

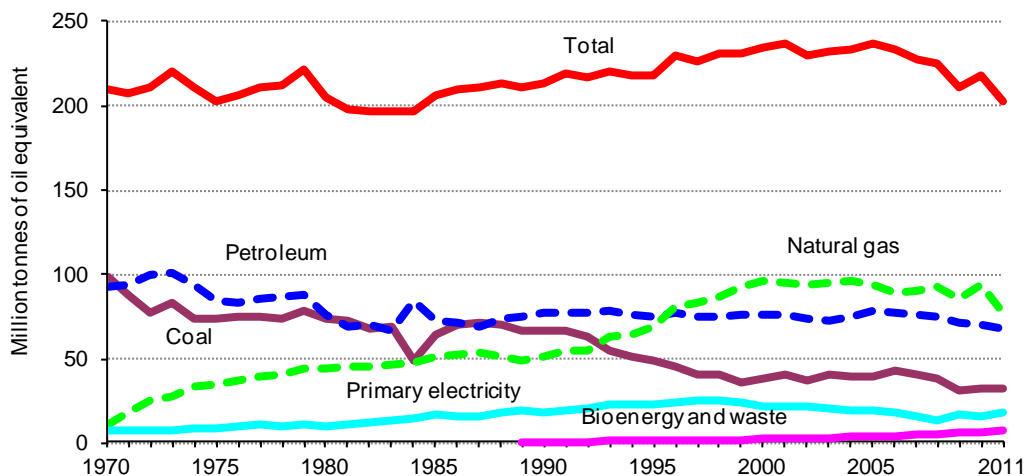
Chapter 1: Long term trends

Energy

Inland consumption of primary fuels (Table 1.1.1)

1.1.1 The trends in inland consumption of primary fuels for energy use are illustrated below in Chart 1.1.1. Overall consumption for energy use increased steadily up to 1973, when the oil price rose following the Arab-Israeli war of that year which led to a major change in patterns of fuel consumption. Having reached a level of over 220 million tonnes of oil equivalent in 1973, energy use subsequently fell, but by 1979 had returned to a similar level to that in 1973. After the outbreak of another Middle East war, consumption fell back to less than 200 million tonnes of oil equivalent in the years 1981 to 1984. It then grew again, and by 1996 had exceeded the peak levels of 1973 and 1979. In 2005 it had grown to 236.3 million tonnes, but has since fallen back by 14.1 per cent to 203.0 million tonnes in 2011. The last few years have been affected by a number of factors: the recession in 2009 reduced consumption; particularly cold weather in 2010 resulted in an increase in demand; whilst warm weather in 2011 caused consumption to fall back. Since 2005, consumption has fallen back by an average of 2.5 per cent per annum.

Chart 1.1.1: Inland consumption of primary fuels and equivalents for energy use 1970 to 2011



1.1.2 Petroleum consumption continued to grow in the period 1970 to 1973, despite strong growth in consumption of natural gas and primary electricity, mainly nuclear. After 1973, consumption of petroleum products declined for ten years, following much the same pattern as coal use. In 2003 petroleum consumption had fallen to its lowest level since 1987, but consumption has risen since then, peaking in 2005, though it has since fallen back by 13.0 per cent. Since 1970, coal consumption has continued to decline, although consumption grew in both 2006 and 2011 following increased demand for coal at power stations. Coal consumption has fallen back by 25.2 per cent since 2006. In 1970 coal accounted for 47 per cent of all fuels consumed. In 1980 this figure had fallen to 36 per cent, in 1990 31 per cent, and in 2011 it had declined further to 16 per cent.

1.1.3 Natural gas consumption, which accounted for only 5.4 per cent of all fuels consumed in 1970, grew steadily from this period, and exceeded petroleum consumption for the first time in 1996; by 2004 it accounted for 41 per cent of all fuels consumed. This fell back in 2006 to 38 per cent as the sharp rise in prices in that year resulted in generators switching some gas fired electricity production to coal fired generation. In 2010, its share had risen back to a record level of 43 per cent as a number of generators, early in the year, switched back some production from using coal to gas fired stations, and there was increased domestic demand due to the colder weather, but higher prices resulted in less use in generation in 2011, and its share fell back to 38 per cent.

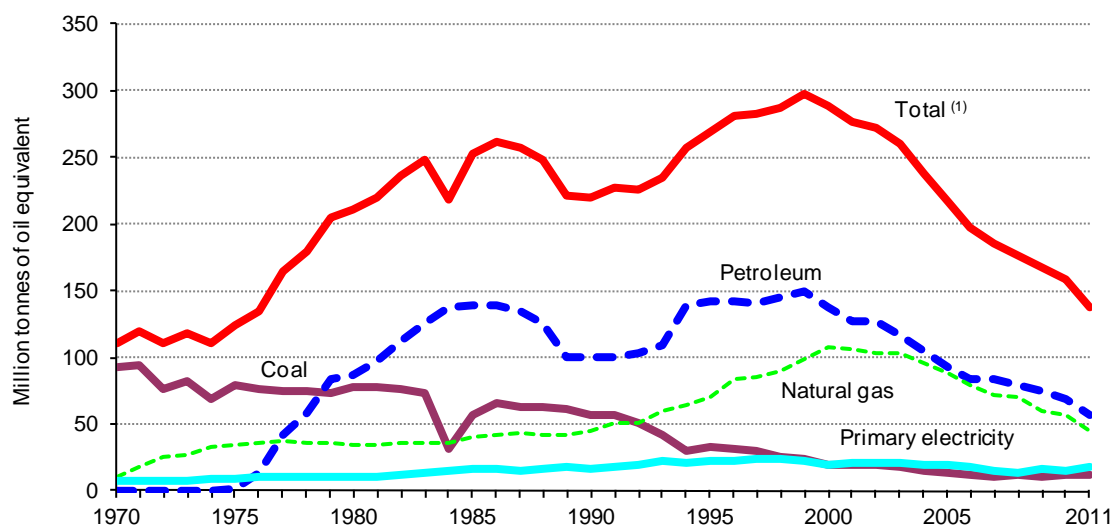
1.1.4 Consumption of bioenergy and waste continued to increase, accounting for 0.3 per cent of all fuels consumed in 1990, but increasing to 3.7 per cent in 2011¹. The share of primary electricity peaked at 11 per cent in 1997, before falling back to a low of 6.2 per cent in 2008. Its share has since grown to 8.9 per cent in 2011, due to a number of factors: increased nuclear availability following maintenance outages in previous years; and increased rainfall resulting in greater hydro-electric output; and increased wind production resulting from increased capacity and higher wind speeds during 2011.

Availability and consumption of primary fuels and equivalents (Table 1.1.2)

1.1.5 An overall view of energy presented in the form of energy balances is given in Table 1.1.2. It is based on Chapter 1, Tables 1.1 to 1.3, of the main Digest with the time series extended back to 1970. Supplies and uses of energy are expressed on an energy-supplied basis in tonnes of oil equivalent, and are balanced by fuel type and for total energy. More details on the derivation of these balances and on the calculation of energy contents are given in Chapter 1, paragraphs 1.30 to 1.31 and Annex A of the main Digest.

1.1.6 Trends in the production of primary fuels in the United Kingdom are illustrated in Chart 1.1.2. In 2011, total energy production was 137 million tonnes of oil equivalent, an increase of 24 per cent on production in 1970, but down by a record 13.2 per cent on 2010. Total energy production has fallen in each of the last 12 years since it peaked in 1999. In the last ten years, UK energy production has declined at a rate of 6.8 per cent per year; within this natural gas production has declined at the fastest rate, down 8.1 per cent per year, followed by petroleum down 7.8 per cent, coal down 5.3 per cent with primary electricity down 1.9 per cent per year. Bioenergy and waste has grown by an average 8.5 per cent per year over this same time period, though in 2011 accounted for only 4.2 per cent of the UK's energy production.

Chart 1.1.2: UK production of primary fuels 1970 to 2011



(1) Includes bioenergy & waste and heat.

1.1.7 From 1975, petroleum production grew rapidly to peak at over 139 million tonnes of oil equivalent in 1985 when it accounted for 55 per cent of the total energy production of 252.5 million tonnes of oil equivalent. By 1991, temporary production problems, following the Piper Alpha disaster of 1988, had reduced petroleum production to 100 million tonnes of oil equivalent. Since then petroleum production has steadily recovered, reaching a record level of 150 million tonnes of oil equivalent in 1999. Between 1999 and 2006 production of petroleum fell by 44 per cent. Production levels stabilised in 2007 as output from new fields (Buzzard) offset the general decline in production. However, output has since fallen by 32 per cent to leave it down 62 per cent from its peak in 1999. Petroleum production currently accounts for 42 per cent of total energy production.

¹ The renewables share was 3.8% in 2011 on the "target measure" – see chapter 6 of DUKES for more detail.

1.1.8 Natural gas from the North Sea started to be produced in substantial quantities from the early 1970s, accounting for 9.4 per cent of total production in 1970, and grew steadily to peak at 108.4 million tonnes in 2000. Since then natural gas production has eased and by 2011 had fallen by 58 per cent from this peak. In 2011 gas accounted for 33 per cent of total energy production.

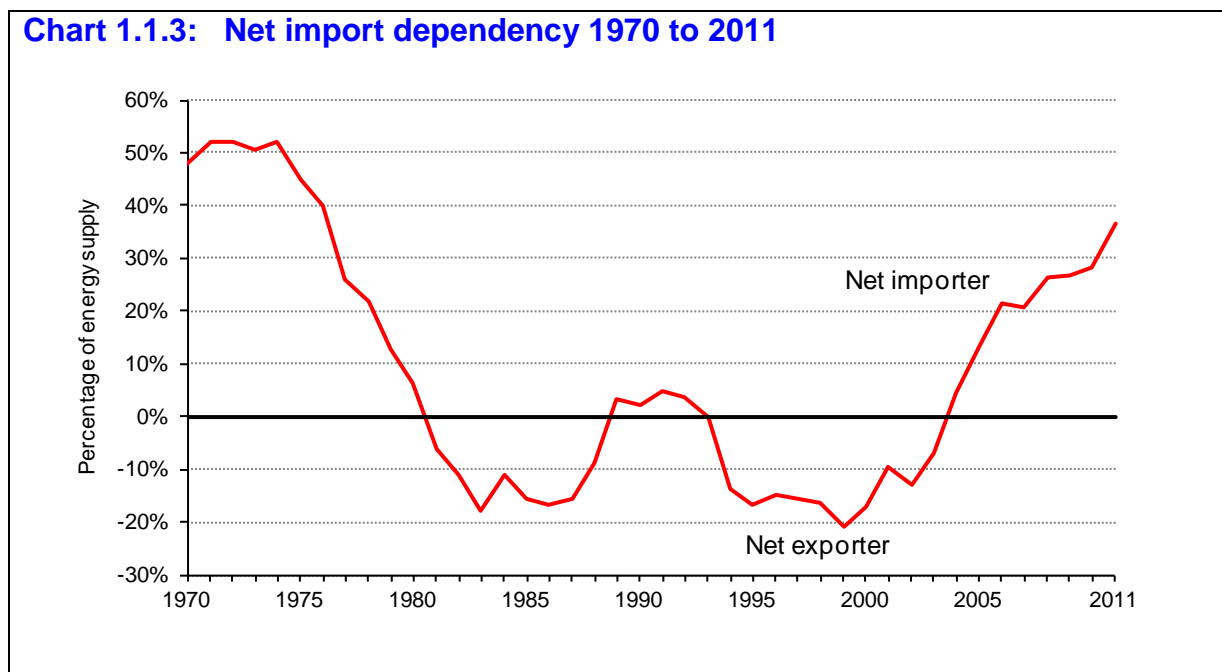
1.1.9 In 1970 coal accounted for 84 per cent of total energy production. In 1980, with the increase in petroleum and natural gas production, coal production fell to 37 per cent of total energy production, falling further to below 10 per cent in 1998. In 2011, coal accounted for 8.5 per cent of total energy production.

1.1.10 Primary electricity (nuclear, wind and hydro combined) accounted for a then record 9.9 per cent of production in 2009, as nuclear output recovered from the outages of 2008, allied with strong growth in output of wind generation. Its share fell back marginally in 2010 as nuclear outages, lower average wind speeds and lower rainfall more than offset the increased wind capacity available. However, in 2011 the share increased to a record 12.8 per cent, with increases in nuclear, hydro and wind. Output of primary electricity was down 27 per cent in 2011 from its peak in 1998.

Comparison of net imports of fuel with total consumption of primary fuels and equivalents (Table 1.1.3)

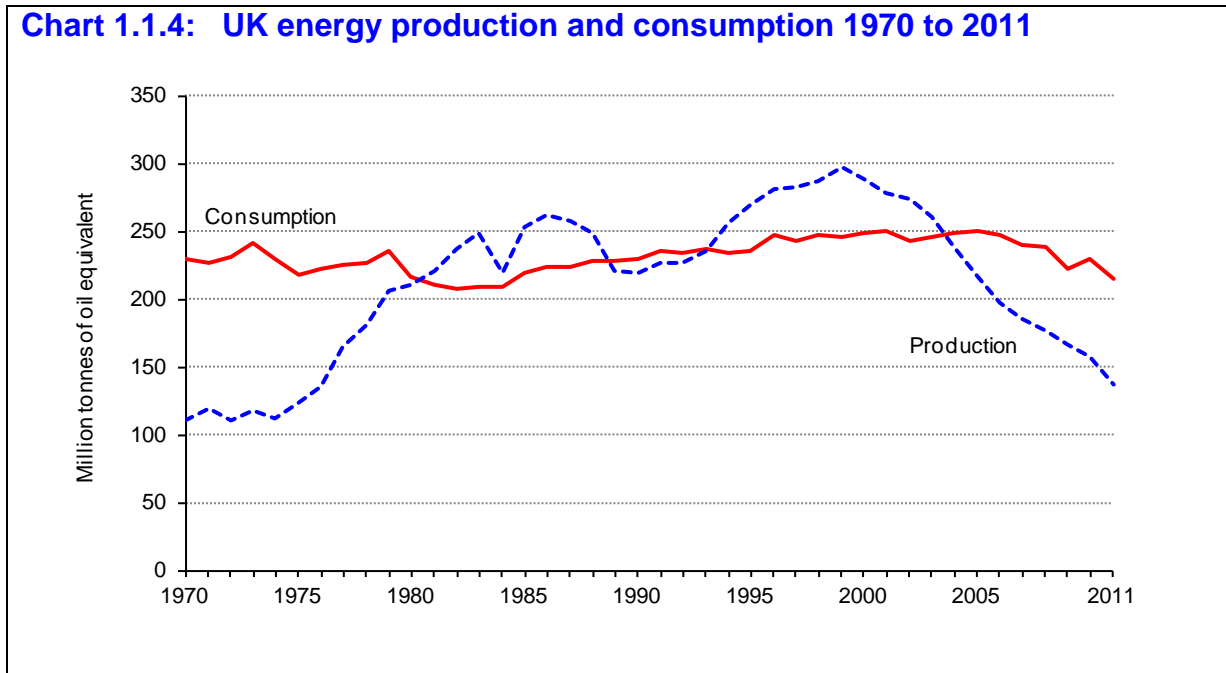
1.1.11 In Table 1.1.3 and Chart 1.1.3 gross fuel consumption in the United Kingdom, including non-energy use and international marine bunkers, is compared with net imports of fuel to show the UK's net import or net export dependency ratio. In the 1970's the UK was a net importer of energy. Following development of oil and gas production in the North Sea, the UK became a net exporter in 1981. Output fell back in the late 1980's following the Piper Alpha disaster, with the UK regaining a position as a net exporter in the mid 1990's. North Sea production peaked in 1999, and the UK returned to being an energy importer in 2004. The UK remains a net exporter of oil products, though the level of net imports of crude oil result in the UK being a net importer of oil. In 2011, 36.5% of energy used in the UK was imported, up sharply from the 2010 level as North Sea oil and gas output fell following adverse weather conditions as well as a number of maintenance issues. The import dependency ratio is at its highest level since 1976.

Chart 1.1.3: Net import dependency 1970 to 2011



1.1.12 Chart 1.1.4 shows United Kingdom primary energy production and consumption (from Tables 1.1.2 and 1.1.3) and also illustrates the degree to which the United Kingdom was dependent on energy imports prior to North Sea oil and gas becoming available.

Chart 1.1.4: UK energy production and consumption 1970 to 2011



Energy ratio (Table 1.1.4)

1.1.13 The relationship between energy consumption and economic activity at the aggregate level can be gauged by comparing a country's temperature corrected inland primary energy consumption with its gross domestic product (GDP). This approach is simple and comprehensive but it has a number of drawbacks which were discussed in the articles in the August 1976, May 1981 and May 1989 issues of *Economic Trends* (The Stationery Office). In September 2011 the methodology used by DECC was modified to move from using temperature deviations to a heating degree day methodology.

1.1.14 Heating degree days (HDD) are defined relative to a base temperature - the outside temperature above which a building needs no heating. DECC use 15.5° as the base data, as this seems the value most commonly used by other comparable countries, and a higher value did not produce appreciably better results. If the average outside air temperature on a given day is above this base temperature, you will not need to use any energy for heat; whilst if it is below, then your heat requirement that day will be in proportion to the temperature deficit in degrees. For example, using a base of 15.5°, if a day has an average temperature of 10°, then we calculate the HDD as 5.5. If the outside average temperature was minus 2°, then we would calculate the HDD as 17.5. The HDD's are summed for the month, and this value is then compared with the long term average. For example the long term average (from 1971 to 2000) for November is 257 HDD or 8.56 degrees per day. November 2009 and 2011 were mild, and the HDD was calculated as 212 and 179 HDD respectively, whilst the colder November 2010 had 304 HDD. The above numbers are calculated based on the average daily temperature (the average of the maximum and the minimum temperature) at each of 17 locations around the UK. More details of the methodology are detailed in an article in the June 2011 edition of *Energy Trends*.

