Electricity generation and supply figures for Scotland, Wales, Northern Ireland and England, 2010 to 2013

Introduction

This article shows how generation and consumption of electricity varies across the four countries of the United Kingdom. It updates and extends that published in December 2013. The UK figures shown in the tables in this article are taken from the Digest of United Kingdom Energy Statistics (DUKES) 2014, Chapters 5 and 6 and so the definitions used are identical to those in the Digest. Tables 1 and 2 are shown in "landscape" format at the end of the main text and cover the last four years.

Generation and trade

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

Between 2012 and 2013, England's share of total generation decreased marginally to 75.7 per cent. An increase in renewable generation was offset by a fall in coal, oil and gas generation. Scotland's share, meanwhile, increased from 13.9 per cent to 14.8 per cent, due to an increase in nuclear and renewable generation. The share of generation in Wales and Northern Ireland remained broadly flat at 7.3 and 2.2 per cent respectively. On average, over the last four years, 76.4 per cent of UK electricity generation has taken place in England, 13.9 per cent in Scotland, 7.7 per cent in Wales and 2.1 per cent in Northern Ireland.

Both Scotland and Wales are net exporters of electricity, with England importing electricity from both countries and from continental Europe (via the France and Netherlands interconnectors). Northern Ireland trades electricity with the Republic of Ireland to which it is a net exporter. It also imports electricity from Scotland via the Moyle interconnector - these imports were greater than exports to the Irish Republic in each of the last four years. In 2012, Scotland exported 25.6 per cent of the electricity generated there to consumers elsewhere in the UK, which increased to 27.9 in 2013. Transfers from Scotland to England increased by 23.9 per cent between 2012 and 2013 to a new record high of 13.3 GWh. Wales exported the equivalent of 6.4 per cent (1.7 GWh) of its generation to consumers in England in 2013, a decrease on the 9.8 per cent in 2012 and a new record low.

Generation by fuel

For each of the four UK countries, Table A1 shows the shares of the generation of electricity by the fuel categories used in Table 5.5 of the Digest of UK Energy Statistics 2014, for 2010 to 2013. The position in 2013 is shown in Chart 1, in terms of GWh. The share of nuclear in generation in England fell in 2010 due to maintenance outages at several stations including Sizewell B, which was offline for six months, before increasing once more in 2011 as these stations came back on line, a trend which continued into 2012, with little change in shares in 2013. In Scotland, after a decrease in the share of nuclear in 2010 due to maintenance outages, shares have been increasing and rose again in 2013 to over one third of all generation due to increased availability. In Wales, nuclear's share of generation has fluctuated in recent years and, following the fall in 2012, rose to 16.4 per cent of all generation in Wales in 2013.

Due to high gas prices, gas' share of generation has been falling since 2010, accounting for 30 per cent of England's generation in 2013 and 10 per cent in Scotland. Coal's share fell by four percentage points in both England and Scotland in 2013, following the closures of Tilbury B and Cockenzie. Gas's share also declined in Wales, whilst coal's share increased by three percentage points. In 2013, gas' share of generation in each of England, Scotland, Wales and Northern Ireland was at a record low for the 2004 to 2013 period covered.

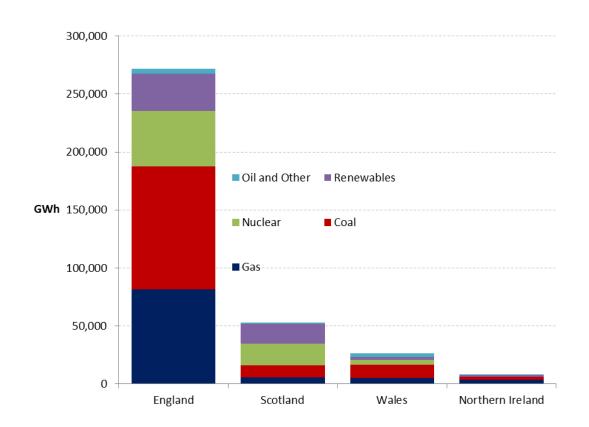
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Table A1: Shares of each country's generation, by fuel type, 2012 and 2013

