

Electricity generation and supply figures for Scotland, Wales, Northern Ireland and England, 2009 to 2012

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 2012. The UK figures shown in the tables in this article are taken from the Digest of United Kingdom Energy Statistics (DUKES) 2013, 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 2011 and 2012, England's share of total UK generation increased marginally to 77.2 per cent. A large increase in coal generation and a small increase in oil generation were offset by a significant decrease in gas generation. Generation shares in Scotland, Wales and Northern Ireland fell marginally to 13.6 per cent, 7.2 per cent and 2.0 per cent respectively due to decline in gas generation. On average, over the last four years, 76.5 per cent of UK electricity generation has taken place in England, 13.6 per cent in Scotland, 7.9 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 2011, Scotland exported 26.1 per cent of the electricity generated there to consumers elsewhere in the UK, the same as in 2012. Transfers from Scotland to England fell by 7.6 per cent between 2011 and 2012; following a record high in 2011. Wales exported the equivalent of 9.9 per cent of its generation to consumers in England in 2012, a decrease on the 13.3 per cent in 2011 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 5.6 of the Digest of UK Energy Statistics 2013, for 2011 and 2012. The position in 2012 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 has continued into 2012. Nuclear's share in Scotland fell in 2010 due to maintenance outages but rose again in 2011 and in 2012 to over one third of all generation due to increased availability. In Wales, nuclear's share of generation has fluctuated in recent years with a fall in 2010 before rising again in 2011. This was succeeded by a fall in 2012 to 15.8% of all generation in Wales.

Due to high gas prices, in England, gas's share of generation fell by thirteen percentage points, between 2011 and 2012, while coal's share rose by ten percentage points, following the same pattern that occurred between 2010 and 2011. This pattern, of an increase in coal's share at the expense of gas, between 2011 and 2012, was repeated in Wales. Gas's share also declined in Scotland, where coal's share increased by four percentage points, after a decline in 2011. In 2012,

Special feature – Sub national electricity figures

gas' share of generation in each of England, Scotland, Wales and Northern Ireland was at a record low for the 2004 to 2012 period covered.

Scotland's renewables share of generation in 2012 is up 3 percentage points on 2011 at 29.8% whilst Northern Ireland's share was also up 3 percentage points to 15.9%. The increase was small in England at 8.2%, up 2 percentage points. However, the increase in Wales was small, up less than 1 percentage point to 8.7%.

Table A1: Shares of each country's generation, by fuel type, 2011 and 2012

	Scotland	Wales	Northern Ireland	England
2011				
Coal	21.0%	22.5%	18.3%	32.1%
Gas	16.1%	39.3%	68.1%	43.5%
Nuclear	33.0%	19.5%	-	16.6%
Renewables	26.8%	8.0%	12.6%	6.3%
Oil and Other	3.0%	10.7%	1.1%	1.5%
2012				
Coal	24.9%	41.2%	32.5%	41.9%
Gas	8.0%	23.2%	50.5%	30.7%
Nuclear	34.4%	15.8%	-	17.5%
Renewables	29.8%	8.7%	15.9%	8.2%
Oil and Other	2.8%	11.1%	1.1%	1.6%

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 2012 on a sub-national and regional basis were published in the September 2013 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 2012, other generators had a 9 per cent share, while in England the share was 10 per cent, in Wales 8 per cent and in Northern Ireland 11 per cent.

Chart 1: Generation by country and fuel type in 2012 (all generating companies)