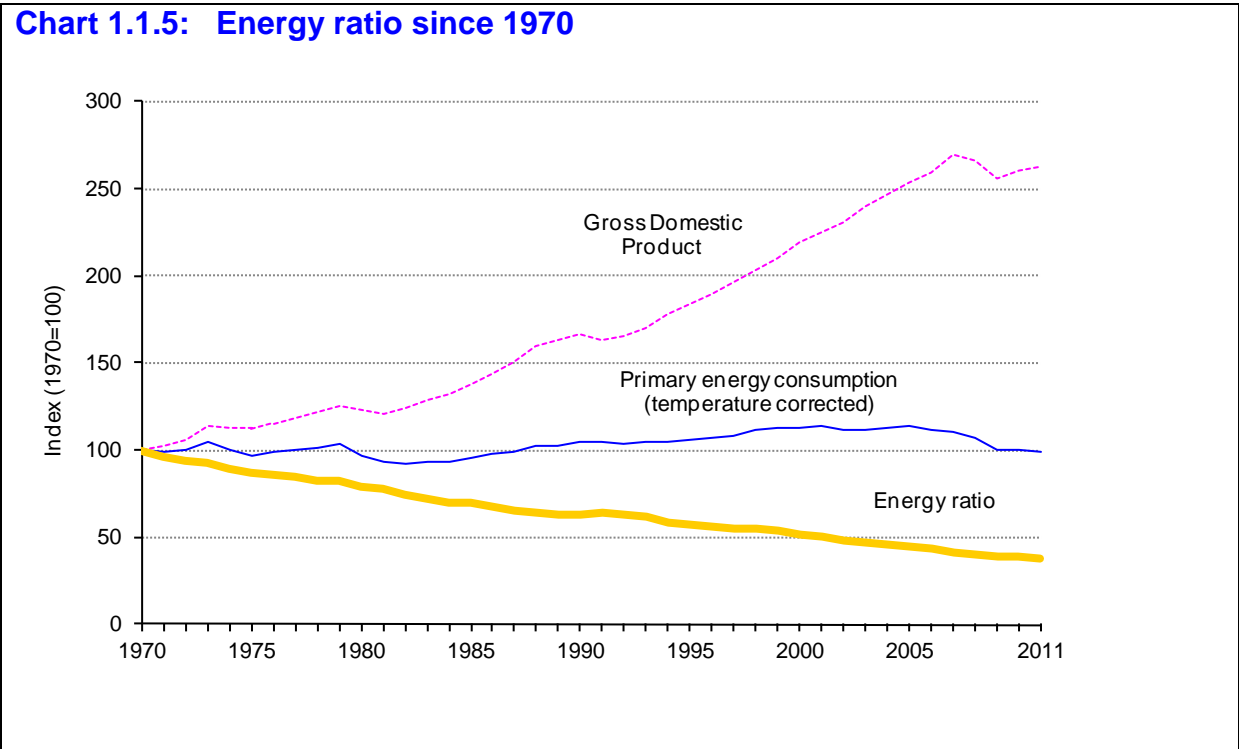
1.1.15 The temperature corrected series of total inland fuel consumption given in Table 1.1.4 indicates what annual consumption might have been if the number of heating degree days for a year had been the same as the average for the years 1971 to 2000. Different adjustment factors are then used for each month for each fuel. Research showed that temperature extremes had more effect on energy demand in the spring and autumn than that in winter and summer. In particular April, September and October showed the largest effects. In the summer, a 1 degree change may not be sufficient to result in additional heating being used. However, in October, a 1 degree difference may well be sufficient to result in heating being turned on or turned off, so resulting in a larger change.

1.1.16 Table 1.1.4 shows the United Kingdom's temperature corrected inland primary energy consumption in column B and GDP at constant prices since 1970 (column D), both expressed in absolute units (millions of tonnes of oil equivalent and billions of pounds sterling at 2009 prices respectively). Dividing energy consumption by GDP yields the energy ratio, which is expressed in

column F of the table as energy consumed per million pound of GDP and in column G as an index number based on 1970=100. For GDP at constant prices the published measure of GDP at market prices at 2009 prices has been used. The GDP figures used are on the European System of Accounts (ESA 95) basis, consistent with the UK national accounts.

1.1.17 Chart 1.1.5 illustrates trends in primary energy consumption, GDP and the energy ratio over the period 1970 to 2011. It shows that energy ratio fell steadily (with the exception of 1979 and 1991) from its 1970 level to 38 per cent of that level by 2011, an average decrease of around 2.4 per cent per annum. The pace of fall has increased in the last 10 years, averaging 2.9 per cent per annum. The strong downward trend since 1970 is explained by at least four factors: improvements in energy efficiency; saturation in the ownership levels and improved efficiency of the main domestic appliances; the unresponsiveness of certain industrial uses, like space heating, to long run output growth; and a structural shift away from energy intensive activities (such as steel making) towards low energy industries (such as services).

Chart 1.1.5: Energy ratio since 1970



Energy consumption by final user (Table 1.1.5)

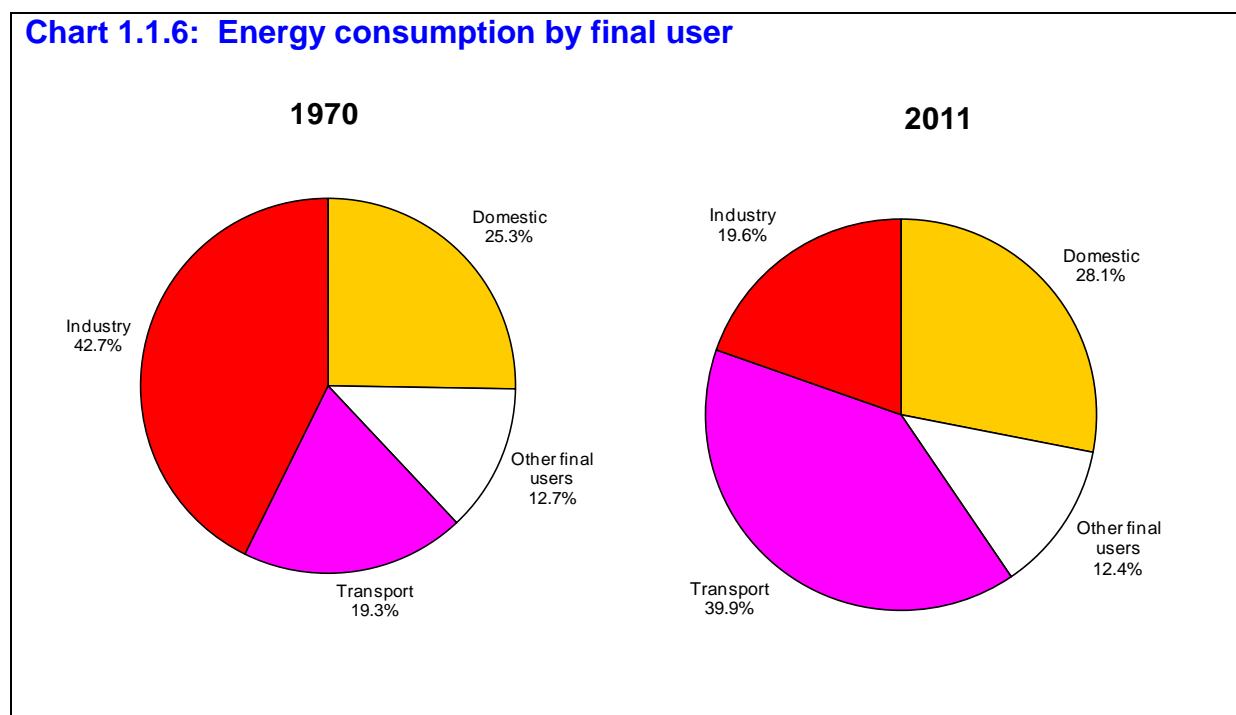
1.1.18 Figures for energy consumption (excluding non-energy use) by category of final users are given in Table 1.1.5. Final users’ consumption is net of the fuel industries’ own use and conversion, transmission and distribution losses, but it includes conversion losses by final users. The user categories are industry (including iron and steel), transport (including coastal shipping), domestic and other final users (public administration, agriculture, commerce and other sectors), see Chapter 1, paragraphs 1.56 to 1.60 of the main Digest.

1.1.19 Up to 1986, data for final consumption of electricity include acquisitions from public supply, output of industrial nuclear stations, and amounts produced by transport undertakings and industrial hydropower for final consumption. From 1987 onwards, all consumption of electricity, whether produced by major power producers or by other generators, are included. There is a corresponding change in treatment, between 1986 and 1987, for other fuels used in electricity generation (see Chapter 1, paragraph 1.36 of the main Digest).

1.1.20 Overall consumption by final users has followed the same pattern as overall primary energy consumption since 1970, accounting for around 70 per cent of the total consumption throughout the period.

1.1.21 In 1970, the industry sector (including iron and steel) had the greatest level of consumption, with 43 per cent of total final consumption. However, since 1970 this sector has steadily reduced its consumption, falling to 34 per cent in 1980 and 26 per cent of total final consumption in 1990. It now stands at 20 per cent of total final consumption for energy use. This share is now less than that of the domestic sector which, has retained around the same share of 30 per cent since 1980. In 2011 the domestic share fell back to 28 per cent due to the warmer weather. In 2010, a much colder year, domestic's share increased to over 32 per cent. The greatest growth has been in the transport sector; this had a share of 19 per cent in 1970, before growing to 25 per cent in 1980, 33 per cent in 1990 and to just under 40 per cent in 2011. Service sector consumption has remained steady from 1970 to 2010 and was just over 12 per cent of total final consumption in 2011.

1.1.22 A comparison of energy consumption for energy purposes by final users in 1970 and 2011 is shown in Chart 1.1.6.

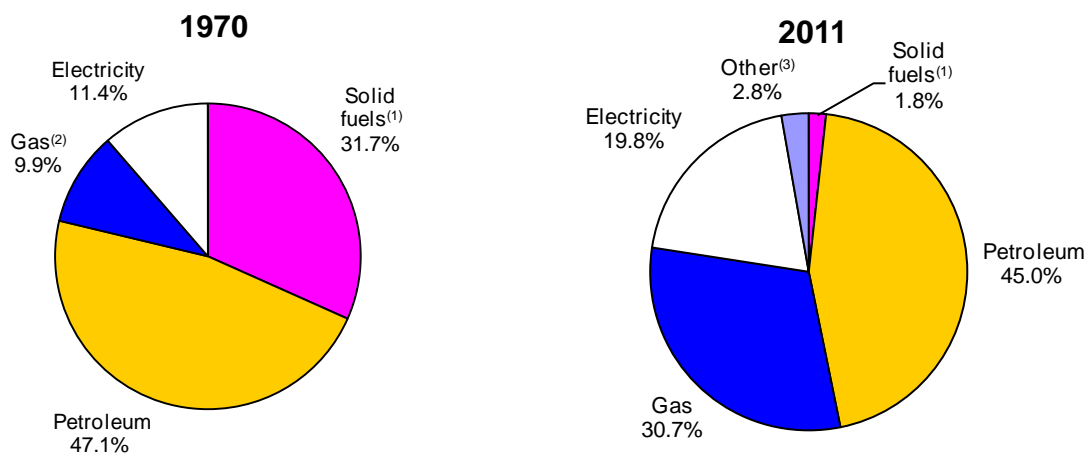


1.1.23 Table 1.1.5 also shows trends in final energy consumption for individual fuels. In 1970, consumption of coal and other solid fuels accounted for 32 per cent of final energy consumption, but this share has declined steadily to around 2 per cent in 2011. Over this period consumption of natural gas has increased rapidly, up from 10 per cent in 1970 to stand at 31 per cent in 2011. In 1970, town gas accounted for 7 per cent of consumption, however use of town gas was phased out in the mid 1970s. Electricity consumption has made steady progress over the last three decades, rising from 11 per cent of the total in 1970 to 20 per cent in 2011. Petroleum's share has remained broadly steady, with a 47 per cent share in 1970 falling back to 40 per cent in 1985, though this has since risen to 45 per cent in 2011. A comparison of final energy consumption for individual fuels in 1970 and 2011 is shown in Chart 1.1.7.

Expenditure on energy by final user (Table 1.1.6)

1.1.24 Total expenditure on fuels is presented in Table 1.1.6 from 1970, and figures for recent years are illustrated in Chapter 1, Chart 1.6 of the main Digest. Data for the latest years are taken from the value balances (Chapter 1, Tables 1.4 to 1.6 of the main Digest) whilst earlier years are taken from their forerunner tables of estimated values of energy purchases by sector. As before, coal purchased by the iron and steel sector and shown in the transformation section of the energy value balance table is included as a final purchase by the industry sector of coal.

Chart 1.1.7: Final energy consumption by type of fuel



- (1) includes manufactured fuels and coke oven gas
(2) includes town gas
(3) includes heat sold, bioenergy and waste

1.1.25 Overall final expenditure on energy was up by around £10 billion (8 per cent) in 2011 compared to 2010, as prices of fuels increased sharply for the second successive year. The level of £134 billion in 2011 is more than double that of 2000 and nearly three times than that in 1990. The change in the final expenditure for all fuels was driven by changes in the price of oil, which rose steadily throughout 2010 and into April 2011, before remaining at these elevated levels for the rest of the year. The value of spending on oil rose by 14 per cent on 2010 levels. Total expenditure on gas fell back by 8 per cent, due to reduced demand.

1.1.26 The makeup of total expenditure has changed through time, reflecting structural or long term changes in fuel mix and shorter term price and consumption effects. In 1970, expenditure on coal and coke accounted for around 15 per cent of total final expenditure, but was down to 1 per cent in 2011. By contrast, the general increase in the consumer price of petroleum (where duty is a major component) has meant that petroleum rose from 45 per cent of all expenditure in 1970 to 63 per cent in 2004. This percentage in 2009 declined to 54 per cent due to the rises in gas and electricity prices since 2004, but climbed to 61 per cent in 2011.

Mean air temperatures and heating degree days (Tables 1.1.7, 1.1.8 and 1.1.9)

1.1.27 Table 1.1.7 gives the average air temperatures in Great Britain between 1971 and 2000 by year, part year and month. Deviations from these means are presented for January 2000 to December 2011. Table 1.1.8 provides similar data, but for heating degree days rather than average temperatures. These heating degree deviations are used to provide the temperature corrected consumption series shown in Table 1.1.4.

1.1.28 Average monthly temperatures back to 1970 are also given in Table 1.1.9. The daily average temperature for 2011 was 1.0 degrees higher than the long term mean covering 1971 to 2000, and 1.8 degrees warmer than 2010. The year 2010 was the coldest since 1987 and included the coldest December for 100 years. The year 2011, according to the Met Office, was the second warmest on record and included the warmest April for over 100 years.

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1.1.1 Inland consumption of primary fuels and equivalents for energy use, 1970 to 2011

		1970	1971	1972	1973	1974
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	156.9	139.3	122.4	133.0	117.9
Petroleum (2)	"	87.0	88.0	94.2	95.3	88.5
Natural gas (3)	GWh	131,472	212,037	300,808	325,455	389,286
Nuclear electricity (4)	"	26,039	27,418	29,275	27,757	33,377
Hydro electricity (4)(5)	"	4,539	3,397	3,429	3,874	4,095
Million tonnes of oil equivalent						
Coal (1)		99.0	87.7	76.8	83.2	73.3
Petroleum (2)		92.4	93.5	100.2	101.5	94.3
Natural gas (3)		11.3	18.2	25.9	28.0	33.5
Nuclear electricity (4)		7.0	7.4	7.9	7.5	9.0
Hydro electricity (5)		0.4	0.3	0.3	0.3	0.4
Total		210.1	207.1	211.0	220.5	210.4
Percentage shares (energy supplied basis)						
Coal		47.1	42.3	36.4	37.7	34.8
Petroleum		44.0	45.2	47.5	46.0	44.8
Natural gas		5.4	8.8	12.3	12.7	15.9
Nuclear electricity		3.3	3.6	3.7	3.4	4.3
Hydro electricity		0.2	0.1	0.1	0.2	0.2
Fossil fuel dependency (7)		96.5	96.3	96.2	96.4	95.5
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	120.0	122.0	122.7	119.9	129.6
Petroleum (2)	"	79.4	77.8	79.3	81.2	81.6
Natural gas (3)	GWh	407,750	432,661	459,858	477,002	521,197
Nuclear electricity (4)	"	30,215	35,570	39,575	37,065	38,062
Hydro electricity (4)(5)	"	3,789	4,552	3,919	4,038	4,289
Million tonnes of oil equivalent						
Coal (1)		73.7	75.0	75.3	73.3	78.8
Petroleum (2)		85.0	83.5	85.1	87.2	87.7
Natural gas (3)		35.1	37.2	39.5	41.0	44.8
Nuclear electricity (4)		8.1	9.6	10.6	10.0	10.2
Hydro electricity (5)		0.3	0.4	0.3	0.3	0.4
Total		202.2	205.6	210.9	211.8	221.9
Percentage shares (energy supplied basis)						
Coal		36.5	36.5	35.7	34.6	35.5
Petroleum		42.0	40.6	40.4	41.2	39.5
Natural gas		17.3	18.1	18.7	19.4	20.2
Nuclear electricity		4.0	4.6	5.0	4.7	4.6
Hydro electricity		0.2	0.2	0.2	0.2	0.2
Fossil fuel dependency (7)		95.8	95.2	94.8	95.2	95.2
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	120.8	118.2	110.7	111.5	79.0
Petroleum (2)	"	70.5	64.2	65.2	61.7	78.6
Natural gas (3)	GWh	521,051	528,114	525,476	547,750	560,410
Nuclear electricity (4)	"	36,870	37,897	44,212	50,138	53,957
Hydro electricity (4)(5)	"	3,934	4,383	4,558	4,563	4,005
Million tonnes of oil equivalent						
Coal (1)		73.3	72.9	68.0	68.6	48.7
Petroleum (2)		76.2	69.5	70.7	67.2	84.7
Natural gas (3)		44.8	45.4	45.2	47.1	48.2
Nuclear electricity (4)		9.9	10.2	11.9	13.5	14.5
Hydro electricity (4)(5)		0.3	0.4	0.4	0.4	0.3
Total (6)		204.5	198.4	196.1	196.8	196.4
Percentage shares (energy supplied basis)						
Coal		35.8	36.7	34.7	34.9	24.8
Petroleum		37.3	35.0	36.0	34.2	43.1
Natural gas		21.9	22.9	23.0	23.9	24.5
Nuclear electricity		4.8	5.1	6.1	6.8	7.4
Hydro electricity		0.2	0.2	0.2	0.2	0.2
Fossil fuel dependency (7)		95.0	94.6	93.7	93.0	92.4