	Scotland	Wales	Northern Ireland	England
2012				
Coal	23.6%	40.8%	32.5%	42.3%
Gas	11.2%	23.7%	50.5%	30.3%
Nuclear	33.8%	15.6%	-	17.6%
Renewables	28.9%	9.2%	15.9%	8.2%
Oil and Other	2.5%	10.8%	1.1%	1.5%
Total	100%	100%	100%	100%
2013				
Coal	20.4%	43.6%	34.0%	38.9%
Gas	10.3%	18.8%	45.6%	30.0%
Nuclear	34.9%	16.4%	-	17.6%
Renewables	32.0%	10.1%	19.7%	12.0%
Oil and Other	2.5%	11.1%	0.7%	1.5%
Total	100%	100%	100%	100%

Combined heat and power (CHP) forms the bulk of "Other generators" generation, although some major power producers (MPPs) also operate generating plant that is partially CHP. CHP statistics for 2013 on a sub-national and regional basis were published in the September 2014 issue of Energy Trends (see references at the end of the article). The share of generation accounted for by generators other than major power producers varies slightly across the UK. In Scotland, in 2013, other generators had a 12 per cent share, while in England the share was 9 per cent, in Wales 11 per cent and in Northern Ireland 14 per cent.

Chart 1: Generation by country and fuel type in 2013 (all generating companies)



Renewables

The share of renewables in electricity generation or sales is measured in two different ways in the UK¹. First, there is the "headline" overall measure that shows the percentage of electricity generation accounted for by all renewables. Secondly, there is the measure that is based on the Renewables Obligation (RO) (and the analogous Renewables Obligation (Scotland) - ROS) which shows the percentage of electricity sales accounted for by renewables eligible under these obligations. The main differences are the exclusion from the RO of large-scale hydro and non-biodegradable wastes². Table A2 shows the overall measure for 2010, 2011, 2012 and 2013.

Table A2: Renewables percentages

		UK	Scotland	Wales	Northern Ireland	England
Overall	2010	6.8	18.9	5.4	10.0	4.8
renewables	2011	9.4	26.5	8.4	12.6	6.3
percentage	2012	11.3	28.9	9.2	15.9	8.2
	2013	14.9	32.0	10.1	19.7	12.0

Lower rainfall in 2010 saw Scotland's renewables' share fall. Since then, higher rainfall, wind speeds and increased wind capacity have seen Scotland's renewables' share rise to 32.0 per cent in 2013. In 2013, all four countries had a record high percentage of electricity generated by renewables (Table A2). On a RO basis, the percentage measure for the UK (6.9 per cent in 2010, 9.4 per cent in 2011, 10.8 per cent in 2012 and 14.1 in 2013) is not meaningful at sub-national level because electricity generated in one part of the UK can be sold in a different part of the UK.

In Scotland, the renewables target (which is to reach 100 per cent by 2020) is expressed as generation as a proportion of gross electricity consumption (defined as generation plus transfers into Scotland less transfers out of Scotland). In 2010, this percentage was 23.8 per cent, rising to 36.0 per cent in 2011, thus exceeding the interim target of 31 per cent. In 2012, this rose to 38.8 per cent and has continued to rise to 44.4 per cent in 2013. The next interim target is to reach 50 per cent by 2015.

The amount of electricity from renewable sources transferred from Scotland or Wales to England, or from Scotland to Northern Ireland, is not known. What is known from Table 2 is that the amount of ROS eligible electricity generated in Scotland in 2013 was 30 per cent more than in 2012, while the amount of RO eligible electricity generated in Wales in 2013 was 14 per cent more than in 2012. In England, the increase was 31 per cent. In Northern Ireland RO eligible electricity generated increased by 35 per cent. In the UK as a whole, RO eligible electricity production increased by 30 per cent. Over the four years shown in Table A2, the increases in RO eligible electricity production have been substantial across all countries, namely 43 per cent for Wales, and an increase of around double in England, Scotland and Northern Ireland.

Renewables statistics for 2013 on a sub-national and regional basis were published in the September 2014 issue of Energy Trends (see references at the end of the article).

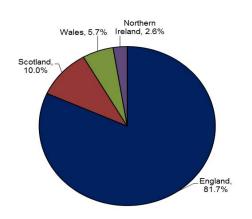
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¹ There is also a third method used by the EU – a Renewables Directive basis – see Chapter 6 of the Digest of UK Energy Statistics 2014, table 6.7 and paragraph 6.52.