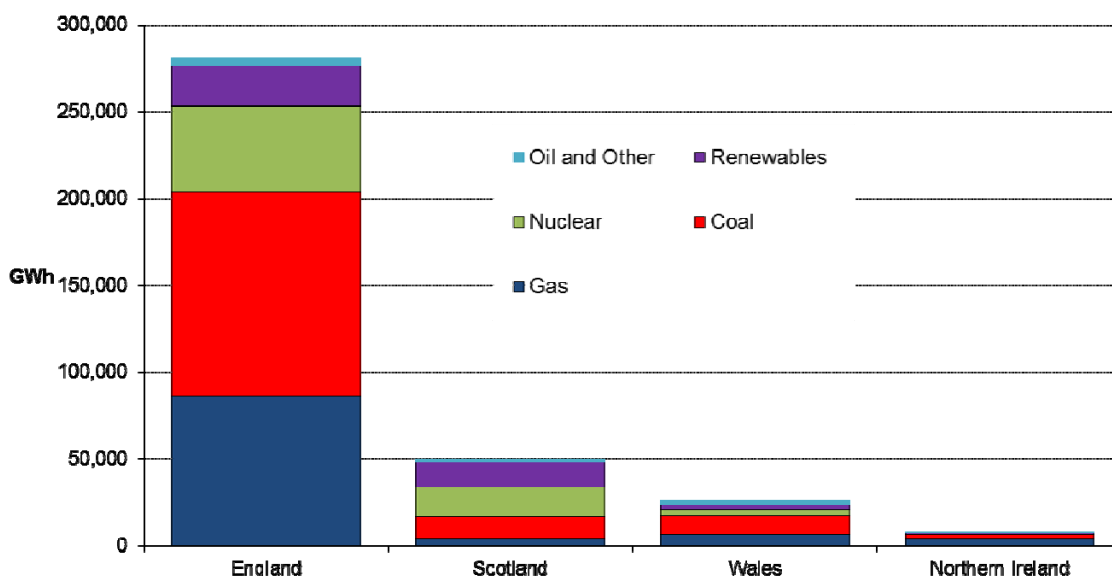
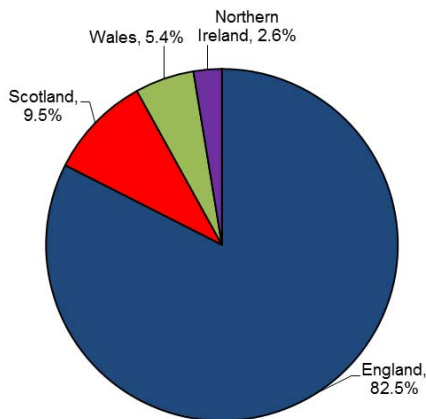


Chart 2: Electricity consumption in 2012



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 2012, 9.5 per cent of electricity consumption in the UK was in Scotland, 5.4 per cent in Wales, 2.6 per cent in Northern Ireland and 82.5 per cent in England. These show little variation from the average percentage shares for each country for the period 2008 to 2011, namely 82.0 per cent for England, 10.0 per cent for Scotland, 5.4 per cent for Wales and 2.6 per cent for Northern Ireland.

Separate data are 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 2013, 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 5.3 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.

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 “headline” measure for 2009, 2010, 2011 and 2012.

Table A2: Renewables percentages

		UK	Scotland	Wales	Northern Ireland	England
Overall renewables percentage	2009	6.7	21.0	5.0	10.3	4.2
	2010	6.8	19.1	5.0	10.0	4.8
	2011	9.4	26.8	8.0	12.6	6.3
	2012	11.3	29.8	8.7	15.9	8.2

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 2013, table 6.7 and paragraph 6.38.

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

Special feature – Sub national electricity figures

Scotland's renewables' share fell in 2010 mainly due to a fall in hydro generation as a result of much lower rainfall. With much higher rainfall, higher wind speeds and increased wind capacity, Scotland's renewables' share rose to 29.8 per cent in 2012. This share is very much higher than other parts of the UK. In 2012, all four countries had a record high percentage of electricity generated by renewables with strong growth in wind generation. On a RO basis, the percentage measure for the UK (6.7 per cent in 2009, 6.8 per cent in 2010, 9.4 per cent in 2011 and 11.3 per cent in 2012) is not meaningful at sub-national level because electricity generated in one part of the UK can be sold in a different part of the UK.

In Scotland, the renewables target (to reach 100 per cent of gross electricity consumption from renewables 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 2009, this percentage was 27.6 per cent, falling to 24.1 per cent in 2010. In 2011, this rose to 36.3 per cent, thus exceeding the interim target³ of 31 per cent. This figure has continued to rise to 40.3 per cent in 2012. 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 2012 was 12 per cent more than in 2011, while the amount of RO eligible electricity generated in Wales in 2012 was 2 per cent more than in 2011. In England, the increase was 30 per cent. In Northern Ireland RO eligible electricity generated was 18 per cent more. In the UK as a whole, RO eligible electricity production increased by 21 per cent. Over the four years shown in Table 2, the increases in RO eligible electricity production have been substantial across all countries, namely 42 per cent for Northern Ireland, 51 per cent for Scotland, 42 per cent for Wales and 95 per cent for England.