1.1.1 Inland consumption of primary fuels and equivalents for energy use, 1970 to 2011 continued)

		1985	1986	1987	1988	1989
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	105.3	113.5	116.2	112.0	108.1
Petroleum (2)	"	66.5	65.3	63.5	67.8	69.0
Natural gas (3)	GWh	602,701	612,724	629,311	597,220	571,187
Nuclear electricity (4)	"	61,391	59,079	55,238	63,456	71,734
Hydro electricity (4)(5)	"	4,093	4,780	4,198	4,919	4,758
Net electricity imports	"	..	4,255	11,635	12,830	12,631
Million tonnes of oil equivalent						
Coal (1)		64.8	70.0	71.7	70.0	67.0
Petroleum (2)		72.2	71.1	69.4	74.0	75.4
Natural gas (3)		51.8	52.7	54.1	51.4	49.1
Nuclear electricity (4)		16.5	15.4	14.4	16.6	17.7
Hydro electricity (4)(5)		0.4	0.4	0.4	0.4	0.4
Net electricity imports		..	0.4	1.0	1.1	1.1
Bioenergy & waste		..	..	..	..	0.7
Total (6)		205.7	210.0	211.0	213.5	211.4
Percentage shares (energy supplied basis)						
Coal		31.5	33.3	34.0	32.8	31.7
Petroleum		35.1	33.9	32.9	34.7	35.7
Natural gas		25.2	25.1	25.6	24.1	23.2
Nuclear electricity		8.0	7.4	6.8	7.8	8.4
Hydro electricity		0.2	0.2	0.2	0.2	0.2
Net electricity imports		..	0.2	0.5	0.5	0.5
Bioenergy & waste		0.3
Fossil fuel dependency (7)		91.8	92.3	92.5	91.6	90.6
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		1990	1991	1992	1993	1994
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	108.4	107.6	101.1	87.4	82.1
Petroleum (2)	"	70.6	70.6	70.9	71.5	70.0
Natural gas (3)	GWh	595,131	643,863	640,459	732,090	754,284
Nuclear electricity (4)	"	65,749	70,543	76,807	76,807	89,353
Hydro electricity (4)(5)	"	5,216	4,635	5,465	5,465	4,521
Net electricity imports	"	11,943	16,408	16,694	16,716	16,887
Million tonnes of oil equivalent						
Coal (1)		66.9	67.1	63.0	55.0	51.3
Petroleum (2)		77.2	77.1	77.5	78.1	76.7
Natural gas (3)		51.2	55.4	55.1	62.9	64.9
Nuclear electricity		16.3	17.4	18.5	21.6	21.2
Hydro electricity (5)		0.4	0.4	0.5	0.5	0.4
Net electricity imports		1.0	1.4	1.4	1.4	1.5
Bioenergy & waste		0.7	0.7	0.8	1.2	1.6
Total (6)		213.6	219.5	216.7	220.7	217.5
Percentage shares (energy supplied basis)						
Coal		31.3	30.6	29.1	24.9	23.6
Petroleum		36.1	35.1	35.8	35.4	35.3
Natural gas		24.0	25.2	25.4	28.5	29.8
Nuclear electricity		7.6	7.9	8.5	9.8	9.7
Hydro electricity		0.2	0.2	0.2	0.2	0.2
Net electricity imports		0.5	0.6	0.7	0.7	0.7
Bioenergy & waste		0.3	0.3	0.4	0.5	0.7
Fossil fuel dependency (7)		91.4	90.9	90.2	88.8	88.7
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		1995	1996	1997	1998	1999
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	77.2	72.1	63.5	63.2r	55.8r
Petroleum (2)	"	68.9	71.3	68.7	68.6r	69.7r
Natural gas (3)	GWh	805,058	941,841	971,503	1,015,486r	1,075,907r
Nuclear electricity (4)	"	88,282	94,671	98,146	99,486	95,133
Hydro electricity (4)(5)	"	5,438	3,879	4,836	5,994	6,187
Net electricity imports	"	16,313	16,755	16,574	12,468	14,244
Million tonnes of oil equivalent						
Coal (1)		48.9	45.7	40.8	41.0r	36.0r
Petroleum (2)		75.4	77.8	75.5	75.4r	76.4r
Natural gas (3)		69.2	81.0	83.5	87.3r	92.5
Nuclear electricity		21.3	22.1	23.1	23.4	22.4
Hydro electricity (5)		0.5	0.3	0.4	0.5	0.5
Net electricity imports		1.4	1.4	1.4	1.1	1.2
Bioenergy & waste		1.7	1.8	1.9	2.1	2.2
Total (6)		218.4	230.0	226.8	230.7r	231.3r
Percentage shares (energy supplied basis)						
Coal		22.4	19.9	18.0	17.8r	15.6r
Petroleum		34.5	33.8	33.3	32.7r	33.0r
Natural gas		31.7	35.2	36.8	37.8r	40.0r
Nuclear electricity		9.7	9.6	10.2	10.2	9.7
Hydro electricity		0.2	0.1	0.2	0.2	0.2
Net electricity imports		0.6	0.6	0.6	0.5	0.5
Bioenergy & waste		0.8	0.8	0.8	0.9	1.0
Fossil fuel dependency (7)		88.6	88.9	88.1	88.3	88.6

1.1.1 Inland consumption of primary fuels and equivalents for energy use, 1970 to 2011 (continued)

		2000	2001	2002	2003	2004
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	59.7r	63.5r	58.8r	63.5r	61.3
Petroleum (2)	"	69.9r	69.1r	67.0r	66.5r	68.3r
Natural gas (3)	GWh	1,114,942r	1,111,363r	1,097,031r	1,100,616r	1,123,922r
Nuclear electricity (4)	"	85,063	90,093	87,848	88,686	79,999
Wind & Hydro electricity (4)(5)	"	6,032	5,020	6,047	4,516	6,783
Net electricity imports	"	14,174	10,399	8,414	2,160	7,490
Million tonnes of oil equivalent						
Coal (1)		38.5r	40.8r	37.7r	40.5r	39.1
Petroleum (2)		76.7r	75.9r	73.5r	73.0r	75.1r
Natural gas (3)		95.9r	95.6r	94.3r	94.6r	96.6
Nuclear electricity		19.6	20.8	20.1	20.0	18.2
Wind & Hydro electricity (5)		0.5	0.4	0.5	0.4	0.6
Net electricity imports		1.2	0.9	0.7	0.2	0.6
Bioenergy & waste		2.3	2.5	2.8	3.1	3.5
Total (6)		234.8r	236.9r	229.6r	231.9r	233.6
Percentage shares (energy supplied basis)						
Coal		16.4r	17.2r	16.4r	17.5	16.7
Petroleum		32.7r	32.0r	32.0r	31.5r	32.1r
Natural gas		40.8r	40.3r	41.1r	40.8r	41.4r
Nuclear electricity		8.4	8.8	8.8r	8.6	7.8
Wind & Hydro electricity		0.2	0.2	0.2	0.2	0.2
Net electricity imports		0.5	0.4	0.3	0.1	0.3
Bioenergy & waste		1.0	1.1	1.2	1.3r	1.5
Fossil fuel dependency (7)		89.9r	89.6	89.5	89.8r	90.2r
		2005	2006	2007	2008	2009
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	62.4r	68.0r	63.7r	59.0r	48.8r
Petroleum (2)	"	71.3r	70.4	69.6r	68.4r	64.8r
Natural gas (3)	GWh	1,096,544r	1,039,629r	1,048,930r	1,082,099r	1,000,553r
Nuclear electricity (4)	"	81,618	75,451	63,028	52,486	69,098
Wind & Hydro electricity (4)(5)	"	7,834	8,829	10,365r	12,269r	14,565
Net electricity imports	"	8,321	7,517	5,215	11,022	2,861
Million tonnes of oil equivalent						
Coal (1)		39.9r	43.4r	41.0	37.8r	31.0r
Petroleum (2)		78.2r	77.4	76.3r	75.1	71.0r
Natural gas (3)		94.3	89.4	90.2	93.0	86.0
Nuclear electricity		18.4	17.1	14.0	11.9	15.2
Wind & Hydro electricity (5)		0.7	0.8	0.9	1.1	1.3
Net electricity imports		0.7	0.6	0.4	0.9	0.2
Bioenergy & waste		4.2	4.4	4.7	5.5	6.2
Total (6)		236.3r	233.1r	227.5r	225.3r	211.0r
Percentage shares (energy supplied basis)						
Coal		16.9	18.6r	18.0	16.8r	14.7r
Petroleum		33.1r	33.2	33.6	33.3	33.7r
Natural gas		39.9r	38.3	39.6	41.3r	40.8r
Nuclear electricity		7.8	7.3	6.2	5.3	7.2
Wind & Hydro electricity		0.3	0.3	0.4	0.5	0.6
Net electricity imports		0.3	0.3	0.2	0.4	0.1
Bioenergy & waste		1.8	1.9	2.0r	2.4	2.9
Fossil fuel dependency (7)		89.9	90.2	91.2	91.4	89.1r
		2010	2011			
In original units of measurement						
	Unit					
Coal (1)	M.tonnes	50.8r	50.5			
Petroleum (2)	"	64.2r	62.1			
Natural gas (3)	GWh	1,085,305r	896,746			
Nuclear electricity (4)	"	62,140	68,980			
Wind & Hydro electricity (4)(5)	"	13,859	21,437			
Net electricity imports	"	2,663	6,222			
Million tonnes of oil equivalent						
Coal (1)		32.2	32.4			
Petroleum (2)		70.3r	68.0			
Natural gas (3)		93.3r	77.1			
Nuclear electricity		13.9	15.6			
Wind & Hydro electricity (5)		1.2	1.8			
Net electricity imports		0.2	0.5			
Bioenergy & waste		6.9	7.5			
Total (6)		218.0r	203.0			
Percentage shares (energy supplied basis)						
Coal		14.8	16.0			
Petroleum		32.2r	33.5			
Natural gas		42.8r	38.0			
Nuclear electricity		6.4	7.7			
Wind & Hydro electricity		0.5	0.9			
Net electricity imports		0.1	0.3			
Bioenergy & waste		3.2	3.7			
Fossil fuel dependency (7)		89.8	87.5			

(1) Includes other solid fuels.

(2) Excludes petroleum for non-energy use and marine bunkers.

(3) Includes colliery methane, non-energy use of natural gas up to 1988.

(4) Electricity generated i.e. including own use.

(5) Excludes pumped storage. Includes generation at wind stations from 1988.

(6) Following the introduction of the energy balance presentation it has been possible to separately identify the losses from the statistical difference for gas and electricity, bringing them onto the same basis as other fuels. This has been accounted for in the total from 1994 onwards.

(7) Fossil fuel share of energy consumption

1.1.2 Availability and consumption of primary fuels and equivalents (energy supplied basis) 1970 to 2011

Thousand tonnes of oil equivalent

	Available supply												
	Production				Imports					Exports			
	Coal	Petroleum	Natural gas	Primary electricity	Total	Coal	Petroleum	Natural gas	Electricity	Total	Coal	Petroleum	Total
	(1)	(2)	(3)	(4)	(5)	(6)					(5)	(6)	(7)
1970	92,792	166	10,461	7,388	110,807	81	131,142	839	48	132,109	2,620	19,762	22,381
1971	94,178	227	17,384	7,661	119,450	2,887	136,359	836	10	140,092	2,048	20,024	22,071
1972	76,484	358	25,084	8,163	110,089	3,408	138,253	771	40	142,472	1,433	21,160	22,593
1973	82,636	400	27,235	7,793	118,064	1,214	144,117	738	5	146,074	2,131	22,026	24,157
1974	68,630	438	32,847	9,322	111,237	2,317	136,472	612	5	139,407	2,149	17,283	19,432
1975	79,172	1,675	34,203	8,446	123,496	3,209	111,703	844	8	115,763	1,975	16,517	18,492
1976	75,988	13,114	36,221	9,951	135,274	2,010	108,818	967	-	111,796	1,506	21,671	23,177
1977	74,769	41,186	37,845	10,973	164,773	1,761	90,004	1,680	-	93,445	1,753	33,112	34,865
1978	75,479	58,184	36,241	10,308	180,212	1,736	85,815	4,758	-	92,309	2,164	41,289	43,460
1979	74,028	83,966	36,596	10,598	205,188	3,169	77,903	8,323	-	89,394	2,025	57,607	59,632
1980	78,502	86,911	34,790	10,247	210,450	5,030	60,385	9,995	-	75,411	3,320	58,385	61,705
1981	78,008	96,941	34,712	10,562	220,223	3,192	50,040	10,681	-	63,912	6,884	69,615	76,500
1982	76,069	112,519	35,281	12,274	236,143	3,360	49,944	9,885	-	63,189	5,693	80,595	86,288
1983	72,696	125,482	36,379	13,866	248,423	3,713	43,543	10,701	-	57,957	4,844	90,608	95,452
1984	30,719	137,646	35,563	14,845	218,773	7,980	59,146	12,606	-	79,731	1,668	101,289	102,957
1985	56,572	139,404	39,679	16,851	252,506	9,482	52,577	12,645	-	74,703	2,441	106,602	109,043
1986	65,592	139,084	41,717	15,839	262,232	7,794	57,610	11,784	366	77,553	2,615	112,166	114,796
1987	63,189	135,071	43,674	14,797	256,731	7,363	54,305	11,079	1,000	73,746	1,872	107,108	108,980
1988	63,303	125,469	42,059	16,990	248,469	9,270	58,254	9,922	1,103	78,550	1,595	97,266	98,861
1989	60,882	100,373	41,188	18,150	221,320	8,840	64,153	9,784	1,163	83,941	1,738	74,434	76,249
1990	56,443	100,104	45,480	16,706	219,446	10,271	69,217	6,866	1,031	87,385	1,880	80,408	82,293
1991	57,555	99,890	50,638	17,830	226,669	13,493	72,942	6,193	1,412	94,040	1,526	81,105	82,632
1992	51,514	103,734	51,494	18,924	226,547	13,955	74,025	5,268	1,438	94,686	854	85,245	86,155
1993	41,588	109,613	60,542	21,969	234,882	13,103	77,612	4,173	1,438	96,326	954	95,312	96,854
1994	29,704	138,937	64,636	21,670	256,559	10,840	68,680	2,843	1,452	83,815	1,098	114,083	116,003
1995	32,751	142,746	70,807	21,735	269,738	11,615	63,341	1,673	1,405	78,034	889	116,001	117,859
1996	31,135	142,079	84,180	22,393	281,559	13,141	64,347	1,703	1,444	80,635	896	114,909	117,115
1997	30,303	140,443	85,887	23,535	282,082	14,400	63,813	1,209	1,429	80,850	1,061	115,815	118,743
1998	25,757	145,263	90,186	23,950	287,233	15,371	64,696	910	1,083	82,061	931	118,896	122,556
1999	23,219	150,160	99,109	22,942	297,655	14,039	64,085	1,106	1,247	80,476	774	123,920	131,976
2000	19,551	138,282	108,397	20,153	288,690	16,079	74,812	2,238	1,230	94,359	813	123,923	137,330
2001	19,969	127,828	105,870	21,227	277,426	23,565	77,235	2,619	917	104,337	679	115,680	128,277
2002	18,808	127,037	103,646	20,619	272,864	18,995	78,348	5,201	790	103,334	667	120,758	134,451
2003	17,636	116,242	102,996	20,428	260,310	21,396	77,062	7,420	440	106,430	530	107,201	123,208
2004	15,594	104,547	96,411	18,746	238,378	24,182	88,394	11,439	841	125,258	572	103,621	114,202
2005	12,714	92,883	88,219	19,044	216,541	29,157	88,791r	14,904	960	134,299r	509	91,470	100,494
2006	11,418	83,958	80,012	17,889	197,246	33,363	94,226	20,983	884	150,006r	462	86,244r	97,410r
2007	10,697	83,912	72,125	14,927r	185,970r	28,928	90,143r	29,065	741	149,331r	589	88,394r	99,975r
2008	11,305	78,580	69,681	12,964r	177,031r	28,910	91,949	35,000	1,057	157,892r	599	84,265	95,521
2009	11,039	74,739	59,737	16,481r	166,896r	24,819r	83,579r	39,191	568	149,468r	617r	77,450	90,223r
2010	11,470	68,983	57,187	15,117r	157,892r	17,186r	85,759r	50,688	614	156,173r	908r	74,534	91,184r
2011	11,580	56,902	45,288	17,468	136,990	21,434	87,859	50,251	747	162,180	727	67,210	84,127

(1) Crude oil plus all condensates and petroleum gases extracted at gas separation plants.

(2) Includes colliery methane.

(3) Nuclear and natural flow hydro electricity excluding generation of pumped storage stations. From 1988 includes generation at wind stations.

(4) Includes solar and geothermal heat, solid renewable sources (wood, waste, etc), and gaseous renewable sources (landfill gas, sewage gas) from 1988.

(5) Includes other solid fuels.

(6) Crude and process oils and petroleum products.

(7) Includes exports of natural gas and electricity.