² Specific exclusions from eligibility for the RO are existing hydro plants over 20 MW; all plants using renewable sources built before 1990 (unless re-furbished); and energy from mixed waste combustion unless the waste is first converted to fuel using advanced conversion technology.

Chart 2: Electricity consumption in 2013



Consumption and sales

Transmission and distribution losses are not separately available for Scotland, Wales, Northern Ireland and England so estimates have been made using the UK proportions. Consumption figures have then been calculated by deducting net transfers and losses figures from the electricity supplied figures shown in Table 1. These show (Chart 2) that in 2013, 10.0 per cent of electricity consumption in the UK was in Scotland, 5.7 per cent in Wales, 2.6 per cent in Northern Ireland and 81.7 per cent in England. These are all around the average percentage shares for each country for the period 2010 to 2013, namely 81.9 per cent for England, 9.9 per cent for Scotland, 5.6 per cent for Wales and 2.6 per cent for Northern Ireland.

Separate data is collected for sales of electricity from the public supply system in Scotland, England and Wales, and Northern Ireland and published in monthly table ET 5.5 on DECC's Energy Statistics website (see references at the end of the article), but for this article the breakdown between England and Wales has been estimated. Because of definitional and other differences set out in the technical notes to Chapter 5 of DUKES 2014, there is a statistical difference between the calculated consumption and the sales data in Table 1. The overall statistical difference for the UK equals that shown in Table 5.2 of DUKES for the UK as a whole for the public distribution system.

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

Chart 3 shows the relationship between generation and consumption of electricity in each of the countries by means of a flow diagram.

Mita Kerai

Electricity Statistics Tel: 0300 068 5044

E-mail: Mita.Kerai@decc.gsi.gov.uk

Kayley Vanlint

Electricity Statistics Tel: 0300 068 5046

E-mail: Kayley.Vanlint@decc.gsi.gov.uk

References:

Digest of UK Energy Statistics 2014 (DUKES); published for DECC by The Stationery Office. £68.00, but also available on DECC's energy statistics website at:

www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes.

Energy Trends monthly table 5.5:

www.gov.uk/government/statistics/electricity-section-5-energy-trends

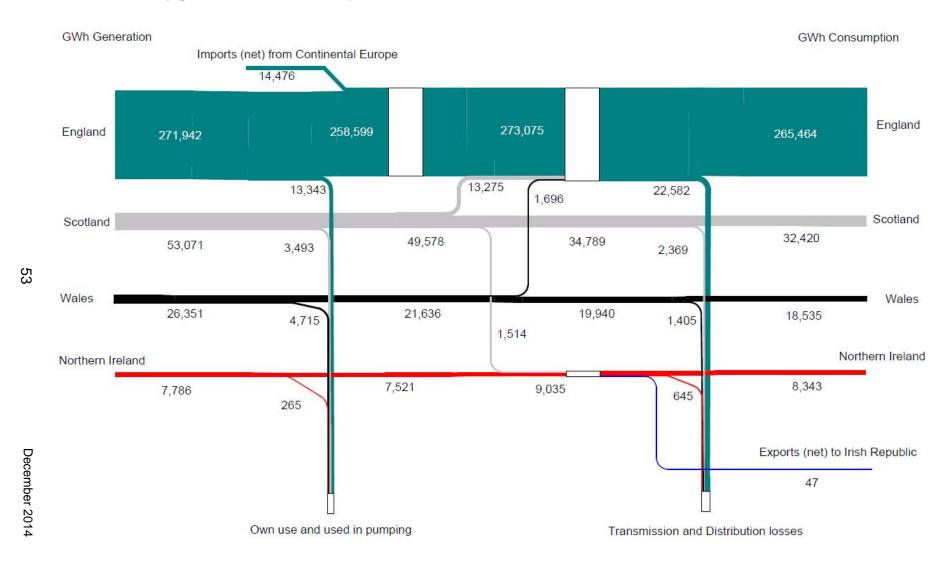
"Combined Heat and Power in Scotland, Wales, Northern Ireland and the regions of England in 2013" – Energy Trends September 2014, page 60:

www.gov.uk/government/collections/energy-trends-articles

"Renewable energy in Scotland, Wales, Northern Ireland and the regions of England in 2013" – Energy Trends September 2014, page 49:

www.gov.uk/government/collections/energy-trends-articles

Chart 3: Electricity generation and consumption flow chart, 2013



	Generation and supply of o		10 to 20	•							GWh
				2010					2011		
				-	Vorthern					Northern	
			Scotland	Wales	Ireland	England		Scotland		Ireland	England
Generated by	Major power producers	347,785	44,179	30,018	7,128	266,460	332,312	44,880	25,043	7,319	255,070
	Other generators	33,921	5,641	2,263	483	25,534	34,939	6,141	2,558	611	25,630
Total generated	d	381,707	49,820	32,281	7,612	291,994	367,251	51,021	27,601	7,930	280,699
Own use by Ot	her generators	1,702	283	114	24	1,282	1,934	340	142	34	1,419
Electricity supplied (net) by Other generators		32,219	5,358	2,150	459	24,253	33,005	5,801	2,417	577	24,211
Used in pumping at pumped storage and other own use by MPPs		18,615	3,264	4,383	199	10,768	18,323	2,924	4,149	179	11,072
Electricity supp	lied (net) by MPPs	329,170	40,915	25,634	6,929	255,692	313,988	41,956	20,893	7,140	243,998
Electricity transferred to England (net of receipts) Electricity transferred to Northern Ireland (net of		-	7,998	7,897	-	-15,896	-	11,597	3,652	-	-15,250
receipts)			2,297	-	-2,297	-	-	1,769	-	-1,769	
Electricity trans	ferred to Europe (net of receipts)	-2,663	-	-	232	-2,895	-6,222	-	-	246	-6,468
Transfers from	other generators to public supply	14,601	2,622	670	364	10,944	15,059	3,035	857	443	10,724
Transmission lo	osses	5,974	590	326	155	4,902	6,467	630	360	169	5,308
Distribution los	ses and theft	21,058	1,812	1,049	532	17,664	21,662	1,810	1,091	548	18,214
Consumption fr	om public supply [A]	319,417	30,842	17,032	8,672	262,871	307,151	29,188	16,648	8,389	252,926
Consumption b	y autogenerators	17,603	2,733	1,479	95	13,297	17,936	2,764	1,559	134	13,479
Total Electricity	consumption	337,020	33,574	18,511	8,767	276,169	325,087	31,952	18,207	8,523	266,405
Electricity sales	(public supply) [B]	319,919	31,143	17,737	8,932	262,108	308,033	29,783	17,241	8,209	252,801
Statistical differ	ence	-502	-301	-705	-260	+764	-883	-595	-593	180	125
between calcul	ated consumption [A] and sales [B]										

Figures in this table do not sum exactly to the UK totals shown because of rounding Negative figures for transfers indicate net imports into the country and positive figure indicate net exports

		Englan	d, 2010 1		3						GWh
				2012					2013		
		1 117 4-4-1	Caatlanal		Northern	Coolean d	1 11/ 4-4-1	Caatland		Northern	C. alaa
			Scotland	Wales	Ireland	England		Scotland	Wales	Ireland	England
Generated by	Major power producers	328,192	44,823	24,029	6,573	252,766	323,704	46,771	23,577	6,706	246,650
	Other generators	35,216	5,613	2,528	825	26,250	35,446		2,774	1,080	25,29
Total generated	I	363,407	50,436	26,558	7,398	279,016	359,150	53,071	26,351	7,786	271,942
Own use by Oth	ner generators	2,078	331	149	49	1,549	2,267	403	177	69	1,618
Electricity suppl	lied (net) by Other generators	33,138	5,282	2,379	776	24,701	33,179	5,897	2,597	1,011	23,674
	g at pumped storage and other own	40.040	0.000	4.000	400	40.000	40.550	0.000	4.500	400	44.70
use by MPP		19,846	2,980	4,330	196	12,339	19,550	,	4,538	196	11,725
Electricity suppl	lied (net) by MPPs	308,346	41,843	19,699	6,377	240,427	304,155	43,681	19,038	6,510	234,926
Electricity transferred to England (net of receipts) Electricity transferred to Northern Ireland (net of		-	10,717	2,589	-	-13,306	-	13,275	1,696	-	-14,971
receipts)		-	2,179	-	-2,179	-	-	1,541	-	-1,541	
Electricity transf	ferred to Europe (net of receipts)	-11,871	-	-	153	-12,024	-14,429	-	-	47	-14,476
Transfers from	other generators to public supply	16,129	2,931	701	621	11,876	14,979	3,443	1,172	878	9,486
Transmission lo	esses	6,754	654	372	175	5,552	6,351	628	360	163	5,200
Distribution loss	ses and theft	22,157	1,880	1,111	545	18,621	20,649	1,741	1,045	482	17,382
Consumption fro	om public supply [A]	307,450	29,346	16,328	8,303	253,472	306,585	29,944	17,110	8,238	251,293
Consumption by	y autogenerators	16,993	2,349	1,677	155	12,813	18,178	2,450	1,423	132	14,172
Total Electricity	consumption	324,444	31,695	18,005	8,458	266,285	324,762	32,395	18,534	8,370	265,464
Electricity sales	(public supply) [B]	308,408	28,636	17,109	7,962	254,701	306,778	28,986	17,342	7,792	252,659
Statistical differen	ence	-958	710	-781	342	-1,229	-193	959	-232	446	-1,366
between calcula	ated consumption [A] and sales [B]										