Renewables statistics for 2012 on a sub-national and regional basis were published in the September 2013 issue of Energy Trends (see references at the end of the article).

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References:

Digest of UK Energy Statistics 2013 (DUKES); published for DECC by The Stationery Office. £62.00, but also available on DECC's energy statistics website at:

www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes#2013.

Energy Trends monthly table 5.5:

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

"Combined Heat and Power in Scotland, Wales, Northern Ireland and the regions of England in 2012" – Energy Trends September 2013, page 60:

www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles_issue/articles_issue.aspx

"Renewable energy in Scotland, Wales, Northern Ireland and the regions of England in 2012" – Energy Trends September 2013, page 49:

www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles_issue/articles_issue.aspx

³ The corresponding percentages for the UK as a whole are 6.7 in 2009, 6.8 in 2010 9.4 in 2011 and 11.3 in 2012, which are similar to the overall renewables percentages in Table 2.

Chart 3: Electricity generation and consumption flow chart, 2012

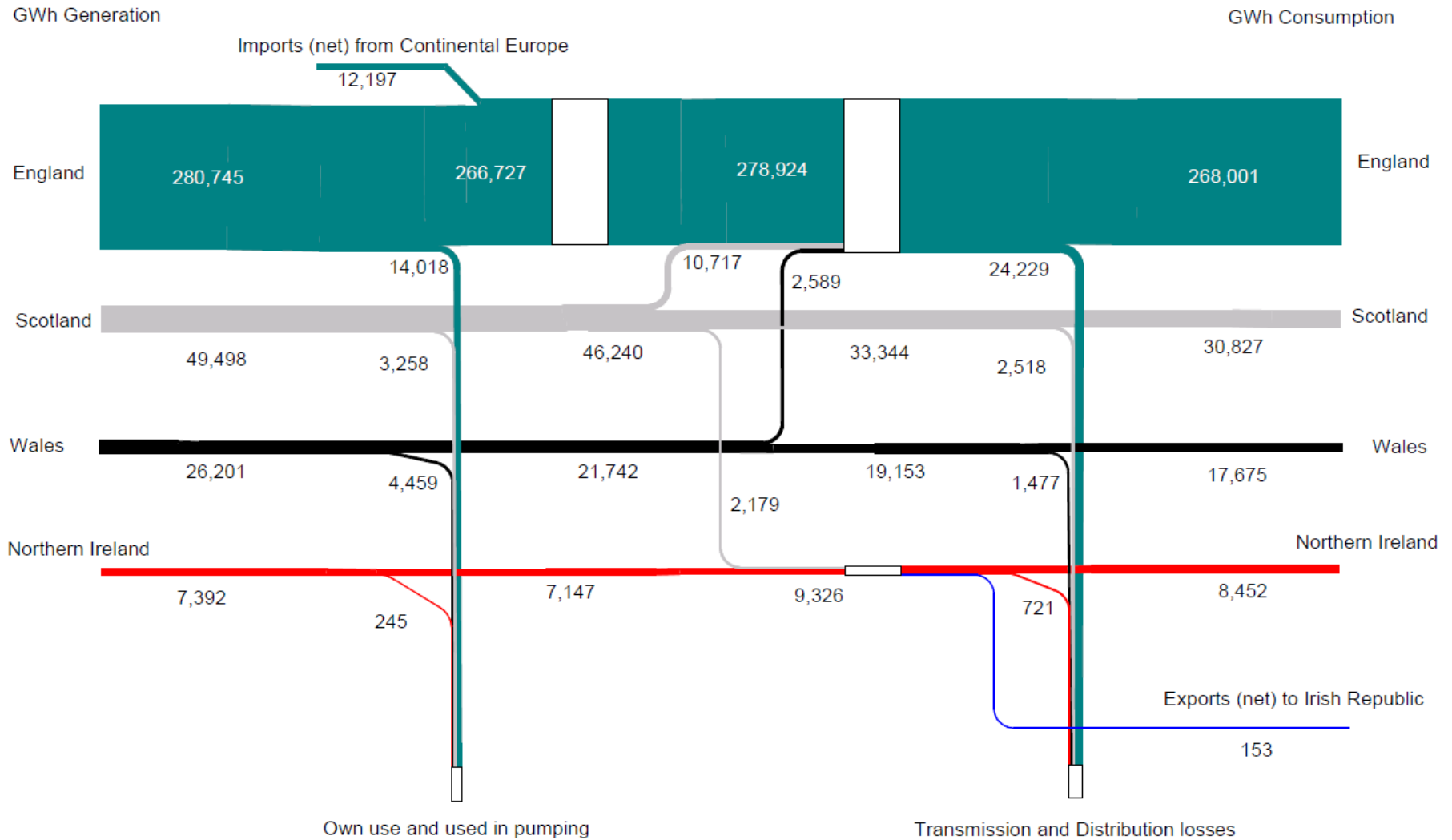


Table 1: Generation and supply of electricity in Scotland, Wales, Northern Ireland and England, 2009 to 2012

		2009					2010					<i>GWh</i>
		UK total	Scotland	Wales	Northern Ireland	England	UK total	Scotland	Wales	Northern Ireland	England	
Generated by	Major power producers	342,374	45,284	30,370	7,628	259,092	347,785	44,179	30,018	7,128	266,460	
	Other generators	34,378	5,889	1,619	388	26,482	33,974	5,785	2,142	483	25,563	