1.1.2 Availability and consumption of primary fuels and equivalents (energy supplied basis) 1970 to 2011 (continued)

Thousand tonnes of oil equivalent

	Marine		Statistical				Gross			Inland consumption for energy use				
	Bunkers	Stock changes (8)		Difference (9)			Total	inland consumption	Non-energy use					Total
		Petro-leum	Coal	Petro-leum	Nat-ural gas	Coal				Petro-leum	Coal	Petro-leum	Natural gas		Primary electricity
	(5)	(6)	(5)	(6)	(7)	(13)	(14)	(10)	(5)	(6)	(2)(11)	(3)(12)	(4)	
1970	+5,721	+8,542	-680	..	+199	+466	+665	223,341	10,859	98,994	92,366	11,300	7,435	210,095
1971	+5,874	-7,046	-3,489	..	-239	-652	-891	220,170	10,839	87,732	93,543	18,220	7,672	207,167
1972	+5,265	-1,370	+2,904	..	-242	-887	-1,129	225,109	11,474	76,847	100,212	25,855	8,203	211,117
1973	+5,769	+1,456	+458	..	+60	-340	-280	235,847	12,635	83,235	101,501	27,974	7,797	220,507
1974	+4,922	+4,839	-5,139	..	-360	-514	-874	225,116	12,865	73,278	94,327	33,460	9,326	210,391
1975	+3,572	-6,489	+3,660	..	-202	-395	-597	213,769	10,255	73,716	84,963	35,060	8,453	202,192
1976	+3,698	-1,597	-348	..	+121	-254	-133	218,116	10,925	75,016	83,480	37,188	9,951	205,635
1977	+2,942	+600	+2,466	..	-113	-557	-670	222,806	10,517	75,263	85,110	39,526	10,973	210,872
1978	+2,733	-1,368	-814	..	-363	-569	-932	223,214	10,245	73,321	87,177	40,999	10,301	211,798
1979	+2,789	+3,600	-2,229	..	+43	-806	-763	232,768	10,232	78,814	87,681	44,919	10,597	222,011
1980	+2,562	-6,789	+40	..	-171	-1,567	-1,738	213,118	7,464	73,263	76,197	44,785	10,247	204,492
1981	+2,156	-2,013	+3,882	..	+562	-154	+408	207,756	8,111	72,865	69,539	45,392	10,564	198,360
1982	+2,715	-5,660	+2,305	..	-118	-2,315	-2,433	204,540	8,134	67,958	70,671	45,166	12,274	196,069
1983	+2,118	-3,209	+1,010	..	+234	-544	-310	206,290	8,625	68,590	67,228	47,080	13,866	196,764
1984	+2,370	+11,842	+922	..	-136	+247	+111	206,052	8,847	48,738	84,651	48,168	14,845	196,402
1985	+2,239	+1,461	+297	-521	-249	-731	-980	216,184	9,230	64,824	72,179	51,803	16,851	205,657
1986	+2,212	-1,889	+338	-836	+1,126	-83	+1,043	221,432	10,247	70,008	71,148	52,665	16,189	210,010
1987	+1,756	+3,396	+338	-662	-355	-146	-501	222,311	10,290	71,721	69,431	54,090	15,796	211,038
1988	+1,932	-1,547	+1,272	-637	+189	-111	+78	225,392	10,970	69,621	74,042	51,352	18,083	213,098
1989	+2,525	-1,787	-628	-281	+817	+159	+976	224,767	12,039	67,014	75,399	49,113	19,236	211,433
1990	+2,666	+891	+1,049	+108	+1,229	+990	+2,219	226,139	11,252	66,954	77,159	51,187	17,733	213,687
1991	+2,618	-3,402	-851	-273	+947	+448	+1,395	232,330	12,184	67,067	77,137	55,362	19,240	219,505
1992	+2,688	-2,439	+709	-348	+884	-647	+237	230,549	12,890	63,060	77,492	55,080	20,359	216,815
1993	+2,618	+766	-631	+84	+411	+1,597	+2,008	233,964	13,012	54,913	78,126	62,948	23,406	220,564
1994	+2,451	+11,055	+454	+233	+772	-1,668	-87	231,956	13,521	51,272	76,668	64,857	23,087	217,491
1995	+2,602	+5,088	+1,122	+820	+820	-426	+1,752	232,458	13,735	48,924	75,421	69,236	23,116	218,421
1996	+2,813	+2,521	-315	-236	+165	-1,814	+701	243,535	13,547	45,738	77,819	80,984	23,833	229,988
1997	+3,121	-2,389	+320	-354	+462	-1,784	-1,048	239,694	12,879	40,792	75,483	83,534	24,960	226,814
1998	+3,257	+773	-741	-32	+39	-692	-38	243,480r	12,737	40,970r	75,357r	87,316r	25,023	230,743r
1999	+2,471	-491	+428	+670	-669	+1,190	715	244,291r	12,963	35,993r	76,433r	92,511r	24,166	231,328r
2000	+2,208	+3,723	+807	-952	-234	+783	920	247,090r	12,283	38,541r	76,720r	95,868r	21,372	234,807r
2001	+2,433	-2,077	-1,333	-57	-196	+486	569	247,586r	10,732	40,778r	75,863r	95,560r	22,121	236,855r
2002	+2,044	+564	+1,514	-633	+154	-490	-99	241,149r	11,544	37,699r	73,480r	94,328r	21,342	229,605r
2003	+1,879	+1,979	+217	+304	-146	-451	-273r	244,152r	12,285	40,482r	73,017r	94,636r	20,614	231,867r
2004	+2,221	-139	-476	-536	-51	-227	-6	246,062r	12,429	39,065r	75,056r	96,640r	19,390	233,633r
2005	+2,174	-1,503	+1,674r	+114	+17	+348r	394r	248,457r	12,143	39,859r	78,241r	94,286r	19,760	236,313r
2006	+2,479	-961	-1,325r	-553	-156	-1r	-135r	244,524r	11,413	43,358r	77,403r	89,392r	18,536	233,111r
2007	+2,506	+1,926	+2,036	+471	-1r	-200r	-219r	237,252r	9,728r	40,961r	76,343r	90,192r	15,376	227,525r
2008	+2,728	-1,809	+397r	-265	-209	+309r	130	234,997r	9,679r	37,807r	75,078r	93,044r	13,912	225,318r
2009	+2,615	-4,208r	+959	-419	-418r	+33r	-365r	219,857r	8,890	31,032r	71,009r	86,032r	16,727r	210,967r
2010	+2,251	+4,456r	+614	+1,313	-28r	+197r	130r	227,012r	8,999r	32,204r	70,273r	93,319r	15,346r	218,013r
2011	+2,413	+149	+877	-1,945	+11	-437	-598	211,711	8,669	32,437	68,038	77,106	18,003	203,042

(8) Stock fall (+), stock rise (-).

(9) Recorded demand minus supply.

(10) Petroleum products for feedstock for petrochemical plants, industrial and white spirits, lubricants bitumen and wax. Also includes miscellaneous petroleum products mainly for inland consumption but excludes small quantities derived from coal. From 1989 also includes estimated quantities of natural gas used for non-energy purposes. Data for non-energy use of natural gas can be found in Chapter 1, Tables 1.1 to 1.3 and Chapter 4, Tables 4.1 and 4.2.

(11) Includes non-energy use of natural gas up to 1988. (See footnote 10).

(12) Includes net imports of electricity.

(13) As of 1994 this total includes the statistical differences for electricity and natural gas.

(14) Equivalent to primary demand as in Chapter 1, Tables 1.1 to 1.3.

1.1.3 Comparison of net imports of fuel with total consumption of primary fuels and equivalents, 1970 to 2011

	Gross inland consumption of primary fuels (1) plus marine bunkers	Net imports (+) /net exports (-) of fuels	Import dependency (2)	Export ratio (3)
	(A)	(B)	(C)	(D)
	Million tonnes of oil equivalent		Per cent	
1970	229.1	109.7	47.9	-
1971	226.0	118.0	52.2	-
1972	230.4	119.9	52.0	-
1973	241.6	121.9	50.5	-
1974	230.0	120.0	52.2	-
1975	217.3	97.3	44.8	-
1976	221.8	88.6	40.0	-
1977	225.7	58.6	25.9	-
1978	225.9	48.8	21.6	-
1979	235.6	29.8	12.6	-
1980	215.7	13.7	6.4	-
1981	209.9	-12.6	-	6.0
1982	207.3	-23.1	-	11.1
1983	208.4	-37.5	-	18.0
1984	208.4	-23.2	-	11.1
1985	218.4	-34.3	-	15.7
1986	223.6	-37.2	-	16.7
1987	224.1	-35.2	-	15.7
1988	227.3	-20.3	-	8.9
1989	227.3	7.7	3.4	-
1990	228.8	5.1	2.2	-
1991	234.9	11.4	4.9	-
1992	233.2	8.5	3.7	-
1993	236.6	-0.5	-	0.2
1994	234.4	-32.2	-	13.7
1995	235.1	-39.8	-	16.9
1996	246.3	-36.5	-	14.8
1997	242.8	-37.9	-	15.6
1998	246.7r	-40.5	-	16.4
1999	246.8r	-51.5	-	20.9
2000	249.3r	-43.0	-	17.2
2001	250.0r	-23.9	-	9.6
2002	243.2r	-31.1	-	12.8
2003	246.0r	-16.8	-	6.8
2004	248.3	11.1	4.5	-
2005	250.6r	33.8	13.5	-
2006	247.0r	52.6r	21.3r	-
2007	239.8r	49.4r	20.6r	-
2008	237.7r	62.4	26.2	-
2009	222.5r	59.2r	26.6r	-
2010	229.3r	65.0r	28.3r	-
2011	214.1	78.1	36.5	-

(1) Includes non-energy use. Equivalent to primary demand plus marine bunkers.

(2) Import dependency (C) = $\frac{\text{Net imports (B)}}{\text{(A)}} \times 100$

(3) Export ratio (D) = $\frac{\text{Net exports (B)}}{\text{(A)}} \times 100$

1.1.4 Primary energy consumption, gross domestic product and the energy ratio⁽¹⁾ 1970 to 2011

	Total inland consumption of primary energy (temperature corrected) (2)	Gross domestic product at market prices (2009 prices)	Energy ratio (3)	
	Million tonnes of oil equivalent (A)	£ billion (B)	Tonnes of oil equivalent per £1 million GDP (C)	Index 1970 = 100
1970	211.9	547.7	386.9	100.0
1971	209.7	560.4	374.2	96.7
1972	212.6	582.1	365.2	94.4
1973	223.1	625.4	356.7	92.2
1974	212.4	618.4	343.5	88.8
1975	206.0	615.3	334.8	86.5
1976	208.9	631.1	331.0	85.6
1977	213.1	646.3	329.7	85.2
1978	213.7	667.5	320.2	82.7
1979	220.0	686.5	320.5	82.8
1980	206.2	672.7	306.5	79.2
1981	198.7	664.2	299.1	77.3
1982	196.3	679.2	289.0	74.7
1983	197.5	705.2	280.1	72.4
1984	196.7	726.0	271.0	70.0
1985	203.1	754.0	269.3	69.6
1986	206.8	786.5	262.9	68.0
1987	210.0	827.0	253.9	65.6
1988	217.7	873.1	249.3	64.4
1989	217.8	895.7	243.2	62.8
1990	221.6	912.1	243.0	62.8
1991	221.4	895.8	247.1	63.9
1992	220.6	903.5	244.2	63.1
1993	222.5	931.5	238.9	61.7
1994	221.5	974.1	227.4	58.8
1995	223.6	1,005.1	222.5	57.5
1996	227.1	1,036.3	219.1	56.6
1997	229.2	1,076.3	212.9	55.0
1998	236.8	1,114.2	212.6	54.9
1999	238.0	1,149.5	207.1	53.5
2000	239.6	1,198.1	200.0	51.7
2001	240.5	1,232.7	195.1	50.4
2002	236.9r	1,262.7	187.6	48.5
2003	236.1r	1,310.9	180.1	46.5
2004	239.1r	1,349.0	177.3	45.8
2005	241.6r	1,386.4	174.3	45.0
2006	236.9r	1,422.5	166.5	43.0
2007	234.4r	1,474.2	159.0	41.1
2008	227.2r	1,459.9	155.6	40.2
2009	213.1r	1,401.9	152.0	39.3
2010	213.3r	1,427.1	149.4	38.6
2011	209.6	1,437.9	145.8	37.7

(1) See paragraphs 1.1.13 to 1.1.17.

(2) The methodology used to temperature correct gas consumption has been modified from 1990. See paragraph 1.1.15 onwards.

(3) Energy ratio (C) = (A)

(B)

1.1.5 Energy consumption by final user (energy supplied basis)⁽¹⁾ 1970 to 2011

Thousand tonnes of oil equivalent

Industry (2)											
	Coal	Coke and breeze (3)	Other solid fuels(4)	Coke oven gas	Town gas	Natural gas (5)	Electricity	Heat sold	Bioenergy & waste	Petroleum	Total (3)
1970	12,681	9,655	209	1,164	1,778	1,788	6,275	..	..	28,397	62,333
1971	10,232	8,298	176	1,118	1,038	5,194	6,313	..	..	28,130	60,746
1972	7,675	7,832	252	1,111	1,154	8,136	6,292	..	..	28,674	61,307
1973	7,950	8,340	226	1,290	788	10,791	6,884	..	..	28,691	65,149
1974	7,290	7,167	201	975	494	12,320	6,517	..	..	24,968	60,058
1975	6,373	6,338	199	1,038	222	12,555	6,479	..	..	22,145	55,444
1976	5,902	7,129	131	1,091	68	14,237	6,950	..	..	21,966	57,584
1977	5,947	6,368	158	1,010	30	14,940	7,053	..	..	21,978	57,574
1978	5,627	5,932	179	899	15	15,149	7,222	..	..	21,570	56,673
1979	6,081	6,512	148	977	18	15,663	7,527	..	..	21,590	58,564
1980	5,083	3,335	133	642	13	15,258	6,854	..	..	16,938	48,291
1981	4,534	4,564	116	665	13	14,489	6,622	..	..	14,761	45,776
1982	4,668	4,083	144	605	8	14,588	6,353	..	..	13,530	44,007
1983	4,708	4,307	126	635	5	14,021	6,376	..	..	11,988	42,191
1984	3,796	4,408	68	537	5	14,686	6,758	..	..	10,859	41,138
1985	4,708	4,655	151	768	3	14,865	6,837	..	..	9,701	41,702
1986(11)	5,242	4,144	98	778	3	13,542	6,884	..	..	10,240	40,931
1987	4,048	4,660	80	821	3	14,137	8,005	..	..	8,456	40,211
1988	4,166	5,041	55	771	-	12,883	8,350	..	100	9,441	40,807
1989	4,489	4,286	30	613	-	12,515	8,550	..	102	8,820	39,405
1990	4,172	3,951	42	602	-	12,889	8,655	..	107	8,242	38,660
1991	4,270	3,691	14	570	-	12,311	8,563	..	109	8,729	38,257
1992	4,375	3,601	14	534	-	11,380	8,194	..	279	8,334	36,711
1993	3,553	3,613	7	560	-	11,521	8,328	..	266	8,592	36,440
1994	3,402	3,818	194	590	-	12,885	8,082	..	487	8,253	37,711
1995	2,840	3,750	184	576	-	12,680	8,654	..	526	7,066	36,276
1996	1,959	855	233	439	-	14,081	9,004	..	533	7,058	34,470
1997	1,963	787	249	457	-	14,754	9,189	..	532	6,315	34,577
1998	1,607	803	243	385	-	15,140	9,216	..	461	6,379	34,512
1999	1,353	820	215	205	-	15,203	9,542	1,086	283	5,374	34,222
2000	1,228	753	225	216	-	15,773	9,812	1,099	264	6,039	35,506
2001	1,195	719	210	154	-	15,464	9,573	1,001	243	6,611	35,443
2002	1,186	610	170	78	-	14,202	9,473	1,321	250	6,248	33,764
2003	1,248	589	166	53	-	14,292	9,396	1,128	267	6,899	34,074
2004	1,235	559	180	67	-	13,238	9,584	832	265	6,918	32,912
2005	1,180	535	171	79	-	13,022	9,976	831	201	6,260r	32,281r
2006	1,164	488	178	106	-	12,428	9,879	809	213	6,079r	31,422r
2007	1,268	513	177	101	-	11,466	9,699r	896	276	6,077r	30,522r
2008	1,296	443	174	92	-	11,925	9,815r	1,021	449	5,552r	30,807r
2009	1,152	387r	152	49	-	10,009	8,576r	763	446r	5,032r	26,594r
2010	1,136r	339r	163	97	-	10,461r	8,987r	822r	482r	5,098r	27,671r
2011	1,111	306	160	65	-	10,701	8,804	839	535	4,526	27,144

(1) Excluding non-energy use of fuels.

(2) Includes the iron and steel industry, but from 1994 onwards excludes iron and steel use of fuels for transformation and energy industry own use purposes.

(3) Blast furnace gas is included in coke and breeze up to 1995 and covers electricity transformation, use by ovens and losses. From 1996 onwards, blast furnace gas is included in the total and covers just coke ovens and losses, which is consistent with the methodology used for compiling the energy balances.

(4) Includes, from 1994, manufactured liquid fuels.

(5) Includes colliery methane. Up to 1988 also includes non-energy use of natural gas.