Figures in this table do not sum exactly to the UK totals shown because of rounding Negative figures for transfers indicate net imports into the country and positive figure indicate net exports

Table 2:	Generation of electrici	ty by fuel	in Scotl	and, Wa	ales, No	rthern Ire	land and E	ngland, 20	10 to 20	13	GWh
				2010					2011		
					Northern					Northern	
		UK total	Scotland	Wales	Ireland	England	UK total	Scotland	Wales	Ireland	England
Major powe	r Coal	103,941	14,653	5,929	1,817	81,542	104,797	10,728	6,170	1,414	86,485
producers:	Oil	2,271	206	-	73	1,992	1,074	160	-	52	862
	Gas	161,748	6,618	15,227	4,840	135,063	132,753	6,227	9,880	5,301	111,346
	Nuclear	62,140	15,293	5,532	-	41,315	68,980	16,892	5,364	-	46,725
	Thermal renewables	3,691	299	72	-	3,321	4,533	274	76	-	4,182
	Hydro natural flow	2,703	2,521	164	-	18	4,594	4,362	210	-	21
	Hydro pumped storage	3,150	779	2,372	-	-	2,906	604	2,301	-	
	Non thermal renewables	8,141	3,811	722	398	3,211	12,675	5,632	1,041	553	5,450
	Total	347,785	44,179	30,018	7,128	266,460	332,312	44,880	25,043	7,319	255,070
Other	Coal	3,753	62	_	41	3,650	3,774	51	-	36	3,687
Generators:	Oil	2,532	1,007	173	34	1,318	2,043	780	121	36	1,106
	Gas	13,908 8,305 1,559 865 2,081 919	1,770	806	44	11,289	13,767	2,028	926	96 82 - 20 341	10,717 6,958 1,207 51 971 933
	Thermal renewables		989 - 737 1,063	460	86	6,770	8,565	985	540		
	Other thermal Hydro natural flow Non thermal renewables			511	_	1,048	1,714	-	508		
				48	36	43	•	959 1,326	58 404 -		
				265	242	511	3,042				
	Wastes		14	_	-	905	945	12			
	Total	33,921	5,641	2,263	483	25,534	34,939	6,141	2,558	611	25,630
Total genera	ation by fuel	381,707	49,820	32,281	7,612	291,994	367,251	51,021	27,601	7,930	280,699
within											
which: F	Renewables Hydro	3,568	3,258	213	36	61	5,682	5,322	268	20	72
	Wind, wave, solar	10,222	4,873	987	640	3,722	15,718	6,958	1,445	893	6,420
	Other	11,996	1,288	532	86	10,091	13,098	1,259	617	82	11,140
	Total	25,785	9,419	1,731	761	13,874	34,498	13,539	2,330	996	17,633
Renewables obligation	s eligible under the renewables	21,947	7,476	1,517	740	12,214	29,034	10,620	2,015	1,056	15,343
				,			·	•		•	
Percentage		28.2%	29.5%	18.4%	24.4%	29.2%	29.6%	21.1%	22.4%	18.3%	32.1%
shares of	Oil	1.3%	2.4%	0.5%	1.4%	1.1%	0.8%	1.8%	0.4%	1.1%	0.7%
generation:	Gas Nuclear		46.0% 16.8% 16.3% 30.7%	17.1%	64.2%	50.1%	1% 39.9%	16.2%	39.1%	68.1%	43.5% 16.6%
					-	14.1%	18.8%	33.1%	19.4%	-	
	Hydro natural flow	0.9%	6.5%	0.7%	0.5%	-	1.5%	10.4%	1.0%	0.3%	
	Other renewables	5.8%		4.7%	9.5%	4.7%	7.8%			12.3%	6.3%
	Other	1.5%	1.6%	8.9%	-	0.7%	1.5%	1.2%	10.2%	-	0.8%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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