Total generated		376,753	51,173	31,989	8,016	285,574	381,759	49,965	32,160	7,612	292,023	
Own use by	Other generators	1,821	312	86	21	1,402	1,705	290	108	24	1,283	
Electricity supplied (net) by	Other generators	32,558	5,577	1,533	367	25,080	32,269	5,495	2,035	459	24,280	
Used in pumping at pumped storage and other own use by	MPPs	19,593	3,649	4,732	184	11,029	18,615	3,264	4,383	199	10,768	
Electricity supplied (net) by	MPPs	322,781	41,635	25,638	7,444	248,063	329,170	40,915	25,634	6,929	255,692	
Electricity transferred to England (net of receipts)		-	10,209	8,140	-	-18,349	-	7,998	7,897	-	-15,896	
Electricity transferred to Northern Ireland (net of receipts)			1937	-	-1937	-	-	2,297	-	-2,297	-	
Electricity transferred to Europe (net of receipts)		-2,861	-	-	367	-3,228	-2,663	0	0	232	-2,895	
Transfers from other generators to public supply		16,303	2,423	579	290	13,011	14,660	2,622	670	364	11,003	
Transmission losses		6,852	671	364	179	5,638	5,975	593	324	155	4,903	
Distribution losses		21,191	1,796	1,065	548	17,781	21,061	1,812	1,049	532	17,667	
Consumption from public supply [A]		313,923	29,449	16,650	8,577	259,247	319,472	30,839	17,034	8,672	262,927	
Consumption by autogenerators		16,234	3,151	953	77	12,053	17,594	2,870	1,364	95	13,265	
Total Electricity consumption		330,157	32,600	17,603	8,654	271,300	337,066	33,709	18,398	8,767	276,192	
Electricity sales (public supply) [B]		313,784	29,955	17,498	8,265	258,065	319,919	31,143	17,737	8,316	262,724	
Statistical difference between calculated consumption [A] and sales [B]		+138	-506	-849	+311	+1,182	-447	-303	-703	+356	+203	

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

Table 1 continued: Generation and supply of electricity in Scotland, Wales, Northern Ireland and England, 2009 to 2012