1.1.5 Energy consumption by final user (energy supplied basis)⁽¹⁾ 1970 to 2011 (continued)

Thousand tonnes of oil equivalent

	Transport												Total (7)
	Rail			Road					Water		Air		
	Coal	Coke and breeze	Electricity (6)	Petroleum	Electricity	Petroleum	Bioenergy & waste	Coal derived fuel	Coal	Petroleum	Petroleum		
1970	88	35	234	1,254	3	21,406	..	15	88	1,184	3,869	28,174	
1971	68	13	237	1,186	-	22,412	..	-	63	1,081	4,247	29,306	
1972	53	5	229	1,121	-	23,535	..	-	23	962	4,514	30,442	
1973	58	-	224	1,123	-	25,125	..	-	10	1,088	4,806	32,435	
1974	50	-	234	1,048	-	24,465	..	-	10	1,239	4,219	31,266	
1975	40	-	249	1,000	-	23,948	..	-	8	1,300	4,340	30,885	
1976	43	3	247	945	-	24,994	..	-	8	1,317	4,476	32,032	
1977	40	3	252	950	-	25,633	..	-	8	1,312	4,678	32,875	
1978	45	3	254	967	-	26,946	..	-	5	1,300	5,051	34,571	
1979	43	3	254	947	-	27,520	..	-	5	1,363	5,224	35,359	
1980	38	3	262	919	-	27,815	..	-	5	1,257	5,242	35,541	
1981	38	-	259	877	-	27,009	..	-	-	1,101	5,020	34,304	
1982	35	-	229	793	-	27,797	..	-	3	1,186	4,993	35,037	
1983	15	-	247	849	-	28,646	..	-	3	1,207	5,093	36,059	
1984	3	-	247	816	-	30,006	..	-	-	1,328	5,383	37,782	
1985	3	-	254	821	-	30,586	..	-	-	1,254	5,582	38,500	
1986(11)	3	-	259	809	-	32,606	..	-	-	1,151	6,126	40,954	
1987	3	-	264	761	-	34,062	..	-	-	1,103	6,479	42,672	
1988	-	-	282	766	-	36,233	..	-	-	1,159	6,905	45,345	
1989	3	-	272	702	-	37,801	..	-	-	1,355	7,308	47,442	
1990	2	-	455	668	-	38,816	..	-	-	1,363	7,332	48,635	
1991	-	-	454	685	-	38,535	..	-	-	1,424	6,872	47,973	
1992	-	-	461	715	-	39,363	..	-	-	1,377	7,435	49,355	
1993	-	-	641	665	-	39,502	..	-	-	1,341	7,871	50,024	
1994	-	-	599	651	-	39,690	..	-	-	1,239	8,070	50,253	
1995	-	-	636	654	-	39,268	..	-	-	1,193	8,485	50,238	
1996	-	-	710	629	-	40,772	..	-	-	1,294	8,917	52,321	
1997	-	-	729	516	-	41,259	..	-	-	1,256	9,322	53,083	
1998	-	-	732	608	-	41,020	..	-	-	1,175	10,237	53,772	
1999	-	-	738	632	-	41,399	..	-	-	1,067	11,017	54,853	
2000	-	-	741	639	-	41,071	..	-	-	1,032	11,978	55,461	
2001	-	-	759	664	-	41,097	..	-	-	844	11,774	55,137	
2002	-	-	727	662	-	41,936	..	-	-	702	11,658	55,685	
2003	-	-	706	667	-	41,823	..	-	-	1,234	11,936	56,366	
2004	-	-	347	700	2	42,221	..	-	-	1,196	12,908	57,374	
2005	3	-	347	629r	2	42,507r	74	-	-	1,365	13,856	58,783r	
2006	14	-	342	627r	2	42,513r	188	-	-	1,805	13,999	59,489r	
2007	14	-	339	642r	2	42,884r	362	-	-	1,612	13,906	59,760r	
2008	14	-	337	653r	2	41,098r	845	-	-	1,757	13,507	58,212r	
2009	13	-	346r	650r	2	39,635r	1,038	-	-	1,625	12,751	56,060r	
2010	14	-	349r	659r	2	39,159r	1,214	-	-	1,469	12,288	55,154r	
2011	11	-	349	652	2	38,646	1,128	-	-	1,597	12,802	55,187	

(6) Includes, from 1990, electricity used at transport premises (see footnote 11).

(7) Includes small amounts of natural gas for road transport.

1.1.5 Energy consumption by final user (energy supplied basis)⁽¹⁾ 1970 to 2011 (continued)

Thousand tonnes of oil equivalent

Domestic									
	Coal	Coke and breeze	Other solid fuels	Natural gas (8)	Electricity	Heat sold	Bioenergy & waste	Petroleum	Total (4)
1970	14,242	1,761	1,975	8,922	6,622	..	..	3,363	36,884
1971	12,164	1,136	2,156	9,900	6,937	..	..	3,328	35,621
1972	10,602	849	2,144	11,359	7,471	..	..	3,836	36,261
1973	10,565	778	2,053	12,129	7,849	..	..	4,202	37,576
1974	9,968	821	1,955	13,562	7,963	..	..	3,733	38,002
1975	8,517	645	1,778	14,840	7,670	..	..	3,612	37,062
1976	7,910	549	1,640	15,602	7,318	..	..	3,615	36,634
1977	8,136	534	1,589	16,600	7,386	..	..	3,653	37,898
1978	7,476	471	1,464	18,291	7,378	..	..	3,610	38,689
1979	7,688	479	1,431	20,718	7,711	..	..	3,539	41,566
1980	6,575	401	1,370	21,258	7,403	..	..	2,834	39,841
1981	6,214	368	1,202	22,076	7,260	..	..	2,554	39,674
1982	6,242	365	1,146	21,963	7,116	..	..	2,385	39,218
1983	5,796	335	1,141	22,346	7,129	..	..	2,267	39,014
1984	4,733	335	728	22,502	7,212	..	..	2,385	37,896
1985	6,290	385	957	24,394	7,582	..	..	2,454	42,062
1986(11)	6,121	335	965	25,797	7,892	..	..	2,590	43,700
1987	5,189	315	1,018	26,450	8,015	..	..	2,474	43,460
1988	4,741	300	907	25,833	7,940	..	205	2,441	42,367
1989	3,719	239	815	24,988	7,935	..	207	2,355	40,258
1990	3,153	254	762	25,835	8,066	..	206	2,480	40,756
1991	3,582	210	785	28,721	8,436	..	209	2,825	44,768
1992	3,105	176	709	28,389	8,555	..	243	2,889	44,066
1993	3,498	147	751	29,254	8,639	..	241	3,019	45,549
1994	2,957	67	601	28,355	8,721	..	242	3,004	43,947
1995	2,077	78	470	28,037	8,790	..	242	2,997	42,691
1996	2,084	129	588	32,317	9,244	..	241	3,518	48,120
1997	1,992	59	419	29,710	8,982	..	225	3,389	44,775
1998	1,819	85	439	30,601	9,408	..	230	3,543	46,126
1999	1,916	86	410	30,788	9,485	44	230	3,162	46,121
2000	1,448	95	365	31,806	9,617	44	236	3,239	46,851
2001	1,461	48	328	32,625	9,917	32	240	3,527	48,178
2002	1,009	127	289	32,362	10,319	33	243	3,087	47,471
2003	813	92	255	33,232	10,576	11	247	3,068	48,293
2004	733	36	230	34,085	10,679	52	252	3,265	49,333
2005	474	24	199	32,836	10,809	52	318	3,092	47,804
2006	426	16	200	31,550	10,723	52	358	3,249	46,574
2007	487	11	182	30,341	10,583	52	400	2,876r	44,931
2008	515	9	229	30,916	10,301	52	431	3,032	45,485
2009	514	7	210	28,590	10,193	52	466	3,012	43,044r
2010	536	7	242	33,499	10,217r	52	506r	3,427r	48,486r
2011	540	6	210	25,191	9,595	52	567	2,681	38,842

(8) Includes town gas prior to 1989. (Separate figures maybe found in previous editions of this Digest).

1.1.5 Energy consumption by final user (energy supplied basis)⁽¹⁾ 1970 to 2011 (continued)

Thousand tonnes of oil equivalent

Other final users (9)								
	Coal	Coke and breeze	Natural gas (8)	Electricity	Heat sold	Bioenergy & waste	Petroleum	Total (4)
1970	2,723	1,499	1,919	3,408	..	..	9,038	18,586
1971	2,328	688	2,181	3,534	..	..	9,184	17,915
1972	2,013	537	2,509	3,650	..	..	9,487	18,195
1973	1,731	602	2,728	3,940	..	..	9,585	18,586
1974	1,685	567	3,197	3,642	..	..	8,401	17,492
1975	1,234	408	3,393	3,894	..	..	8,431	17,360
1976	1,300	335	3,831	4,023	..	..	8,668	18,157
1977	1,370	315	3,998	4,257	..	..	9,157	19,097
1978	1,300	275	4,393	4,481	..	..	8,764	19,213
1979	1,307	285	4,955	4,731	..	..	8,754	20,031
1980	1,154	237	5,194	4,733	..	..	7,403	18,721
1981	1,174	204	5,315	4,804	..	..	7,096	18,592
1982	1,222	212	5,486	4,867	..	..	6,678	18,464
1983	1,166	257	5,915	5,106	..	..	6,403	18,847
1984	1,141	252	6,101	5,063	..	..	6,381	18,938
1985	1,123	297	6,718	5,446	..	..	6,018	19,603
1986(11)	982	390	7,308	5,731	..	..	5,723	20,135
1987	935	368	7,534	5,965	..	..	4,988	19,790
1988	831	264	7,569	6,240	..	138	5,008	20,050
1989	698	119	7,278	6,497	..	138	4,345	19,075
1990	795	127	7,329	6,426	..	139	4,402	19,218
1991	753	105	8,640	6,717	..	149	4,456	20,820
1992	622	88	8,585	6,996	..	150	4,518	20,959
1993	566	74	8,504	6,999	..	146	4,446	20,735
1994	496	34	8,695	6,951	..	172	4,289	20,637
1995	362	39	9,374	7,199	..	189	4,016	21,179
1996	385	-	10,138	7,495	..	181	3,909	22,108
1997	375	-	9,697	7,859	..	174	3,362	21,467
1998	291	-	10,114	7,788	..	174	3,144	21,511
1999	189	-	9,156	7,986	1,368	174	2,464	21,338
2000	57	-	9,498	8,155	1,371	172	2,294	21,547
2001	47	-	9,726	8,359	1,294	173	2,568	22,167
2002	14	-	8,670	8,148	730	188	1,805	19,556
2003	17	-	9,177	8,231	648	196	1,145	19,414
2004	19	-	9,757	8,532	373	198	1,438	20,317
2005	38	-	9,526	8,846	386	205	1,763	20,764
2006	24	-	8,655	8,738	384	192	1,521	19,514
2007	19	-	8,154	8,755	390	198r	1,493	19,008r
2008	21	-	8,223	8,936	393	239r	1,414	19,226r
2009	53	-	7,200	8,549	392	268r	1,242	17,704r
2010	28r	-	7,589r	8,716r	392r	309r	1,251r	18,285r
2011	28	-	6,486	8,594	380	321	1,360	17,168

(9) Mainly agriculture, public administration and commerce. Prior to 1990, including electricity used at transport premises (see footnote 6).

1.1.5 Energy consumption by final user (energy supplied basis)⁽¹⁾ 1970 to 2011 (continued)

Thousand tonnes of oil equivalent

All final users											
	Coal	Coke and breeze	Other solid fuels (4)	Coke oven gas	Town gas	Natural gas (4)	Electricity	Heat sold	Bioenergy & waste	Petroleum	Total (3)(10)
1970	29,822	12,950	2,184	1,164	10,746	3,662	16,542	..	..	68,511	145,977
1971	24,855	10,134	2,333	1,118	8,882	9,431	17,021	..	..	69,568	143,589
1972	20,366	9,222	2,396	1,111	8,094	15,063	17,643	..	..	72,129	146,205
1973	20,313	9,721	2,280	1,290	5,852	20,584	18,898	..	..	74,620	153,744
1974	19,003	8,555	2,156	975	3,836	25,736	18,356	..	..	68,072	146,818
1975	16,172	7,391	1,977	1,038	1,796	29,212	18,293	..	..	64,776	140,751
1976	15,162	8,016	1,771	1,091	534	33,204	18,537	..	..	65,981	144,407
1977	15,502	7,220	1,748	1,010	174	35,393	18,948	..	..	67,361	147,444
1978	14,454	6,681	1,642	899	81	37,766	19,336	..	..	68,208	149,146
1979	15,124	7,279	1,579	977	91	42,262	20,223	..	..	68,937	155,521
1980	12,854	3,975	1,504	642	76	41,647	19,252	..	..	62,408	142,394
1981	11,960	5,136	1,317	665	65	41,828	18,945	..	..	58,420	138,346
1982	12,169	4,660	1,290	605	55	41,990	18,567	..	..	57,360	136,726
1983	11,688	4,899	1,267	635	45	42,242	18,856	..	..	56,453	136,111
1984	9,673	4,995	796	537	43	43,251	19,280	..	..	57,158	135,753
1985	12,124	5,338	1,108	768	40	45,940	20,118	..	..	56,416	141,867
1986(11)	12,348	4,869	1,063	778	28	46,622	20,763	..	..	59,245	145,719
1987	10,174	5,343	1,098	821	28	48,096	22,252	..	..	58,325	146,132
1988	9,738	5,605	962	771	8	46,277	22,811	..	443	61,952	148,569
1989	8,909	4,645	845	613	-	44,780	23,254	..	447	62,685	146,180
1990	8,122	4,333	804	602	-	46,052	23,601	..	451	63,302	147,268
1991	8,605	4,006	799	570	-	49,676	24,170	..	467	63,525	151,818
1992	8,101	3,866	723	534	-	48,357	24,206	..	672	64,632	151,091
1993	7,617	3,833	758	560	-	49,282	24,607	..	652	65,437	152,747
1994	6,855	3,919	795	590	-	49,935	24,353	..	901	65,196	152,548
1995	5,279	3,867	654	576	-	50,091r	25,279	..	956	63,679	150,384r
1996	4,429	984	821	439	-	56,536	26,453	..	954	66,096	157,019
1997	4,331	846	667	457	-	54,162	26,759	..	930	65,418	153,902
1998	3,716	889	682	385	-	55,856	27,143	..	865	66,107	155,921
1999	3,458	906	625	205	-	55,148	27,751	2,498	688	65,116	156,534
2000	2,733	848	590	216	-	57,077	28,325	2,515	672	66,293	159,365
2001	2,704	766	539	154	-	57,814	28,609	2,327	656	67,084	160,926
2002	2,209	737	459	78	-	55,234	28,667	2,084	682	66,099	156,476
2003	2,078	680	420	53	-	56,701	28,910	1,787	710	66,772	158,147
2004	1,988	595	411	67	-	57,080	29,144	1,258	715	68,647	159,936
2005	1,695	559	370	79	-	55,384	29,981	1,268	798	69,473r	159,633r
2006	1,627	504	378	106	-	52,633	29,684	1,245	952	69,793r	156,999r
2007	1,788	524	359	101	-	49,961	29,377r	1,338	1,235r	69,490r	154,222r
2008	1,845	452	403	92	-	51,064	29,391r	1,465	1,964r	67,014r	153,730r
2009	1,733	395r	362	49	-	45,799	27,665r	1,206	2,219r	63,947r	143,402r
2010	1,713r	346r	405	97	-	51,550r	28,270r	1,266r	2,511r	63,351r	149,596r
2011	1,690	312	370	65	-	42,378	27,344	1,271	2,551	62,264	138,341

(10) Before 1971 includes the use for transport of liquid fuel made from coal.

(11) See paragraph 1.1.19 about changed treatment of electricity produced, and fuel used by, companies other than major power producers.

1.1.6 Expenditure on energy by final user, ⁽¹⁾ 1970 to 2011

£million

Industry	Industry					Total	Domestic					Total
	Coal and solid fuels (3)	Natural gas (4)	Electricity	Petroleum products (5)	Heat and other fuels (6)		Coal and solid fuels (3)	Natural gas (4)	Electricity	Petroleum products (5)	Heat and other fuels (6)	
1970	285	70	475	300		1,130	395	385	645	85		1,510
1971	285	85	530	350		1,250	385	430	730	90		1,635
1972	280	120	540	345		1,285	360	505	830	110		1,805
1973	320	150	595	390		1,455	370	535	885	140		1,930
1974	410	195	775	880		2,260	405	605	1,070	200		2,280
1975	545	240	1,015	920		2,720	440	760	1,495	235		2,930
1976	720	380	1,260	1,065		3,425	500	1,000	1,825	295		3,620
1977	780	535	1,470	1,305		4,090	595	1,205	2,135	360		4,295
1978	800	695	1,670	1,255		4,420	620	1,365	2,380	370		4,735
1979	1,010	820	1,925	1,570		5,325	770	1,575	2,675	475		5,495
1980	675	1,060	2,185	1,815		5,735	920	1,875	3,310	510		6,615
1981	850	1,215	2,420	1,890		6,375	960	2,460	3,905	560		7,885
1982	860	1,335	2,560	1,870		6,625	995	3,070	4,200	610		8,875
1983	900	1,375	2,655	1,800		6,730	1,015	3,520	4,300	645		9,480
1984	845	1,555	2,695	1,810		6,905	830	3,655	4,495	640		9,620
1985	990	1,735	2,750	1,740		7,215	1,120	4,090	4,840	665		10,715
1986	1,000	1,350	2,765	1,065		6,180	1,135	4,385	5,105	460		11,085
1987	865	1,375	3,285	865		6,390	990	4,465	5,140	410		11,005
1988	880	1,225	3,590	785		6,480	830	4,385	5,340	365		10,920
1989	905	1,210	3,965	845		6,925	730	4,455	5,800	390		11,375
1990	930	1,260	3,985	900		7,075	700	4,865	6,255	485		12,305
1991	910	1,115	4,120	905		7,050	795	5,775	7,105	460		14,135
1992	775	970	4,180	790		6,715	710	5,685	7,460	460		14,315
1993	740	915	3,940	895		6,490	780	5,705	7,590	465		14,540
1994	650	1,010	3,855	865		6,380	685	6,020	7,870	455		15,030
1995	605	1,015	3,970	830		6,420	615	6,010	8,060	470		15,155
1996	590	755	3,900	965		6,210	640	6,510	8,380	630		16,165
1997	565	870	3,625	890		5,950	560	6,125	7,965	560		15,210
1998	545	990	3,535	715	40	5,825	525	6,015	7,595	465	30	14,630
1999	430	970	3,730	735	215	6,080	540	5,610	7,600	465	40	14,255
2000	430	1,115	3,435	1,145	205	6,330	465	5,485	7,475	735	40	14,200
2001	445	1,470	3,145	1,235	190	6,485	535	5,735	7,540	715	35	14,560
2002	365	1,280	2,995	1,065	265	5,970	465	6,090	7,510	645	35	14,745
2003	380	1,345	2,925	1,240	220	6,110	320	6,260	7,660	730	30	15,000
2004	525	1,480	3,255	1,485	90	6,835	285	8,285	9,120	805	40	18,535
2005	740	2,110	5,060	2,015	95	10,020	215	8,215	9,665	1,010	50	19,155
2006	815	2,635	6,775	2,420	100	12,745	205	10,100	11,340	1,225	50	22,920
2007	765	1,975	6,970	2,275	110	12,095	230	9,950	12,540	1,130	55	23,905
2008	1,185	2,945	8,750	2,735	310	15,925	300	12,070	14,245	1,695	65	28,375
2009	1,335r	2,290r	6,775r	2,020r	150	12,570r	350	12,605	14,535	1,245	60	28,795
2010	1,315r	2,185r	6,335r	2,440r	205r	12,480r	375	14,275r	14,085r	1,730	65	30,530r
2011	1,565	2,710	6,545	2,695	210	13,725	375	12,310	14,695	1,685	70	29,135

(1) All data is to the nearest £5 million. VAT is only included where not refundable. Methodology used to calculate the series has changed over the years, as such the data provides a guide to changing patterns of expenditure on energy, but not too much significance should be drawn from small changes.

