). This share continues to grow as deep mined production has been steadily declining. Surface mine production fell by 27 per cent in 2015 compared to a year earlier due to the closure of a four mines in 2015 and other mines producing less coal as they are coming to the end of operation. However, its share of all coal production was unchanged compared to 2014 at 68 per cent. **(Chart 2)**

[3] Between 1972 and 1974, deep mined production on average decreased by 9 per cent a year as a result of miner's striking over pay

Remaining operating deep mines as at the end of December 2015

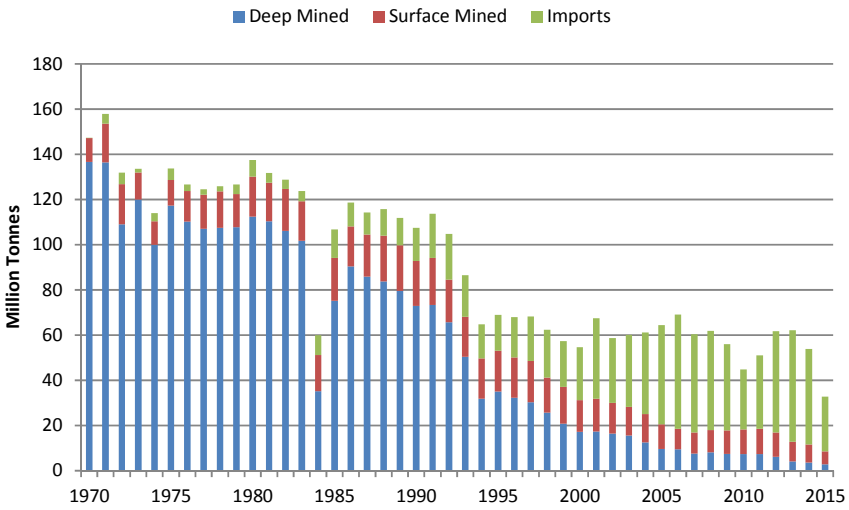
Name	Region
Ayle Colliery	Northumberland
Eckington Colliery	Derbyshire
Hill Top Colliery	Lancashire
Nant Hir No.2 Colliery	Neath Port Talbot
Dan-y-Graig No.4 Colliery	Neath Port Talbot
Aberpergwm Colliery	Neath Port Talbot
Monument Colliery	Gloucestershire

Remaining operating surface mines as at the end of December 2015

Name	Region
Glan Lash	Carmarthenshire
East Pit	Neath Port Talbot
Nant Helen	Powys
Selar	Neath Port Talbot
Brenkley Lane	Newcastle upon Tyne
Rusha Site	West Lothian
Shotton	Northumberland
Glenmuckloch Site	Dumfries & Galloway
Greenburn Project	East Ayrshire
Comrie Colliery Site	Fife
Ffos-y-Fran Land Reclamation Scheme	Merthyr Tydfil
Muir Dean Site	Fife
Netherton	East Ayrshire
Tower Colliery Surface Mining Site	Rhondda
Minorca	Leicestershire
Potland Burn	Northumberland
Broken Cross Site	South Lanarkshire
House of Water	East Ayrshire

In 2015 the last three large deep mines closed (Hatfield Colliery, Thoresby Colliery and Kellingley Colliery) and four surface mines closed (Earlseat, Laigh Glenmuir Site, Butterwell Disposal and Lodge House).