		2011					2012					GWh
		UK total	Scotland	Wales	Northern Ireland	England	UK total	Scotland	Wales	Northern Ireland	England	
Generated by	Major power producers	332,312	44,880	25,043	7,319	255,070	328,106	44,823	24,029	6,573	252,680	
	Other generators	35,142	6,357	2,398	611	25,776	35,730	4,675	2,172	819	28,064	
Total generated		367,454	51,237	27,441	7,930	280,846	363,836	49,498	26,201	7,392	280,745	
Own use by Other generators		1,947	352	133	34	1,428	2,121	277	129	49	1,666	
Electricity supplied (net) by Other generators		33,195	6,005	2,266	577	24,348	33,609	4,397	2,043	770	26,399	
Used in pumping at pumped storage and other own use by MPPs		18,323	2,924	4,149	179	11,072	19,859	2,980	4,330	196	12,352	
Electricity supplied (net) by MPPs		313,988	41,956	20,893	7,140	243,998	308,247	41,843	19,699	6,377	240,328	
Electricity transferred to England (net of receipts)		-	11,597	3,652		-15,250	0	10,717	2,589	0	-13,306	
Electricity transferred to Northern Ireland (net of receipts)		-	1,769	-	-1,769	-	-	2,179	-	-2,179	-	
Electricity transferred to Europe (net of receipts)		-6,222	0	0	246	-6,468	-12,044	0	0	153	-12,197	
Transfers from other generators to public supply		15,226	3,035	857	443	10,891	16,669	2,931	701	621	12,417	
Transmission losses		6,470	633	357	169	5,311	6,764	637	366	175	5,585	
Distribution losses		21,673	1,811	1,092	548	18,222	22,156	1,878	1,110	545	18,624	
Consumption from public supply [A]		307,313	29,184	16,651	8,389	253,089	308,040	29,363	16,335	8,303	254,038	
Consumption by autogenerators		17,949	2,966	1,407	134	13,442	16,915	1,463	1,341	149	13,962	
Total Electricity consumption		325,262	32,150	18,058	8,523	266,531	324,954	30,827	17,675	8,452	268,001	
Electricity sales (public supply) [B]		308,033	29,783	17,241	7,931	253,078	308,408	28,636	17,109	7,927	254,735	
Statistical difference between calculated consumption [A] and sales [B]		-720	-599	-590	+458	+11	-369	+727	-775	+376	-697	

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

Table 2: Generation of electricity by fuel in Scotland, Wales, Northern Ireland and England, 2009 to 2012 *GWh*

		2009					2010				
		UK total	Scotland	Wales	Northern Ireland	England	UK total	Scotland	Wales	Northern Ireland	England
Major power producers:	Coal	99,287	11,896	6,547	1,371	79,473	103,941	14,653	5,929	1,817	81,542
	Oil	3,839	278	-	78	3,484	2,271	206	-	73	1,992
	Gas	152,598	7,430	14,111	5,642	125,415	161,748	6,618	15,227	4,840	135,063
	Nuclear	69,098	16,681	6,122	-	46,295	62,140	15,293	5,532	-	41,315
	Thermal renewables	2,670	242	91	-	2,338	3,691	299	72	-	3,321
	Hydro natural flow	4,294	4,056	216	-	22	2,703	2,521	164	-	18
	Hydro pumped storage	3,685	1,087	2,598	-	-	3,150	779	2,372	-	-
	Non thermal renewables	6,904	3,615	685	538	2,066	8,141	3,811	722	398	3,211
	Total	342,374	45,284	30,370	7,628	259,092	347,785	44,179	30,018	7,128	266,460
Other Generators:	Coal	3,751	69	-	31	3,651	3,753	62	-	41	3,650
	Oil	2,155	1,017	64	34	1,041	2,532	1,007	173	34	1,318
	Gas	13,901	1,940	470	32	11,459	13,908	1,770	806	44	11,289
	Thermal renewables	8,004	1,084	348	43	6,528	8,346	1,126	339	87	6,795
	Other thermal	2,327	-	468	-	1,860	1,559	-	511	-	1,048
	Hydro natural flow	947	808	50	31	58	872	742	49	36	46
	Non thermal renewables	2,424	953	220	217	1,035	2,085	1,066	265	242	512
	Wastes	868	18	-	-	851	919	14	-	-	905
	Total	34,378	5,889	1,619	388	26,482	33,974	5,785	2,142	483	25,563
Total generation by fuel		376,753	51,173	31,989	8,016	285,574	381,759	49,965	32,160	7,612	292,023
<i>within</i>	Renewables Hydro	5,241	4,864	266	31	80	3,575	3,263	213	36	64
<i>which:</i>	Wind, wave, solar	9,328	4,568	905	754	3,101	10,226	4,877	987	639	3,723
	Other	10,674	1,326	439	43	8,866	12,037	1,425	411	87	10,115
	Total	25,243	10,759	1,610	828	12,046	25,838	9,564	1,610	762	13,902
Renewables eligible under the renewables obligation		21,086	7,944	1,485	828	10,829	22,513	7,717	1,516	762	12,519
Percentage shares of generation:	Coal	27.3%	23.4%	20.5%	17.5%	29.1%	28.2%	29.5%	18.4%	24.4%	29.2%
	Oil	1.6%	2.5%	0.2%	1.4%	1.6%	1.3%	2.4%	0.5%	1.4%	1.1%
	Gas	44.2%	18.3%	45.6%	70.8%	47.9%	46.0%	16.8%	49.9%	64.2%	50.1%
	Nuclear	18.3%	32.6%	19.1%	-	16.2%	16.3%	30.6%	17.2%	-	14.1%
	Hydro natural flow	1.4%	9.5%	0.8%	0.4%	-	0.9%	6.5%	0.7%	0.5%	-
	Other renewables	5.3%	11.5%	4.2%	9.9%	4.2%	5.8%	12.6%	4.3%	9.5%	4.7%
	Other	1.8%	2.2%	9.6%	-	0.9%	1.5%	1.6%	9.0%	-	0.7%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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