(2) Includes commercial, public administration, agriculture and all fuels used for transport purposes.

(3) Includes coal, coke, breeze and other manufactured solid fuel. Prior to 1996, an estimate of the value of coke produced in coke ovens owned by the iron and steel industry was included, this has now been replaced by an estimate of the value of coal purchased for such ovens, which is the actual monetary trade.

(4) Includes town gas.

(5) Includes heating oils, LPG etc. Excludes motor transport fuels.

(6) Includes other fuels not listed eg coke oven gas, heat, biofuels etc. Heat data not available before 1999, and other fuels

1.1.6 Expenditure on energy by final user, ⁽¹⁾ 1970 to 2011 (continued)

£million

Other final users (2)						All final users							
Coal and solid fuels (3)	Natural gas (4)	Electricity	Petroleum products	Of which road transport	Heat and other fuels (6)	Total	Coal and solid fuels (3)	Natural gas (4)	Electricity	Petroleum products	Heat and other fuels (6)	Total	
60	70	390	1,910	1,720		2,430	740	525	1,510	2,295		5,070	1970
45	80	435	2,105	1,885		2,665	715	595	1,695	2,545		5,550	1971
45	80	480	2,305	2,070		2,910	685	705	1,850	2,760		6,000	1972
45	90	515	2,580	2,305		3,230	735	775	1,995	3,110		6,615	1973
60	105	590	3,885	3,150		4,640	875	905	2,435	4,965		9,180	1974
70	140	835	4,685	3,845		5,730	1,055	1,140	3,345	5,840		11,380	1975
90	200	1,030	5,305	4,325		6,625	1,310	1,580	4,115	6,665		13,670	1976
115	255	1,200	6,030	4,835		7,600	1,490	1,995	4,805	7,695		15,985	1977
115	310	1,375	6,075	4,890		7,875	1,535	2,370	5,425	7,700		17,030	1978
130	385	1,655	8,265	6,660		10,435	1,910	2,780	6,255	10,310		21,255	1979
115	520	1,985	10,735	8,650		13,355	1,710	3,455	7,480	13,060		25,705	1980
110	585	2,460	12,345	10,060		15,500	1,920	4,260	8,785	14,795		29,760	1981
135	655	2,690	13,470	10,950		16,950	1,990	5,060	9,450	15,950		32,450	1982
135	745	2,855	14,965	12,240		18,700	2,050	5,640	9,810	17,410		34,910	1983
135	795	2,980	16,140	13,250		20,050	1,810	6,005	10,170	18,590		36,575	1984
155	920	3,265	17,640	14,615		21,980	2,265	6,745	10,855	20,045		39,910	1985
140	1,045	3,485	15,845	13,745		20,515	2,275	6,780	11,355	17,370		37,780	1986
125	1,035	3,490	16,630	14,525		21,280	1,980	6,870	11,915	17,905		38,670	1987
95	1,025	3,810	16,855	14,960		21,785	1,805	6,635	12,740	18,005		39,185	1988
95	1,015	4,185	18,755	16,690		24,050	1,730	6,680	13,950	19,980		42,340	1989
105	1,085	4,465	21,120	19,020		26,775	1,735	7,210	14,705	22,505		46,155	1990
85	1,310	4,960	21,900	19,995		28,255	1,790	8,200	16,185	23,265		49,440	1991
95	1,245	5,495	22,455	20,825		29,290	1,580	7,900	17,135	23,705		50,320	1992
70	1,155	5,555	24,365	22,540		31,145	1,590	7,775	17,115	25,725		52,205	1993
50	1,125	5,380	25,190	23,515		31,745	1,385	8,155	17,140	26,510		53,190	1994
35	1,110	5,300	25,895	24,140		32,340	1,255	8,135	17,330	27,195		53,915	1995
30	975	5,405	28,240	26,145		34,650	1,260	8,240	17,685	29,835		57,020	1996
35	855	5,420	30,645	28,685		36,955	1,165	7,850	17,010	32,095		58,120	1997
25	885	5,200	31,375	29,810	-	37,485	1,095	7,885	16,335	32,555	70	57,940	1998
10	780	4,990	38,435	36,680	235	44,450	980	7,355	16,330	39,640	490	64,795	1999
5	850	4,950	38,860	35,635	235	44,900	890	7,445	15,860	40,740	485	65,425	2000
5	1,110	4,330	37,195	34,320	225	42,865	985	8,310	15,020	39,145	445	63,905	2001
-	1,025	4,050	36,355	34,020	140	41,570	830	8,395	14,550	38,065	440	62,285	2002
5	1,120	3,830	38,160	35,055	125	43,240	695	8,720	14,415	40,135	375	64,345	2003
5	1,320	4,355	46,560	42,975	70	52,310	815	11,085	16,730	48,850	195	77,680	2004
-	1,655	5,405	49,480	44,535	70	56,610	960	11,980	20,135	52,505	215	85,795	2005
5	2,155	6,720	52,905	46,880	320	62,105	1,025	14,890	24,835	56,550	470	97,770	2006
-	1,980	7,055	54,955	49,120	555	64,545	995	13,905	26,565	58,360	720	100,545	2007
-	2,290	8,225	66,730	57,115	1,365	78,610	1,485	17,305	31,220	71,160	1,740	122,910	2008
-	2,130	10,020r	56,595r	50,630r	1,470	70,215r	1,685r	17,025r	31,330r	59,860r	1,680	111,580r	2009
5	1,990r	9,750r	67,370r	59,645r	2,075r	81,190r	1,695r	18,450r	30,165r	71,535r	2,345r	124,190r	2010
10	1,880	9,770	77,320	67,355	2,235	91,215	1,950	16,900	31,010	81,700	2,510	134,070	2011

1.1.7 Mean air temperatures (deviations) ⁽¹⁾⁽²⁾ 2000 to 2011 Great Britain

Degrees Celsius

	Average 1971-2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Calendar year	9.7	+0.8	+0.5	+1.1	+0.9	+0.9	+0.8	+1.1	+0.8	+0.3	+0.4	-0.7	+1.0
First half year	8.0	+1.0	+0.1	+1.5	+1.2	+1.1	+1.0	+0.3	+1.7	+0.8	+0.6	-0.4	+1.2
Second half year	11.4	+0.5	+0.8	+0.7	+0.6	+0.6	+0.6	+1.8	-0.0	-0.3	+0.3	-1.1	+0.9
First quarter	5.0	+1.5	-0.3	+2.0	+0.7	+0.9	+1.1	-0.5	+1.7	+0.9	-0.2	-1.6	+0.6
Second quarter	10.9	+0.6	+0.5	+1.0	+1.7	+1.4	+0.9	+1.1	+1.8	+0.8	+1.2	+0.7	+1.7
Third quarter	15.3	+0.6	+0.5	+0.5	+1.3	+0.6	+0.6	+2.0	-0.4	+0.0	+0.3	+0.1	-0.0
Fourth quarter	7.5	+0.4	+1.1	+0.9	-0.0	+0.6	+0.6	+1.6	+0.4	-0.7	+0.2	-2.3	+1.8
Summer (3)	13.1	+0.6	+0.5	+0.7	+1.5	+1.0	+0.7	+1.5	+0.7	+0.4	+0.8	+0.4	+0.8
Winter (3)	6.3	+0.0	+1.5	+0.8	+0.4	+0.8	+0.1	+1.6	+0.6	-0.4	-0.7	-0.9	+1.4
January	4.3	+1.2	-0.4	+1.8	+0.5	+1.2	+2.0	+0.2	+2.6	+2.1	-1.0	-2.8	-0.5
February	4.5	+1.9	+0.3	+2.7	-0.1	+1.1	-0.0	-0.4	+1.5	+0.8	-0.2	-1.8	+1.8
March	6.2	+1.3	-0.7	+1.4	+1.6	+0.4	+1.0	-1.2	+0.9	-0.1	+0.7	-0.1	+0.6
April	7.9	-0.0	-0.1	+1.4	+2.0	+1.6	+0.9	+0.6	+3.2	+0.0	+1.8	+0.9	+3.7
May	11.0	+1.0	+1.4	+0.9	+1.0	+1.1	+0.2	+0.8	+0.8	+2.0	+0.9	-0.3	+1.2
June	13.7	+1.0	+0.3	+0.6	+2.2	+1.6	+1.6	+2.0	+1.2	+0.3	+1.1	+1.6	+0.3
July	16.2	-1.0	+0.5	-0.3	+1.3	-0.5	+0.4	+3.0	-1.0	+0.0	-0.1	+0.8	-0.9
August	16.0	+0.7	+0.7	+0.9	+2.0	+1.3	+0.1	+0.1	-0.5	+0.2	+0.5	-0.7	-0.6
September	13.6	+2.3	+0.4	+0.8	+0.7	+1.1	+1.4	+2.8	+0.2	-0.1	+0.5	+0.3	+1.5
October	10.3	+0.2	+3.2	-0.1	-1.3	+0.2	+2.7	+2.4	+0.7	-0.6	+1.1	+0.1	+2.0
November	7.0	+0.2	+1.0	+1.8	+1.4	+1.0	-0.6	+1.1	+0.6	+0.0	+1.5	-1.6	+2.6
December	5.1	+0.7	-1.0	+0.8	-0.1	+0.6	-0.3	+1.3	-0.1	-1.4	-2.0	-5.4	+0.8

(1) Latest monthly figures available at http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/source/temperatures/temperatures.aspx

(2) Average mean air temperatures calculated from the maximum and minimum daily temperature as recorded at 17 meteorological stations, selected as representative of fuel consumption in Great Britain, 2 in Scotland, 2 in Wales and 13 in England, 4 of which are counted twice. Data on temperatures recorded are provided by the Meteorological Office.

(3) The summer period is from April to September inclusive, and the winter period is the six months beginning in October and ending with March of the following year.

1.1.8 Mean heating degree days, 2002 to 2011, Great Britain

	January	February	March	April	May	June	July	August	September	October	November	December	Total heating degrees days temperature	Year
Long-term mean (1971-2000)	11.2	11.0	9.3	7.6	4.6	2.3	0.8	0.9	2.3	5.2	8.6	10.4	2,243.5	6.1
2002	9.5	8.3	7.8	6.1	3.6	1.4	0.6	0.1	1.2	5.2	6.7	9.5	1,823.3	5.0
2003	10.6	11.1	7.7	5.6	3.6	0.3	0.0	0.3	1.5	6.1	7.1	10.5	1,948.8	5.3
2004	10.0	9.9	8.9	5.9	3.4	1.0	0.7	0.2	1.2	4.9	7.5	9.8	1,931.9	5.3
2005	9.1	11.0	8.2	6.7	4.3	1.3	0.3	0.3	1.2	2.6	9.1	10.7	1,953.8	5.4
2006	11.0	11.3	10.5	7.0	3.7	0.6	0.0	0.3	0.3	2.7	7.4	9.1	1,932.3	5.3
2007	8.6	9.5	8.4	4.3	3.7	0.9	0.5	0.5	2.1	4.5	8.0	10.5	1,860.3	5.1
2008	9.1	10.1	9.4	7.6	2.6	1.6	0.5	0.2	2.0	5.8	8.5	11.8	2,101.8	5.7
2009	12.2	11.1	8.6	5.8	3.6	1.6	0.2	0.2	1.5	4.0	7.1	12.4	2,067.2	5.7
2010	14.0	12.7	9.4	6.6	4.9	1.0	0.1	0.7	1.8	5.1	10.1	15.8	2,489.0	6.8
2011	11.6	9.2	8.7	3.8	3.3	1.9	0.5	0.8	1.0	3.4	6.0	9.6	1,815.3	5.0
2012	10.0	11.1	7.0	8.2	4.2	2.1								

(1) Latest monthly figures available at www.decc.gov.uk/en/content/cms/statistics/source/temperatures/temperatures.aspx

(2) Degree days calculated from the maximum and minimum daily temperature as recorded at 17 meteorological stations, selected as representative of fuel consumption in Great Britain with 2 in Scotland, 2 in Wales and 13 in England, 4 of which are counted twice. Data on temperatures recorded are provided by the Meteorological Office.

1.1.9 Mean air temperatures (averages) ⁽¹⁾⁽²⁾, 1970 to 2011 Great Britain

	Degrees Celsius												
	January	February	March	April	May	June	July	August	September	October	November	December	Year
1970	4.0	3.2	4.0	6.8	12.7	16.1	15.4	16.1	14.5	10.9	7.9	4.5	9.7
1971	4.7	5.0	5.4	7.8	11.5	12.5	16.9	15.6	14.3	11.6	6.4	7.1	9.9
1972	4.2	4.6	6.5	8.6	10.6	11.9	15.5	15.2	11.9	10.7	6.4	5.8	9.3
1973	4.7	4.7	6.5	7.2	11.3	14.9	15.7	16.5	14.3	9.4	6.2	5.1	9.7
1974	6.1	5.8	5.8	8.0	10.9	13.7	15.1	15.2	12.1	7.9	6.7	8.0	9.6
1975	6.7	4.7	5.0	8.3	9.7	14.5	17.2	18.2	13.4	10.2	6.3	5.3	10.0
1976	5.9	4.8	5.0	8.0	11.8	16.7	18.3	17.3	13.4	10.7	6.2	2.2	10.0
1977	3.0	5.1	7.0	7.3	10.4	12.4	15.9	15.3	13.1	11.7	6.4	6.2	9.5
1978	3.4	3.6	6.8	6.4	11.3	13.6	14.7	14.9	14.0	11.9	8.6	4.3	9.5
1979	0.5	1.4	4.8	7.6	9.7	14.1	16.2	14.9	13.2	11.2	7.0	5.5	8.9
1980	2.4	6.0	4.9	8.7	11.0	13.8	14.5	15.7	14.6	9.0	6.6	5.8	9.4
1981	4.8	3.3	6.6	7.8	10.5	13.3	15.6	16.2	14.6	7.6	7.7	0.8	9.1
1982	2.8	4.8	5.8	8.2	11.1	11.2	16.2	15.4	13.8	9.8	7.4	4.1	9.2
1983	6.2	1.9	6.1	6.3	9.6	13.6	18.4	16.8	13.2	10.0	7.3	5.5	9.6
1984	3.3	3.5	4.5	7.7	9.5	13.9	16.2	17.0	13.2	10.7	7.7	5.0	9.4
1985	1.0	2.5	4.4	8.0	10.4	12.2	15.6	14.2	14.1	10.7	4.0	6.1	8.6
1986	3.2	-0.5	4.9	5.4	10.6	14.1	15.4	13.2	11.0	10.6	7.3	5.8	8.5
1987	1.1	3.7	4.1	9.4	9.7	12.2	15.5	15.2	13.3	9.3	6.4	4.7	8.7
1988	4.9	4.5	5.8	7.8	11.2	14.0	14.4	14.9	13.2	9.4	5.3	7.1	9.4
1989	6.1	5.8	7.0	6.1	12.5	14.0	17.4	16.1	14.1	11.5	6.4	4.5	10.2
1990	6.3	7.0	8.0	7.7	12.1	13.3	16.3	17.6	13.1	12.0	7.2	5.1	10.5
1991	3.7	2.4	7.8	8.0	11.0	12.2	17.1	17.0	14.7	10.3	7.0	5.0	9.7
1992	4.0	5.9	7.4	8.6	13.1	15.5	16.1	15.3	13.2	7.8	7.5	4.1	9.9
1993	6.0	5.4	6.6	9.3	11.2	14.4	15.1	14.4	12.5	8.5	5.0	5.3	9.5
1994	5.2	3.5	7.6	8.1	10.4	14.3	17.6	15.9	12.7	10.2	10.1	6.4	10.2
1995	4.9	6.7	5.6	8.9	11.6	14.0	18.4	18.9	13.8	13.2	8.1	2.8	10.6
1996	4.8	3.1	4.6	8.7	9.3	14.4	16.4	16.7	13.7	11.8	6.2	3.5	9.4
1997	2.9	6.9	8.4	9.1	11.5	14.0	16.9	18.6	14.5	10.5	8.9	6.1	10.7
1998	5.5	7.7	8.0	7.8	12.9	14.1	15.5	15.9	14.8	10.6	7.3	5.9	10.5
1999	5.8	5.6	7.4	9.4	12.8	13.7	17.5	16.3	15.7	11.0	8.1	5.0	10.7
2000	5.5	6.4	7.5	7.9	12.1	14.7	15.2	16.7	15.9	10.5	7.1	5.8	10.5
2001	3.9	4.8	5.5	7.8	12.4	14.0	16.7	16.7	14.1	13.6	7.9	4.1	10.2
2002	6.1	7.2	7.6	9.4	11.9	14.3	15.9	17.0	14.5	10.3	8.8	6.0	10.8
2003	4.9	4.5	7.8	9.9	12.1	15.9	17.5	18.0	14.3	9.0	8.4	5.0	10.6
2004	5.5	5.6	6.6	9.6	12.1	15.3	15.7	17.4	14.8	10.6	8.0	5.7	10.6
2005	6.4	4.5	7.2	8.8	11.2	15.4	16.6	16.1	15.0	13.0	6.4	4.8	10.5
2006	4.5	4.2	5.0	8.5	11.8	15.8	19.3	16.2	16.4	12.8	8.1	6.4	10.8
2007	6.9	6.0	7.1	11.2	11.9	14.9	15.2	15.5	13.9	11.0	7.5	5.0	10.5
2008	6.4	5.4	6.1	7.9	13.0	14.0	16.3	16.2	13.5	9.8	7.0	3.7	10.0
2009	3.3	4.4	6.9	9.7	11.9	14.8	16.2	16.6	14.2	11.5	8.4	3.1	10.1
2010	1.5	2.8	6.1	8.9	10.8	15.3	17.0	15.3	14.0	10.4	5.4	-0.3	9.0
2011	3.9	6.3	6.8	11.7	12.3	14.0	15.3	15.4	15.1	12.4	9.5	5.9	10.7
2012	5.5	4.4	8.5	7.3	11.6	13.6							

(1) Latest monthly figures available at www.decc.gov.uk/en/content/cms/statistics/energy_stats/source/temperatures/temperatures.aspx

(2) Average mean air temperatures calculated from the maximum and minimum daily temperature as recorded at 17 meteorological stations, selected as representative of fuel consumption in Great Britain, 2 in Scotland, 2 in Wales and 13 in England, 4 of which are counted twice. Data on temperatures recorded are provided by the Meteorological Office.