Chart 2: UK coal supply, 1970 to 2015



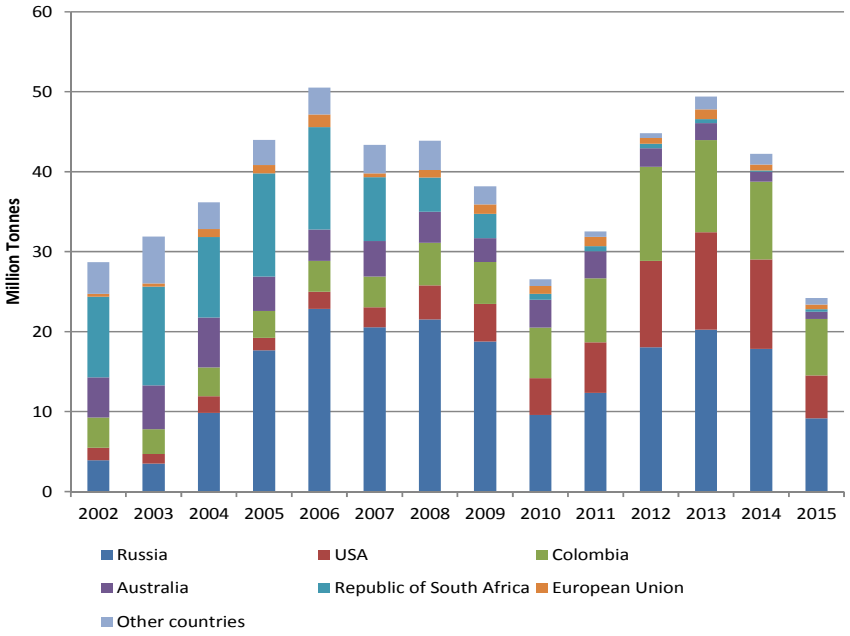
Coal imports

From 1970 imports, initially of coal types in short supply in this country, grew steadily to reach 20 million tonnes a year by the late 1990s. In 2001, the very rapid expansion of imports meant that imports exceeded the level of UK production in that year for the first time. As annual levels of UK coal production continued to fall, imports continued to grow rapidly and in 2006 reached a new record of 51 million tonnes, representing 75 per cent of total UK coal supply. From this point on UK imports fell, mainly as a result of lower demand by electricity generators, rather than higher indigenous production. However, in 2012, due to a greater demand by electricity generators and with UK production at an all-time low, imports increased by 38 per cent (+12 million tonnes) from the levels reported in 2011 (33 million tonnes). Imports continued to rise in 2013, before falling again in 2014. In 2015 coal imports fell 43 per cent from 2014 to 24 million tonnes (lowest value for 15 years. This was due to lower demand from coal overall. Imports from Russia fell by nearly half compared with 2014. **(Chart 3)**

Steam coal (used mainly by electricity generators) represents on average around 83 per cent of total UK imports each year and represented 80 per cent of total imports in 2015 (24 million tonnes). Russia has long been the UK's main source of imports, contributing 41 per cent of steam coal imports in 2015. In more recent years, steam coal has also been imported from Colombia and the USA, together contributing 53 per cent of total steam coal imported in 2015.

Twenty per cent of coal imported during 2015 was coking coal (5 million tonnes), which has been used in coke ovens and similar carbonising processes within the industrial sector. Ninety per cent of this total originated from three countries alone, USA (44 per cent), Russia (27 per cent) and Australia (19 per cent). Imports of anthracite (mainly used in the domestic sector) are negligible in comparison to steam and coking coal.

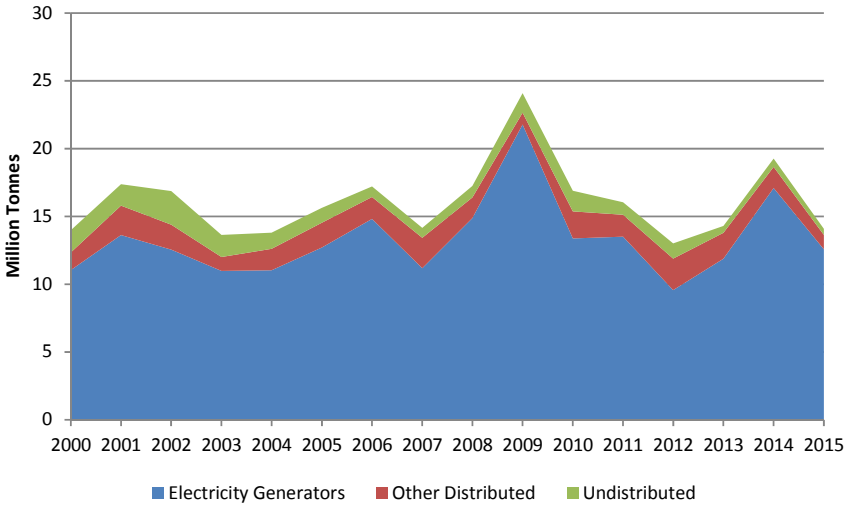
Chart 3: Total UK coal imports by country of origin, 2002 to 2015



Coal stocks

Most coal stocks in the UK are those held by electricity generators since this sector represents the largest share of the total demand for coal in the UK. From 2000 to 2015 coal stocks were between 13 and 18 million tonnes, with exceptions in 2009 and 2014. In 2009, coal stocks increased by 7 million tonnes (largest year-on-year increase) on 2008 to reach a record high of 24 million tonnes. In contrast, stocks decreased during 2010 by 7 million tonnes to 17 million tonnes as generators used their stocks as opposed to importing coal. This fall continued into 2012, where total coal stocks decreased to 13 million tonnes, the lowest level on record, of which 10 million tonnes were held by generators. Following stock rises in 2013 and 2014, stocks fell again in 2015 to 14 million tonnes. This was mainly due to generators using more coal stocks for electricity generation. **(Chart 4)**