I abic Z	continued: Generation of	CICCLITCI	y by ide	2012	tialia, V	uics, 140	i di ci ii ii ciai	id dild Ell	2013	010 10 201	3 GWh
		-			Northern		-		2013	Northern	
		UK total	Scotland	Wales	Ireland	England	UK total	Scotland	Wales	Ireland 2,606	England 105,319
Major power	Coal	140.164	11.867	10.824	2.367	115,105	130,204	10.802	11,478		
producers:	Oil	1,132	155	-	44	933	745	161		21	563
	Gas	86,229	3,680	5,167	3,609	73,773	82,405	3,497	3,985	3,457	71,466
	Nuclear	70,405	17,050	4,141	-	49,214	70,608	18,498	4,326	-, -	47,785
	Thermal renewables	6,156	422	104	_	5,630	9,405	360	129	-	8,915
	Hydro natural flow	4,169	3,859	287	-	24	3,609	3,409	175	-	24
	Hydro pumped storage	2,966	610	2,357	_		2,898	615	2,283	-	
	Non thermal renewables	16,970	7,181	1,149	553	8,087	23,830	9,428	1,200	622	12,579
	Total	328,192	44,823	24,029	6,573	252,766	323,704	46,771	23,577	6,706	246,650
Other	Coal	2,992	25	_	39	2,928	564	18	_	39	507
Generators:	Oil	1,439	449	56	36	899	1,391	434	49	38	870
	Gas Thermal renewables Other thermal Hydro natural flow Non thermal renewables Wastes	13,929 8,759 1,767	1,959	1,125	124	10,721	13,207 9,087 2,319	1,946 1,001	971 490 594 52 618	95 134 - 21 753	10,195 7,462 1,598 59 3,463 1,137
			1,070	466	109	7,114					
			27 980	454	-	1,286		127			
		1,115		51	21	64	1,089	957			
			1,074	377		2,098	6,645	1,812 6			
			31	-		1,139	1,143				
	Total	35,216	5,613	2,528	825	26,250	35,446	6,300	2,774	1,080	25,291
Total genera		363,407	50,436	26,558	7,398	279,016	359,150	53,071	26,351	7,786	271,942
within	Renewables Hydro	E 20E	4,838	337	21	88	4,698	4,366	227	21	83
which: F		5,285	,				,	•			
	Wind, wave, solar	21,015	8,254	1,527	1,049	10,185	30,475	11,240	1,817	1,375	16,042
	Other Total	14,914 41,214	1,491 14,584	570 2,434	109 1179	12,744 23,017	18,492 53,665	1,361 16,967	619 2,664	134 1531	16,377 32,503
		41,214	14,304	2,434	1173	23,017	33,003	10,907	2,004	1331	32,303
Renewables obligation	eligible under the renewables	33,428	11,134	1,901	1,121	19,273	43,359	14,422	2,170	1,512	25,256
Percentage	Coal	39.4%	23.6%	40.8%	32.5%	42.3%	36.4%	20.4%	43.6%	34.0%	38.9%
shares of	Oil	0.7%	1.2%	0.2%	1.1%	0.7%	0.6%	1.1%	0.2%	0.7%	0.5%
generation:	Gas	27.6%	11.2%	23.7%	50.5%	30.3%	26.6%	10.3%	18.8%	45.6%	30.0%
	Nuclear Hydro natural flow	19.4%	33.8%	15.6%	-	17.6%	19.7%	34.9%	16.4%	-	17.6%
		1.5%	9.6%	1.3%	0.3%	-	1.3%				-
	Other renewables	9.9%	19.3%	7.9%	15.7%	8.2%	13.6%	23.7%	9.2%	19.4%	11.9%
	Other	1.6%	1.3%	10.6%	-	0.9%	1.8%	1.4%	10.9%	0.0%	1.0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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