Chapter 2: Long term trends

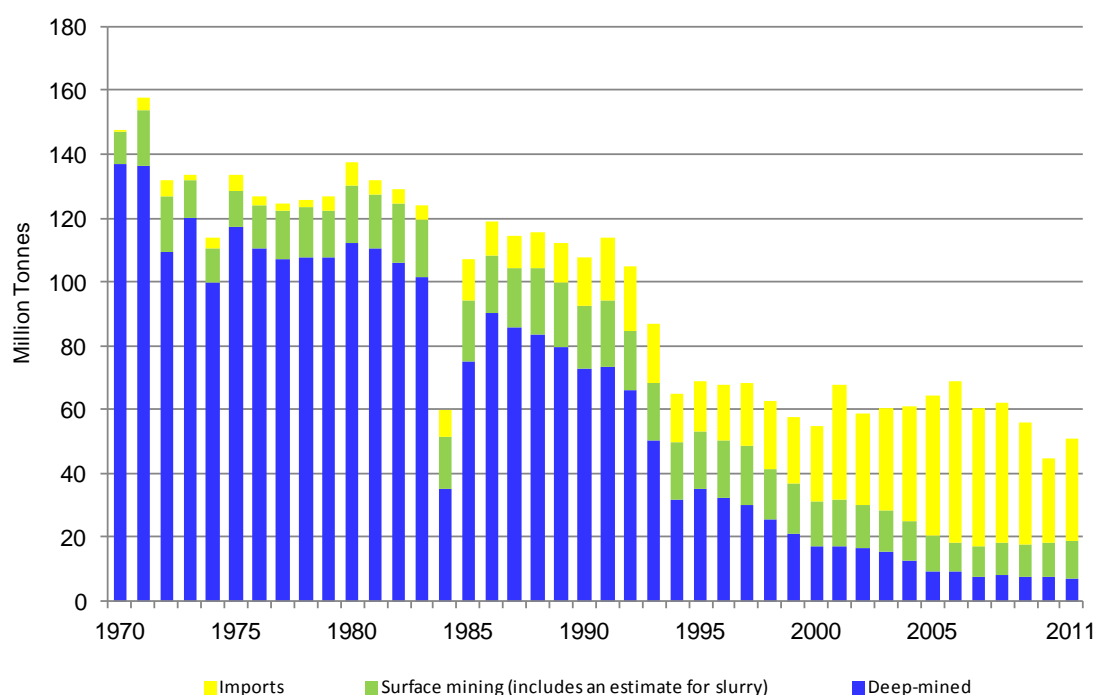
Solid fuels and derived gases

Coal production, trade and stocks (Table 2.1.1)

2.1.1 Figures for coal production, imports, overseas shipments and stocks are given in Table 2.1.1, which is based on Table 2.7 of Chapter 2 of the main Digest. The table series extends back to 1970.

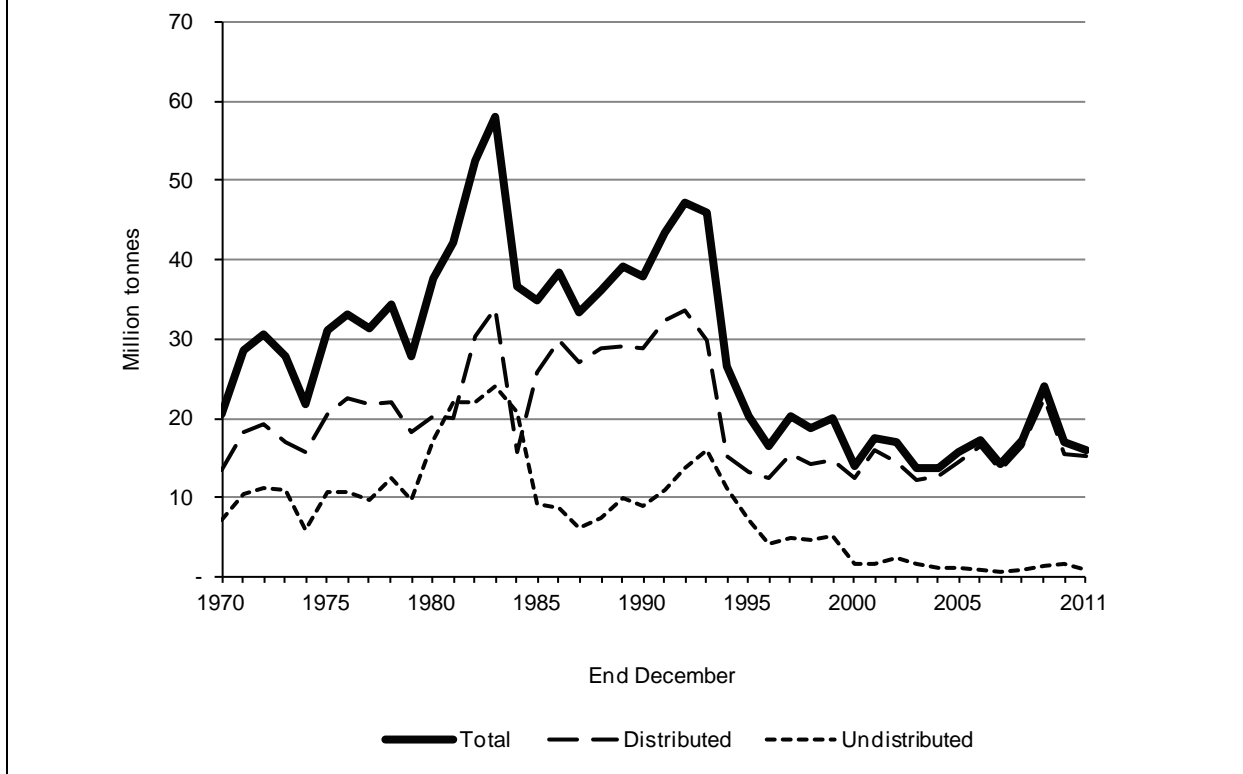
2.1.2 Table 2.1.1 shows a decline in deep-mined production of 95 per cent since the highest level shown in this table in 1970 (137 million tonnes). Production plummeted in 1984 as a result of the miners' strike before recovering fairly quickly to levels recorded pre-1984, and fell again in the early 1990's. Figures for 2011 show that coal production (including an estimate for slurry) increased by a small amount on 2010 (1.1 per cent) to 19 million tonnes. Surface mine production (including an estimate for slurry) in 2011 was around the same as the levels shown in 1970 (11 million tonnes). Since 1970, UK coal imports have grown steadily. This growth increased more rapidly over a short period of time in the early 2000s. This meant in 2001 UK imports (36 million tonnes) exceeded UK production (32 million tonnes) for the first time. This rapid growth in imports continued and in 2006 imports reached a new record of 51 million tonnes. Since then, levels have declined. However, in 2011 UK imports were 33 million tonnes, an increase of 23 per cent on 2010 (27 million tonnes) but a decrease of 36 per cent on the 2006 record. These trends are illustrated in Chart 2.1.1.

Chart 2.1.1: Coal production and imports 1970 to 2011



2.1.3 Total coal stocks were around 20 million tonnes in 1970. Since then distributed stocks increased substantially (mainly due to growth at electricity generators) and in 1983, total stocks, reached a record high of 58 million tonnes, of which 59 per cent was distributed. Thereafter, although there have been year-on-year fluctuations, stock levels have declined back to under 20 million tonnes a year, with the exception of 2009, where total stocks were 24 million tonnes (Chart 2.3), the highest since 1994 (27 million tonnes). Total stocks at the end of 2011 (16 million tonnes) were nearly a third of the year's coal consumption and 0.8 million tonnes less than total stocks held at the end of 2010. Trends in coal stocks are shown in Chart 2.1.2.

Chart 2.1.2: Coal stocks 1970 to 2011



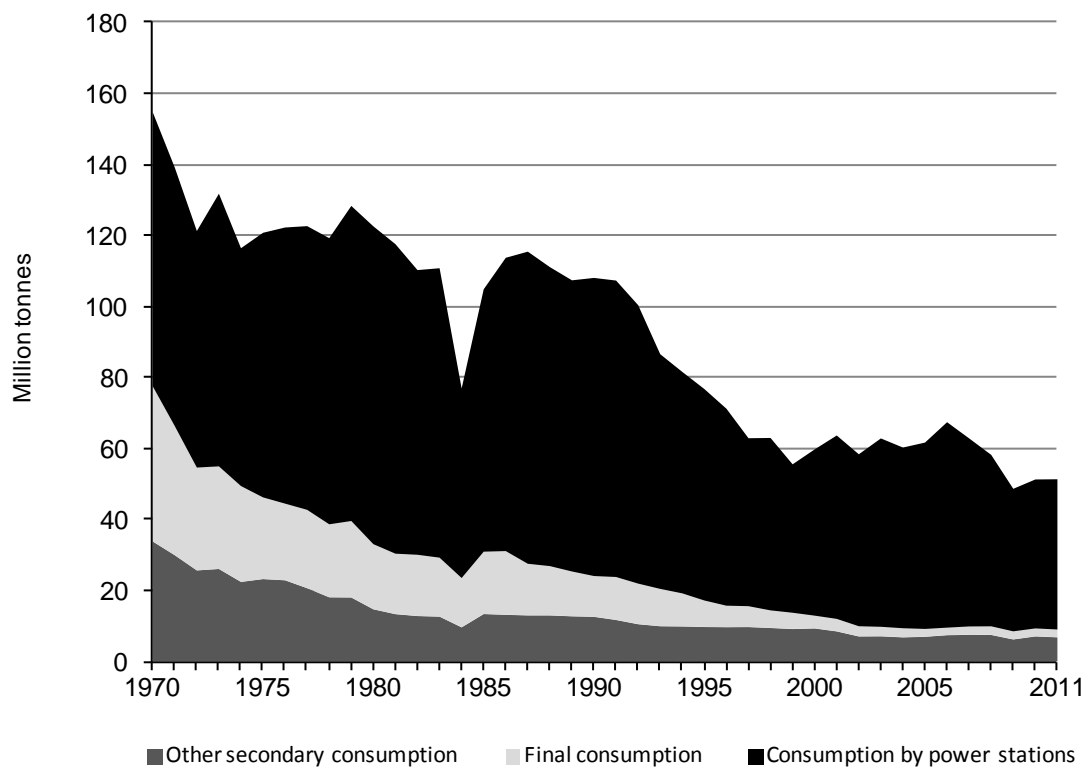
Inland consumption of solid fuels (Table 2.1.2)

2.1.4 Figures for inland consumption of coal by fuel producers and final users are given in Table 2.1.2, which are based on Table 2.7 of Chapter 2 of the main Digest. The table also shows final consumption figures for coke and breeze, and other solid fuels based on Table 2.8 of Chapter 2. These products are mainly supplied from the conversion of coal, supplemented by a small amount of foreign trade. Where possible the series have been extended back to 1970.

2.1.5 Trends in inland consumption of coal, in total and by power stations, coke ovens and final consumers, are illustrated in Chart 2.1.3 below.

2.1.6 Total inland consumption of coal fell by 67 per cent from 157 million tonnes in 1970 to 52 million tonnes in 2011. Consumption by the electricity generators increased from 77 million tonnes in 1970 to a peak of 90 million tonnes in 1980 and continued in the 80-90 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. In 2011, coal use by generators showed little change from 2010 at 42 million tonnes and accounted for 82 per cent of total consumption compared with only 49 per cent in 1970.

Chart 2.1.3: Inland consumption of coal, 1970 to 2011



Power stations only include all generators from 1987 (see footnote (1) to Table 2.1.2).

2.1.7 A more detailed examination of historical coal statistics was published in the September 2001 issue of Energy Trends. This looked at trends in coal production, consumption and employment in the coal mining industry over the last 150 years. The updated data set on which the article is based is available on the Department of Energy and Climate Change (DECC) website at: www.decc.gov.uk/en/content/cms/statistics/energy_stats/source/coal/coal.aspx.

The original article is to be found at: <http://webarchive.nationalarchives.gov.uk/+http://www.berr.gov.uk/files/file30455.pdf> (on page 15).

Additionally, an article on coal statistics trends spanning the last 60 years were published in a special 60th anniversary edition of the Digest of United Kingdom Energy Statistics. This publication is also available on the DECC website at: www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx.

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2.1.1 Coal production and stocks ⁽¹⁾

Thousand tonnes

	Coal production					Coal stocks (at year end) (5)		
	Total	Deep-mined	Surface mining (2,3)	Imports (4)	Exports	Total	Distributed	Undistributed
1970	147,195	136,686	10,509	79	3,191	20,630	13,414	7,216
1971	153,683	136,478	17,205	4,241	2,667	28,664	18,271	10,393
1972	126,834	109,086	17,748	4,998	1,796	30,460	19,351	11,110
1973	131,984	120,030	11,954	1,675	2,693	27,886	17,035	10,850
1974	110,452	99,993	10,459	3,547	1,865	21,807	15,827	5,979
1975	128,683	117,412	11,271	5,083	2,182	31,159	20,541	10,618
1976	123,801	110,265	13,536	2,837	1,436	33,115	22,457	10,658
1977	122,150	107,123	15,027	2,439	1,835	31,444	21,704	9,740
1978	123,577	107,528	16,049	2,352	2,253	34,475	22,038	12,437
1979	122,369	107,775	14,594	4,375	2,175	27,908	18,339	9,569
1980	130,097	112,430	17,667	7,334	3,809	37,687	20,370	17,317
1981	127,469	110,473	16,996	4,290	9,113	42,253	20,136	22,117
1982	124,711	106,161	18,550	4,063	7,447	52,377	30,422	21,955
1983	119,254	101,742	17,512	4,456	6,561	57,960	33,964	23,996
1984	51,182	35,243	15,939	8,894	2,293	36,548	15,794	20,753
1985	94,111	75,289	18,822	12,732	2,432	34,979	25,752	9,228
1986	108,099	90,366	17,733	10,554	2,677	38,481	29,776	8,704
1987	104,533	85,957	18,576	9,781	2,353	33,246	27,104	6,142
1988	104,066	83,762	20,304	11,685	1,822	36,166	28,834	7,332
1989	99,820	79,628	20,192	12,137	2,049	39,244	29,191	10,053
1990	92,762	72,899	19,863	14,783	2,307	37,760	28,747	9,013
1991	94,202	73,357	20,845	19,611	1,824	43,321	32,343	10,977
1992	84,493	65,800	18,693	20,339	973	47,207	33,493	13,714
1993	68,199	50,457	17,742	18,400	1,114	45,860	29,872	15,989
1994	49,785	31,854	17,931	15,088	1,236	26,572	15,301	11,271
1995	53,037	35,150	17,887	15,896	859	20,330	13,226	7,104
1996	50,197	32,223	17,974	17,799	988	16,505	12,352	4,153
1997	48,495	30,281	18,214	19,757	1,146	20,188	15,385	4,803
1998	41,177	25,731	15,446	21,244	971	18,767	14,202	4,565
1999	37,077	20,888	16,189	20,293	761	19,931	14,774	5,157
2000	31,198	17,188	14,010	23,446	660	14,077	12,431	1,646
2001	31,930	17,347	14,583	35,542	550	17,468	15,885	1,583
2002	29,989	16,391	13,598	28,686	537	16,968	14,486	2,482
2003	28,279	15,633	12,646	31,891	542	13,731	12,107	1,624
2004	25,096	12,542	12,554	36,153	622	13,791	12,598	1,192
2005	20,498	9,563	10,935	43,968	536	15,628	14,527	1,101
2006	18,517	9,444	9,073	50,528	443	17,210	16,427	783
2007	17,007	7,674	9,333	43,364	544	14,155	13,420	734
2008	18,053	8,096	9,958	43,875	599	17,246	16,392	854
2009	17,874	7,520	10,354	38,167r	646	24,090r	22,640r	1,450
2010	18,417	7,390	11,026	26,541r	715	16,883	15,366	1,517
2011	18,627	7,312	11,315	32,527	491	16,039	15,113	926

(1) 2008 is 4 days longer than the standard 52 week statistical reporting period (SRP) for January to December 2008. This is to enable a smooth transition to publishing data on a calendar month basis from January 2009 rather than 4 and 5 week SRPs used for previous years.

(2) Includes estimates for slurry etc recovered from dumps, ponds, rivers etc.

(3) The term 'surface mining' has now replaced opencast production. Opencast production is a surface mining technique.

(4) The 1993 import figure includes an additional estimate for unrecorded trade.

(5) Excludes distributed stocks held in merchants' yards, etc, mainly for the domestic market and stocks held by the industrial sector.