Chart 4: Total UK coal stocks, 2000 to 2015



Coal consumption

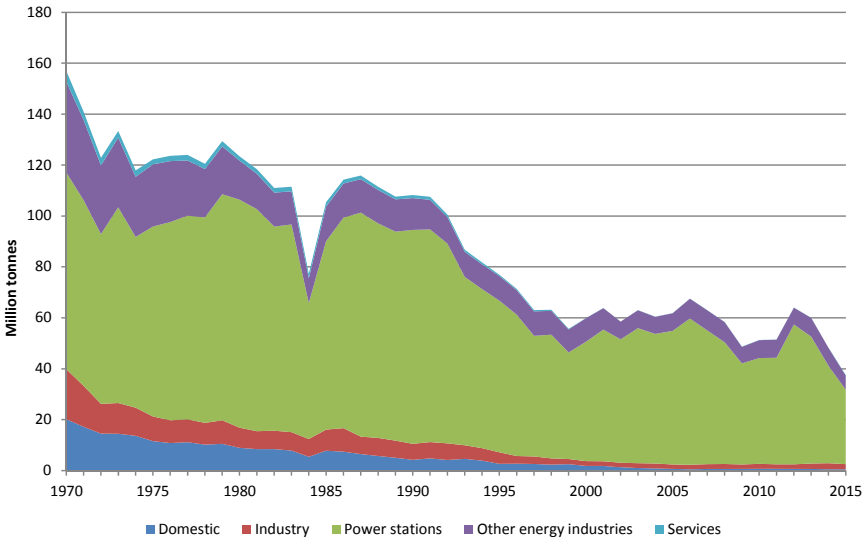
Coal consumption fell gradually from 157 million tonnes in 1970. There was a large fall in 1984 due to the miners' strike. Consumption quickly rose again to pre-1984 levels before gradually falling again. In 2015, consumption of coal was 37 million tonnes, 76 per cent lower than in 1970 and 23 per cent lower than in 2014 (48 million tonnes). **(Chart 5)**

Consumption by electricity generators increased from 77 million tonnes in 1970 to a peak of 90 million tonnes in 1980 and continued in the 80 to 90 million tonnes range until 1991, with the exception of the miners' strike years. Coal consumed by generators fell steadily after 1991 until 1999, as the UK's energy mix became more diverse. Environmental regulations and high coal prices made natural gas more attractive to purchase for generation use. Coal consumption by generators broadly rose again after 1999 to 2006 as the price of gas encouraged generation from coal. From 2006 to 2010 the fall in consumption resumed. In the next three years, there was higher coal use due to higher gas prices making generation from coal more attractive. However, after 2013, the demand for coal decreased again and fell to 29 million tonnes in 2015 (a new record low). The decline was due to a number of reasons: increased availability of nuclear and wind generation, the conversion of a third unit at Drax from coal to high-range co-firing (85% to <100% biomass) in July 2015 and an increase in the carbon price floor (from April 2015). In previous years the price of gas relative to coal was a key reason for the decline, but in 2015 the price of coal purchased by major power producers fell by 14 per cent in 2015, while the price of gas fell by 17 per cent.

Other energy industries consumption fell gradually from 1970, with the exception of 1984 when there was a miners' strike. Consumption increased by 11 per cent in 2013 compared with 2012 mainly due to coking coal in blast furnaces increasing by 43 per cent from 1.0 million tonnes in 2012 to 1.4 million tonnes in 2013. This increase was due to the re-opening of Teesside steelworks in April 2012, which gradually increased operations over the next year and the newly opened blast furnace at Port Talbot in February 2013. In 2014, coking coal in blast furnaces increased further to 1.5 million tonnes, but fell again in 2015 to 1.4 million tonnes as steel production in the UK became less competitive and SSI steelworks closed in October 2015.

Final consumption has fallen continuously from 1970, with the exception of an increase for two years following the 1984 strike, as gas has taken over as the main heating fuel in the UK, and the demand from industry also declined (particularly from 1986). In terms of share, industry has overtaken domestic rising from 45 per cent share in 1970 to 78 per cent in 2015. Domestic's share has fallen from 46 per cent to 21 per cent. The service sector's share of final consumption has fallen from 9 per cent in 1970 to 1 per cent in 2015.