Table 2 continued: Generation of electricity by fuel in Scotland, Wales, Northern Ireland and England, 2008 to 2012 GWh

		2011					2012				
		UK total	Scotland	Northern			UK total	Scotland	Wales	Northern	
				Wales	Ireland	England				Ireland	England
Major power producers:	Coal	104,797	10,728	6,170	1,414	86,485	140,164	11,867	10,799	2,367	115,130
	Oil	1,074	160	-	52	862	1,130	155	-	44	931
	Gas	132,753	6,227	9,880	5,301	111,346	86,229	3,680	5,167	3,609	73,773
	Nuclear	68,980	16,892	5,364	-	46,725	70,405	17,050	4,141	-	49,214
	Thermal renewables	4,533	274	76	-	4,182	6,157	422	129	-	5,606
	Hydro natural flow	4,594	4,362	210	-	21	4,169	3,859	287	-	24
	Hydro pumped storage	2,906	604	2,301	-	-	2,966	610	2,357	-	-
	Non thermal renewables	12,675	5,632	1,041	553	5,450	16,884	7,181	1,149	553	8,001
	Total		332,312	44,880	25,043	7,319	255,070	328,106	44,823	24,029	6,573
Other Generators:	Coal	3,774	51	-	36	3,687	3,017	467	-	36	2,515
	Oil	2,043	780	121	36	1,106	1,935	569	102	36	1,228
	Gas	13,767	2,036	913	96	10,722	13,844	286	903	123	12,532
	Thermal renewables	8,667	1,140	394	82	7,050	9,041	1,227	297	109	7,408
	Other thermal	1,714	-	508	-	1,207	1,576	27	456	-	1,093
	Hydro natural flow	1,096	969	59	20	49	1,115	985	50	21	59
	Non thermal renewables	3,079	1,369	404	341	966	3,891	1,083	365	494	1,950
	Wastes	1,000	12	-	-	988	1,311	31	-	-	1,280
	Total		35,142	6,357	2,398	611	25,776	35,730	4,675	2,172	819
Total generation by fuel		367,454	51,237	27,441	7,930	280,846	363,836	49,498	26,201	7,392	280,745
<i>within which:</i>											
	Renewables Hydro	5,690	5,331	269	20	70	5,284	4,844	337	21	83
	Wind, wave, solar	15,755	7,001	1,445	893	6,416	20,775	8,264	1,514	1,047	9,950
	Other	13,200	1,415	470	82	11,233	15,198	1,649	426	109	13,014
	Total	34,645	13,747	2,184	996	17,718	41,258	14,756	2,277	1,177	23,048
Renewables eligible under the renewables obligation		30,042	10,682	2,068	996	16,296	36,388	11,998	2,107	1,177	21,106
Percentage shares of generation:	Coal	29.5%	21.0%	22.5%	18.3%	32.1%	39.4%	24.9%	41.2%	32.5%	41.9%
	Oil	0.8%	1.8%	0.4%	1.1%	0.7%	0.8%	1.5%	0.4%	1.1%	0.8%
	Gas	39.9%	16.1%	39.3%	68.1%	43.5%	27.5%	8.0%	23.2%	50.5%	30.7%
	Nuclear	18.8%	33.0%	19.5%	-	16.6%	19.4%	34.4%	15.8%	-	17.5%
	Hydro natural flow	1.5%	10.4%	1.0%	0.3%	-	1.5%	9.8%	1.3%	0.3%	-
	Other renewables	7.9%	16.4%	7.0%	12.3%	6.3%	9.9%	20.0%	7.4%	15.6%	8.2%
	Other	1.5%	1.2%	10.2%	-	0.8%	1.6%	1.3%	10.7%	-	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