Chart 5: Coal consumption, 1970 to 2015



Manufactured Solid Fuels

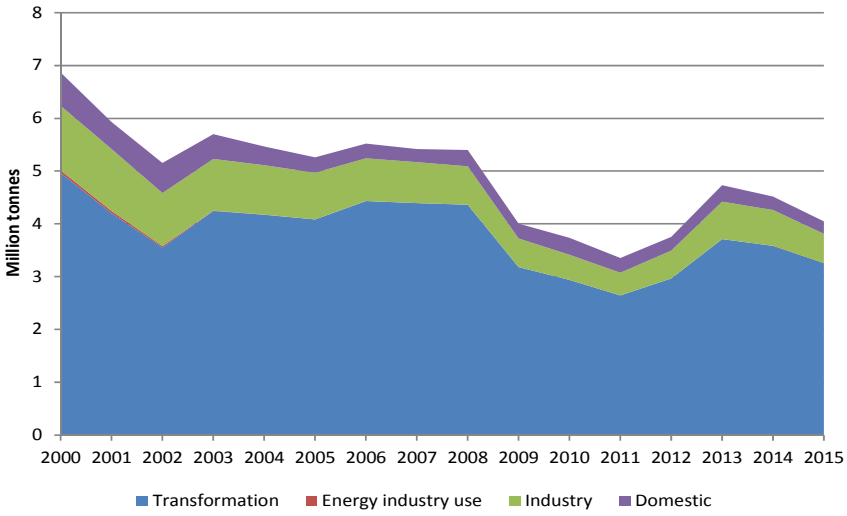
In 2015, around 92 per cent of manufactured solid fuel production was coke oven coke, a proportion that has remained the same for the past 16 years.

The main purpose of coke oven coke is for use in blast furnaces in the UK iron and steel industry. Between 1970 and 2013 there was an overall decline in coke oven coke production. However, in 2013 there was a 22 per cent increase in blast furnace consumption, which rose to 3.3 million tonnes from 2.7 million tonnes in 2012. This was due to the re-opening of Teesside steelworks in April 2012 which gradually increased operations over the next year, and the newly opened furnace at Port Talbot in February 2013. Demand has fallen since 2013. In 2015 blast furnace use had fallen to 2.8 million tonnes. This was due to reduced steel production in the UK, as a result of the UK steel industry becoming less competitive. Monckton Coke and Chemicals, the only dedicated coke plant in the UK closed in December 2014. SSI steelworks at Redcar ceased production in mid-September (with the subsequent closure in October). Blast furnace use represented 99 per cent of total demand (2.8 million tonnes), and was 10 per cent lower than in 2014.

Most of the supply of coke breeze is from re-screened coke oven coke, with direct production accounting for only 1.9 per cent of total supply in 2015. In 2015, 45 per cent of coke breeze was used in blast furnaces (0.4 million tonnes) for transformation and 55 per cent used for final consumption (Table 2.5).

Other manufactured solid fuels (patent fuels) are manufactured smokeless fuels, produced mainly for the domestic market. A small amount of these fuels (only 8.5 per cent of total supply in 2014) was imported, but exports generally exceed this. **(Chart 6)**

Chart 6: Total Manufactured Solid Fuels consumption in the UK, 2000 to 2015



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International energy price comparisons

Introduction

This article looks at international comparisons in the EU for gas and electricity prices to both the non-domestic and the domestic sectors. It differs from Section 5 of Quarterly Energy Prices (QEP) as comparisons are also made in Purchasing Power Standard per kWh, whereas QEP only compares energy prices in pence per kWh. These comparisons were previously published in DECC's (now BEIS) UK Energy Sector Indicators.

The purchasing power standard (PPS) is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country. However, price differences across borders mean that different amounts of national currency units are needed for the same goods and services depending on the country. PPS are derived by dividing any economic aggregate of a country in national currency by its respective purchasing power parities[(1)].

Energy prices in Western European countries are generally lower when in PPS per kWh (PPS/kWh) than in pence per kWh (pence/kWh). The generally higher GDP in Western Europe offsets the typically higher cost of living in western European countries, with higher energy costs seen when data presented in a pence/kWh format.

All data used in this article are sourced from Eurostat, the statistical office of the EU. Data are available at http://ec.europa.eu/eurostat/web/energy/data/database .

Summary

UK gas prices, when measured using market exchange rates are around the EU28 average, though below the EU15 average. When prices are converted using PPS, UK prices are amongst the lowest in the EU28.

UK non-domestic electricity prices, converted using market exchange rates are amongst the highest in the EU. Conversion using PPS results in the UK price levels being around the EU median. In a similar manner, UK domestic prices move from being above the EU28 median when market exchange rates are used to below when PPS are used.

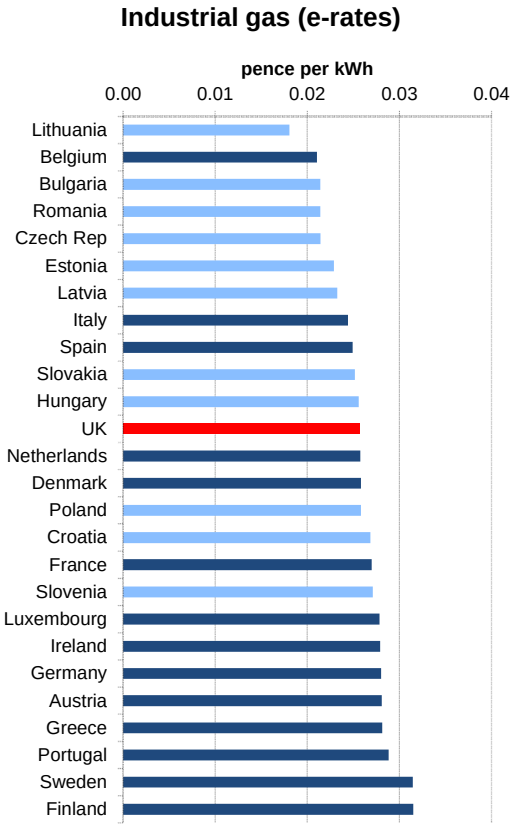
[1] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Purchasing_power_parities_(PPPs)

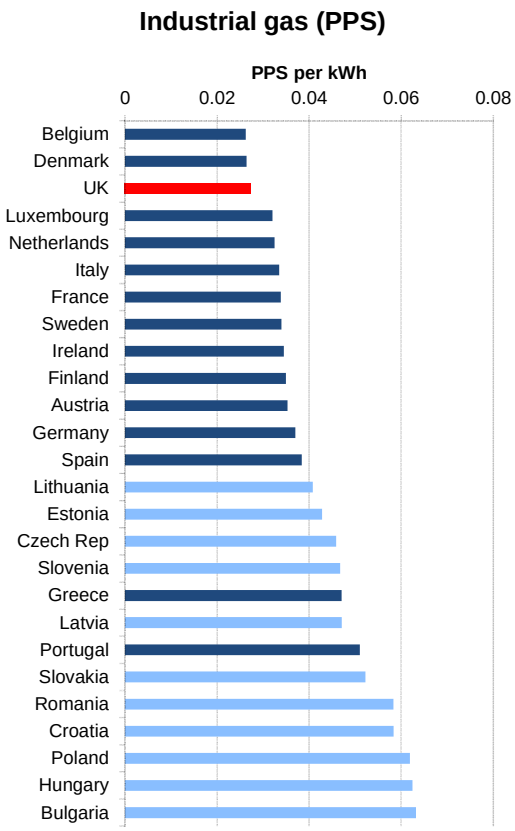
International non-domestic price comparisons

1.1 Non-domestic gas price comparisons in 2015 [2], [3], [4]

For non-domestic gas prices to medium sized consumers, measured in pence/kWh, the UK ranks twelfth lowest within the EU28, marginally below the EU28 median. However, when measured in PPS/kWh UK gas prices are third lowest in the EU28, 31 per cent below the median.

As can be seen from the charts below, when measured using PPS the 13 lowest prices are to be found in EU15 countries. Data are not published by Eurostat for Cyprus and Malta – there is limited gas use by non-domestic consumers in both these countries. Different shades have been used to differentiate between EU15 and the additional EU28 member states.





Between 2014 and 2015, when measured using market exchange rates UK prices fell by around 11 per cent. This however, contrasts with a larger average price fall of 16 per cent for other EU countries. This difference is partly due to the appreciation of the pound between 2014 and 2015 moving from an average euro/sterling rate of 1.24 in 2014, to an average of 1.38 in 2015 (an 11 per cent appreciation). When measured using PPS the UK price again fell by 11 per cent whilst the EU median excluding the UK fell by a smaller 7 per cent.

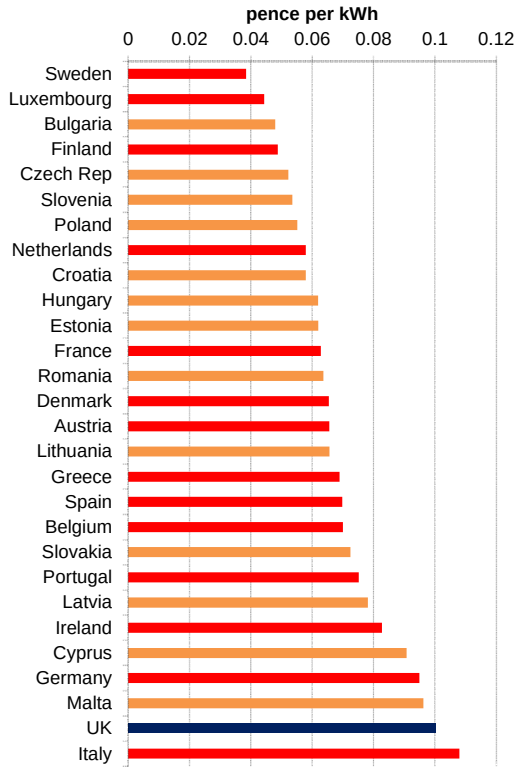
[2] Gas prices for non-domestic medium consumers: consuming 2,778 – 27,777 MWh per annum.
[3] Prices include all taxes where not refundable on purchase.
[4] Source: Eurostat Statistics in Focus and database for all data in this article.

1.2 Non-domestic electricity price comparisons in 2015 [5], [6]

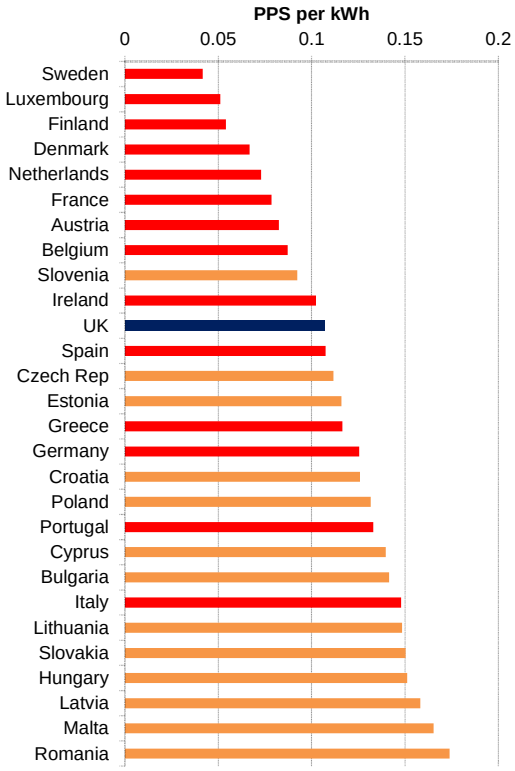
For non-domestic electricity prices to medium sized consumers, measured in pence/kWh, the UK ranks second highest within the EU28, 53 per cent above the EU28 median. However, when measured in PPS/kWh UK electricity prices are eleventh lowest in the EU28, 8.2 per cent below the median.

As can be seen from the charts below, when measured using PPS, 11 of the lowest 12 prices are to be found in EU15 countries.

Industrial electricity (e-rates)



Industrial electricity (PPS)



Between 2014 and 2015, when measured using market exchange rates UK prices rose by around 4.3 per cent. This contrasts with an average price fall of 13 per cent for other EU countries. The UK ranking slipped from fifth highest to the second highest between 2014 and 2015. The appreciation of the pound, as discussed earlier in the article explains a large part of the difference in the growth. When measured using PPS, UK prices rose by 4.2 per cent whilst the EU median excluding the UK fell by 4 per cent. The UK's ranking fell slightly from tenth in 2014 to its current eleventh place.

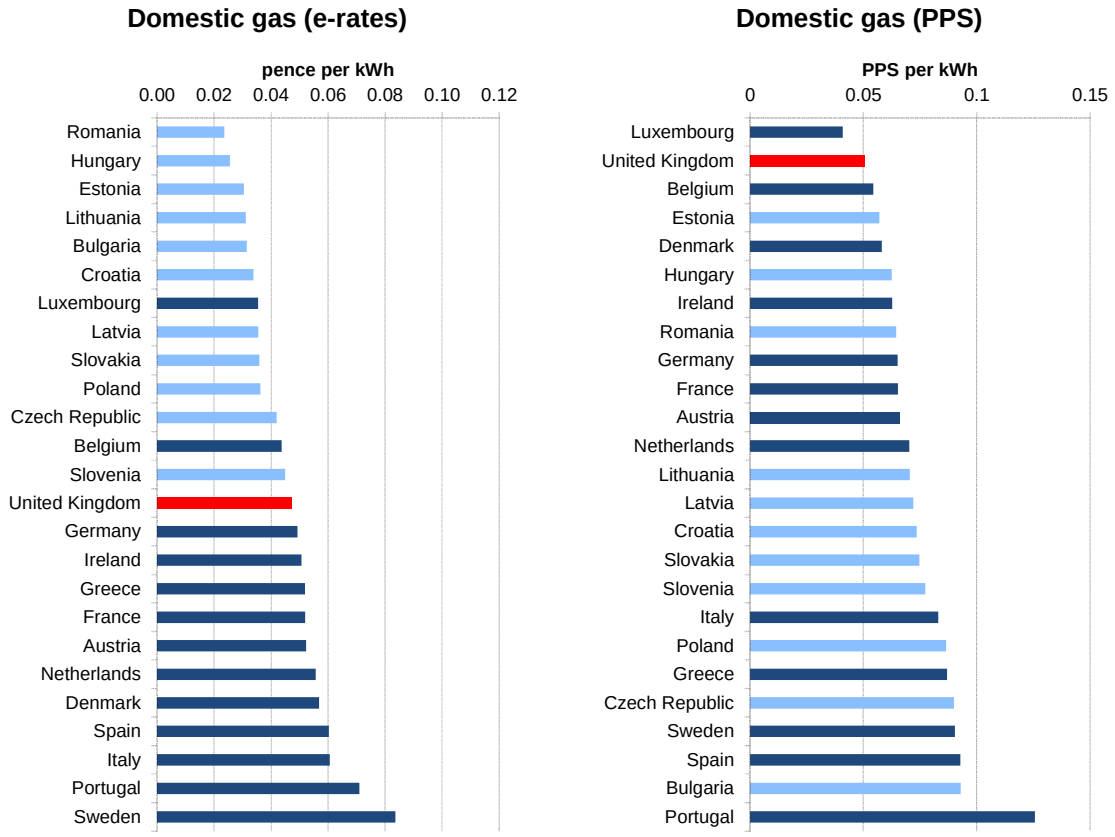
[5] Electricity prices for non-domestic medium consumers: consuming 2,000 – 19,999 MWh per annum
[6] Prices include all taxes where not refundable on purchase

International domestic price comparisons

2.1 Domestic gas price comparisons in 2015 [7], [8]

For non-domestic gas prices to medium sized consumers, measured in pence/kWh, the UK ranks twelfth highest within the EU28, 5.3 per cent above the EU28 median. However, when measured in PPS/kWh UK gas prices are second lowest in the EU28, 29 per cent below the median.

As can be seen from the charts below, 9 of the 12 countries whose prices rank below the EU28 Median, when measured using PPS, are in the EU15. This is only true of two EU15 countries when measured in GBP, Luxembourg and Belgium.



Between 2014 and 2015, when measured using market exchange rates UK prices fell by 5.8 per cent. This however, contrasts with a larger average price fall of 12 per cent for other EU countries. This difference is partly due to the appreciation of the pound between 2014 and 2015 of 11 per cent. When measured using PPS the UK price again fell by 5.9 per cent whilst the EU median excluding the UK fell by a much smaller 2.6 per cent.

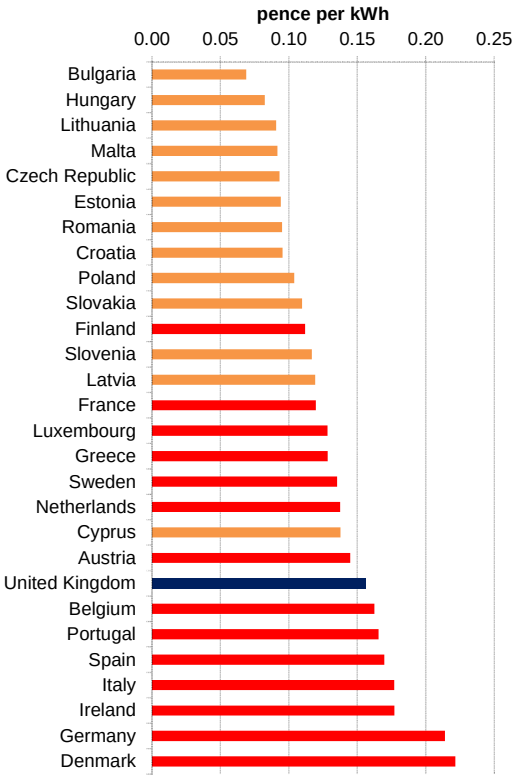
[7] Gas prices for domestic medium consumers: consuming 5,557 – 55,557 kWh per annum
[8] Prices include all taxes

2.2 Domestic electricity price comparisons in 2015 [9], [10]

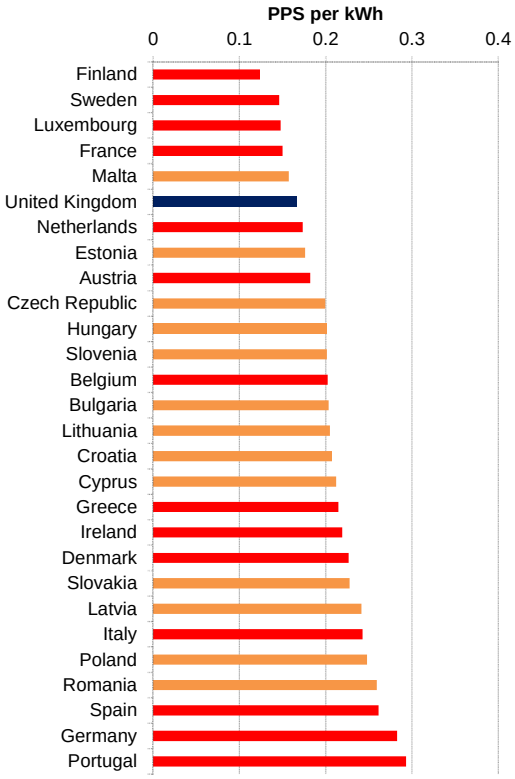
For non-domestic electricity prices to medium sized consumers, measured in pence/kWh, the UK ranks eighth highest within the EU28, 26 per cent above the EU28 median. However, when measured in PPS/kWh UK electricity prices are sixth cheapest in the EU28, 19 per cent below the median.

When measured in pence per kWh, the majority of the EU15 prices are above the median price. However, when measured in PPS, the prices for the EU15 countries are distributed more evenly and are not all amongst the highest prices.

Domestic electricity (e-rates)



Domestic electricity (PPS)



Between 2014 and 2015, when measured using market exchange rates UK prices fell by 1.3 per cent. This contrasts with an average price fall of 10 per cent for other EU countries. When measured using PPS, UK prices fell by 1.5 per cent whilst the EU median excluding the UK was generally unchanged.

[9] Electricity prices for domestic medium consumers: consuming 2,000 – 19,999 kWh per annum
[10] Prices include all taxes

Conclusion

Using Purchasing Power Standards allows international comparisons of energy prices without the effect of exchange rates. For both non-domestic and domestic, energy prices in the UK are ranked more favourably amongst the EU28 compared to the ranking based on pence per kWh.

Gas prices, for both UK non-domestic and domestic, move from being ranked around the EU median when measured in pence per kWh, to one of the lowest in PPS. Similarly, electricity prices for the UK move from being amongst the highest, to being below the EU median when PPS are used to convert currencies.

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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 September 2016 at:
www.gov.uk/government/collections/household-energy-efficiency-national-statistics

Greenhouse Gas Emissions quarterly statistics

This publication provides provisional estimates of UK greenhouse gas emissions on a quarterly basis. The latest release covering emissions up to and including the 2nd quarter of 2016, was published on 29 September 2016 at:
www.gov.uk/government/collections/uk-greenhouse-gas-emissions-quarterly-official-statistics

Following a user consultation this will be the final release of these statistics, however a quarterly time series will now be included within the annual provisional emissions statistics publication, the next edition of which will be released on 30 March 2017.

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 June 2016, was published on 29 September 2016 at:
www.gov.uk/government/collections/smart-meters-statistics

Sub-national consumption of other fuels, 2014

This publication presents the findings of the residual fuels sub–national energy consumption analysis in the UK for the period covering 1 January to 31 December 2014. Other fuels are defined as non-gas, non-electricity and non-road transport fuels, and cover consumption of coal, petroleum, manufactured solid fuels and bioenergy and waste not used for electricity generation or road transport. The release was published on 29 September 2016 at:
www.gov.uk/government/collections/sub-national-consumption-of-other-fuels

Sub-national total final energy consumption, 2014

This factsheet presents the findings of the sub–national energy consumption analysis in the UK for all fuels, for the period covering 1 January to 31 December 2014. The release was published on 29 September 2016 at:
www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level

Sub-national electricity consumption in Northern Ireland, 2014

This publication presents estimates of the latest analysis of electricity consumption in Northern Ireland at District Council level, for the period covering 1 January to 31 December 2014. The release was published on 29 September 2016 at:
www.gov.uk/government/collections/sub-national-electricity-consumption-in-northern-ireland.

UK Energy Sector Indicators

This annual publication, previously published in October each year, will no longer be produced. BEIS alerted users to this decision, in October 2015, as well as committing to publishing data not readily available elsewhere in the quarterly statistical publication Energy Trends.

The September 2016 edition of Energy Trends therefore includes articles on competition in electricity and gas supply and international energy price comparisons, whilst further articles on energy diversity and international comparisons of energy production and use will be published in forthcoming editions of Energy Trends.

Energy Trends and Energy Prices: December 2016

Energy Trends and Energy Prices are normally released concurrently on the last Thursday of March, June, September and December. Given that the last working Thursday of December, the 29 December, will fall between Christmas and New Year it has been decided that the release date for the December 2016 editions will be brought forward to Thursday 22 December 2016.

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 will be 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 will be published on 22 December 2016, at:
www.gov.uk/government/collections/sub-national-gas-consumption-data.

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