2.1.2 Inland consumption of solid fuels ⁽⁴⁾

Thousand tonnes

	Coal consumption by fuel producers							Final consumption					
	Primary		Secondary				Coal (1)			Coke and breeze (2)	Other solid fuel (3)		
	Total inland consumption of coal	Collieries	Power stations (1)	Coke ovens and blast furnaces	Other solid fuel plants (3)	Gas works	Total	Industry	Domestic			Other	Total
1970	156,885	1,916	77,237	25,340	4,150	4,280	111,007	19,613	20,190	4,159	43,962	18,090	3,203
1971	140,931	1,581	72,847	23,554	4,477	1,855	102,733	16,105	17,185	3,327	36,617	15,100	3,456
1972	122,883	1,405	66,664	20,476	4,547	575	92,262	11,663	14,554	2,999	29,216	14,090	3,514
1973	133,371	1,381	76,838	21,888	3,607	512	102,845	12,062	14,502	2,581	29,145	15,000	3,375
1974	117,887	1,256	67,026	18,461	3,788	107	89,382	11,077	13,667	2,505	27,249	13,220	3,184
1975	122,213	1,238	74,569	19,085	4,063	9	97,726	9,685	11,616	1,948	23,249	11,640	2,919
1976	123,604	1,132	77,819	19,402	3,405	8	100,634	8,970	10,823	2,045	21,838	12,460	2,647
1977	123,977	1,124	79,956	17,406	3,173	-	100,535	9,033	11,136	2,149	22,318	11,310	2,609
1978	120,477	1,010	80,643	14,946	3,070	-	98,659	8,550	10,217	2,041	20,808	10,484	2,453
1979	129,379	834	88,790	15,081	2,883	-	106,754	9,232	10,508	2,051	21,791	11,361	2,364
1980	123,460	663	89,569	11,610	3,022	-	104,201	7,898	8,946	1,752	18,596	6,221	2,252
1981	118,386	616	87,226	10,805	2,458	-	100,489	7,046	8,454	1,781	17,281	7,952	1,975
1982	110,998	534	80,228	10,406	2,326	-	92,960	7,175	8,474	1,855	17,504	7,248	1,921
1983	111,475	486	81,565	10,448	2,114	-	94,127	7,218	7,872	1,772	16,862	7,600	1,889
1984	77,309	209	53,411	8,246	1,300	-	62,957	7,006	5,406	1,731	14,143	7,653	1,186
1985	105,386	332	73,940	11,122	2,176	-	87,238	8,313	7,799	1,704	17,816	8,230	1,658
1986	114,234	306	82,652	11,122	1,959	-	95,733	9,278	7,421	1,496	18,195	7,558	1,601
1987	115,894	235	87,960	10,859	2,052	-	100,871	6,827	6,536	1,425	14,788	8,233	1,652
1988	111,499	196	84,258	10,902	2,006	-	97,166	7,131	5,741	1,265	14,137	8,591	1,443
1989	107,581	146	82,053	10,792	1,717	-	94,562	6,763	5,048	1,062	12,873	8,159	1,253
1990	108,257	117	84,014	10,852	1,544	-	96,410	6,280	4,239	1,211	11,730	7,637	1,214
1991	107,514	112	83,542	10,011	1,501	-	95,054	6,426	4,778	1,144	12,348	7,136	1,200
1992	100,580	79	78,469	9,031	1,319	-	88,819	6,581	4,156	945	11,682	6,887	1,089
1993	86,756	48	66,136	8,479	1,329	-	75,944	5,300	4,638	826	10,764	6,638	1,138
1994	81,767	22	62,406	8,581	1,190	-	72,177	4,946	3,901	721	9,568	6,578	949
1995	76,942	8	59,588	8,657	982	-	69,227	4,494	2,690	523	7,707	6,541	742
1996	71,400	8	55,511	8,632	946	-	65,089	3,076	2,705	523	6,303	6,993	868
1997	63,080	8	47,333	8,750	864	-	56,947	2,993	2,587	545	6,125	6,866	645
1998	63,152	5	48,588	8,728	635	-	57,951	2,414	2,366	416	5,196	6,622	644
1999	55,724	10	41,178	8,413	646	-	50,237	2,040	2,517	271	4,828	6,749	585
2000	59,931	12	46,197	8,685	540	-	55,422	1,876	1,883	82	3,841	6,352	532
2001	63,850	10	50,931	7,895	496	-	59,323	1,826	1,874	68	3,768	5,514	495
2002	58,553	9	47,741	6,533	436	-	54,710	1,809	1,286	22	3,117	4,732	424
2003	63,024	6	52,464	6,611	396	-	59,471	1,857	1,043	25	2,925	5,336	363
2004	60,451	8	50,444	6,382	327	-	57,153	1,848	941	28	2,817	5,082	320
2005	61,852	6	52,058	6,609	266	-	58,933	1,781	614	59	2,455	5,003	256
2006	67,594	4	57,438	7,049	276	-	64,763	1,756	561	54	2,370	5,263	257
2007	63,029	5	52,511	7,174	265	-	59,950	1,896	648	45	2,590	5,253	235
2008	58,385	5	47,808	7,045	352	-	55,205	1,940	683	49	2,672	5,104	294
2009	48,821r	5	39,681r	5,787	341r	-	45,809r	1,742r	689r	94r	2,525r	3,735	269
2010	51,455r	5r	41,498r	6,632r	351r	-	48,480r	1,716r	718r	58r	2,492r	3,424	311
2011	51,514	4	41,857	6,393	331	-	48,580	1,681	717	55	2,453	3,084	270

(1) Up to 1986 power stations include those in the public electricity supply, railways and transport industries. Consumption by other generators is included in final coal consumption. From 1987, coal consumption at power stations also includes other generators' consumption, which is therefore excluded from final coal consumption (see also Table 2.7). From 1999 includes coal consumption for heat sold to third parties.

(2) This series comprises final consumption and consumption at blast furnaces which can now be separated following production of energy balances in Tables 2.4 to 2.6 of the main Digest.

(3) Low temperature carbonisation and patent fuel plants and their products.

(4) 2008 is 4 days longer than the standard 52 week statistical reporting period (SRP) for January to December 2008. This is to enable a smooth transition to publishing data on a calendar month basis from January 2009 rather than 4 and 5 week SRPs used for previous years.

Chapter 3: Long term trends

Petroleum

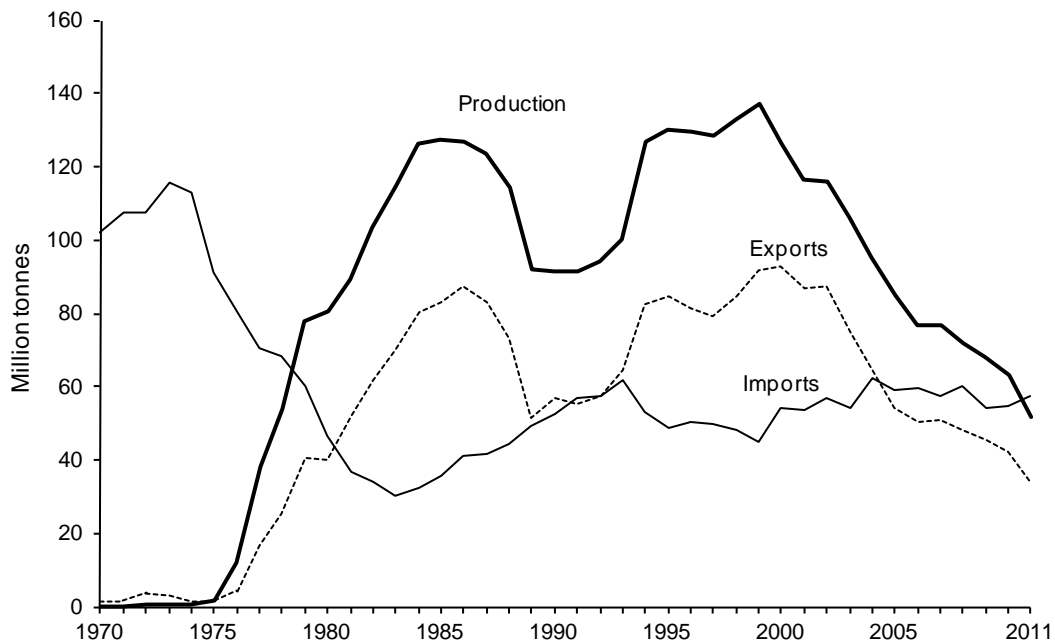
3.1.1 Tables 3.1.1 and 3.1.2 present extended time series of selected, more aggregated data, from the tables in Chapter 3 of the main Digest. They give additional background on the historic development of the crude oil and petroleum sectors.

Crude oil and petroleum products: production, imports and exports (Table 3.1.1)

3.1.2 The left-hand side of Table 3.1.1 shows data from 1970 to 2011 for production, imports and exports of crude oil (including natural gas liquids and feedstocks) and oil products. This part of the table also shows United Kingdom refinery throughput of crude oil, and the inland deliveries of oil products. Indigenous production of crude oil is shown in total with landward production shown separately.

3.1.3 The first three columns of the right-hand side of Table 3.1.1 consist of time series showing net exports of crude oil and products. It should be noted that exports of crude oil include some imports that have been re-exported. In years of significant indigenous production these have little effect on exports as a proportion of indigenous production, but in the earlier years (approximately pre-1975) the re-exports exceeded indigenous production and thus the ratio of exports to indigenous production was greater than one.

Chart 3.1.1: Production, exports and imports of oil⁽¹⁾ 1970 to 2011



(1) Includes crude oil, natural gas liquids and process oils.

3.1.4 Chart 3.1.1 illustrates the trends in the production, exports and imports of crude oil. It shows that indigenous production of crude oil was negligible up to 1974 and then increased rapidly as North Sea production came on stream. Imports peaked in 1973, immediately prior to the first OPEC price 'hike'. The chart shows the rapid decline of net imports thereafter as indigenous production rose, until 1981 when the surplus turned from net imports to net exports. Net exports first peaked in 1986, one year after the first peak for North Sea production in 1985.

3.1.5 The large fall in production in 1988 and particularly 1989 reflects the effects of the Piper Alpha disaster and subsequent incidents, and the continued 'low' production in 1990 and 1991 reflects the consequent safety work. Production has been declining since the peak production of 137 million tonnes in 1999. In 2011 production was 11 million tonnes lower, decreasing by a nearly a fifth compared with 2010. This was largest decrease since large scale oil extraction began. More information on the reasons behind this reduction can be found in Annex F, paragraph F.8.

3.1.6 Table 3.1.1 also shows that the import share of refinery throughput of crude oil fell from nearly 100 per cent, prior to North Sea oil production starting, to a low of 39 per cent in 1983 (the lowest year for imports), before rising to 64 per cent in 1993. Since then, indigenous production has increased significantly leading to the import share falling to 51 per cent in 1999, the year of record UK production of crude oil. The imports' share of refinery throughput was 77 per cent in 2011 due to the lower levels of production mentioned above. These developments are mirrored by the changes in the ratio of indigenous production to refinery throughput. Ignoring pre-1976 figures, the proportion of indigenous production exported increased from 35 per cent in 1976 to around two-thirds towards the end of the 1980s. Although the decreases in production in the late 1980s did lead to some reduction in the level of exports, the proportion of production exported continued at roughly this level during the 1990s. Since 2000, however, the proportion has risen to about two thirds.

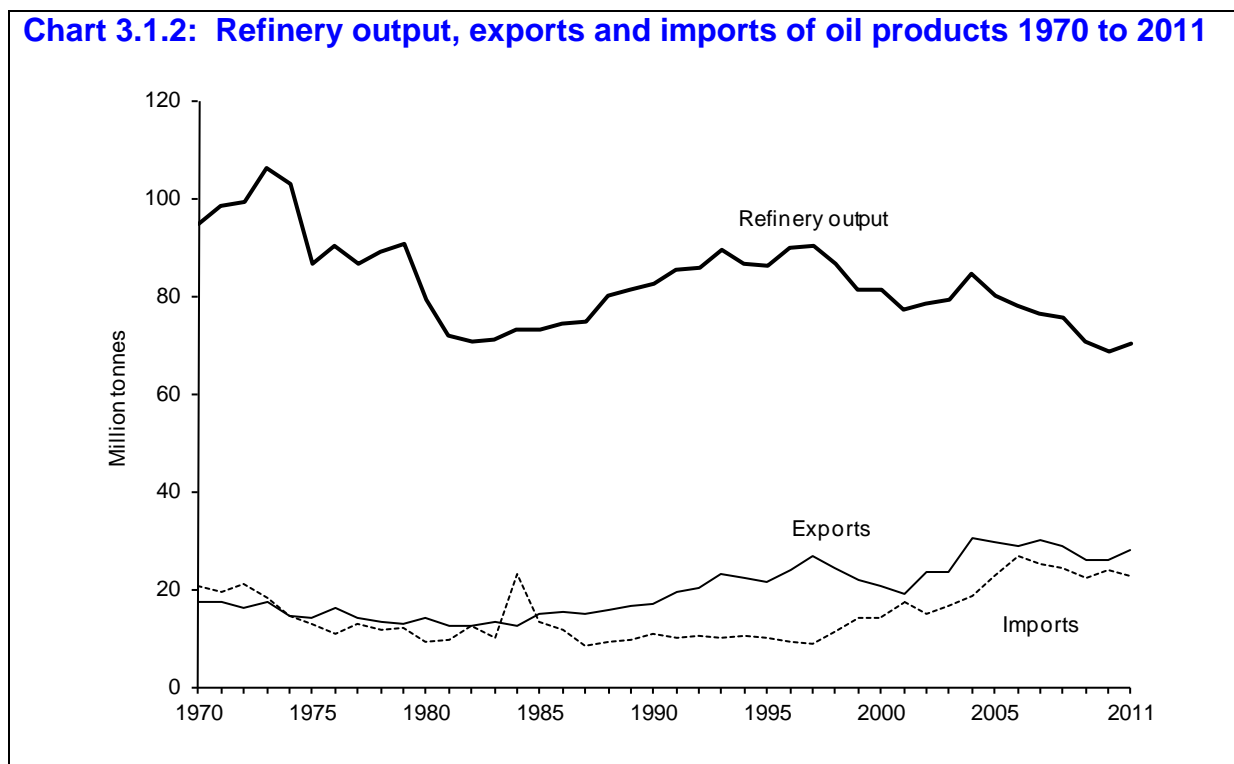
3.1.7 Imports of crude oil in 1991 (and marginally again in 1992) exceeded exports for the first time since 1980. Net exports of crude oil resumed in 1993, and continued to rise until 1999. In 1999 net exports of crude oil were 47 million tonnes at their highest since 1984 with overall net exports of crude oil and oil products at a record level of almost 55 million tonnes. However, the decreased level of crude oil production since 1999 has seen net exports of crude oil falling over the last six years and the UK becoming a net-importer of primary oils in 2005 for the first time since 1992. In 2011, the UK was a net-importer of primary oils and a net-exporter of oil products, however, the extent of importing was on a large enough scale that overall, for both primary oils and oil products combined the UK was a net-importer. In 2011, imports of primary oil also marginally exceeding production for the first time, as shown in chart 3.1.1.

3.1.8 Refinery throughput peaked in 1973 but subsequently fell to pre-1970 levels together with refinery output. (The difference between refinery throughput and output is refinery use of fuel and gains/losses). Since the low point of 1983 (throughput 77 million tonnes), both refinery throughput and output increased to a new peak in 1997. However, with the closure of the Gulf Oil refinery in late 1997, refinery output fell by 4 per cent in 1998 and then by another 6 per cent in 1999 to the lowest level seen since 1989. The remaining refineries in the UK worked to increase their capacity and utilisation rates and to a large extent offset the closures of the Gulf Oil and Shell Haven refineries. The fall in refinery output in 2001 is the result of the shutdowns mentioned above. In 2010 refinery output and throughput were both lower by 3 per cent than in 2009 and were the lowest since the 1960's. The principal driver for this reduction was the cessation of refinery operations at Petroplus Teesside in 2009. Citing prevailing economic circumstances, the Petroplus refinery was mothballed and converted to a storage site. In 2011 refinery output stood at 70 million tonnes, 2 per cent higher than in 2010. In 2011, refinery throughput stood at 75 million tonnes, 2 per cent higher than in 2010.

3.1.9. In 1984 the UK was a net importer of oil products due to the increased demand for oil products as a result of the miners strike. Since 1984 the UK has been a net exporter of oil products with increases in exports during the 1990s leading to a record high in 1997. The increases in net exports of products in the 1990s reflect the increased throughput from refineries mainly feeding through to increased exports of oil products, rather than increases in deliveries to the domestic market. Net exports of products decreased in both 1998 and 1999, (following the closure of the Gulf Oil refinery from December 1997). The closure of the Shell Haven refinery was the main reason for the decline in net exports of products in 2000. The sharp fall in 2001 occurred due to a number of prolonged shutdowns and slowdowns at refineries in the first half of the year to allow upgrade work for the introduction of ultra low sulphur petrol. Exports of oil products increased from 1991 to 1993 (comfortably exceeding the earlier peak at the beginning of the 1970s), fell in 1994 and 1995 before climbing again to reach a new peak in 1997 at 26.8 million tonnes. Imports of oil products were at their highest in 1967 (24 million tonnes) and, apart from a 'blip' in 1984 as a result of the miners' strike, were less than half this peak until 1999. As a result, 1984 apart, exports of oil products have exceeded imports in every year since 1974. In 2011, imports made up 36 per cent of inland deliveries, a higher level than the last 40 years, including the 1984 miners strike. In 2011, imports made up 35

per cent of inland deliveries. Chart 3.1.2 summarises the trend in refinery output, exports and imports of oil products over the period.

Chart 3.1.2: Refinery output, exports and imports of oil products 1970 to 2011



Inland deliveries of petroleum products (Table 3.1.2)

3.1.10 Table 3.1.2 shows data for deliveries of petroleum products from 1970 to 2011, split between non-energy uses in total and the major products delivered for energy use. While data for deliveries are considered to be a good proxy for consumption, differences can occur mainly due to stock changes along the chain of consumption. Total deliveries for energy use shown in the first (left-hand) half of the table and include 'own use' by refineries that are separately identified in the right-hand part of the table.

3.1.11 Deliveries of petroleum products peaked in 1973, in common with other aggregate oil figures (see Table 3.1.1). The 'blip' in 1984 reflects the increased deliveries (of fuel oil in particular) during the miners' strike. Fuel oil deliveries are now 6 per cent of their level in 1970 while gas oil deliveries (excluding DERV fuel) are half their 1970 level. In contrast, deliveries of aviation turbine fuel have more than tripled during the period. After limited growth during the 1970s and early 1980s, deliveries of DERV fuel resumed the high growth rates apparent in the 1960s, and have increased by over a quarter over the last 10 years. The upward surge of deliveries of transport fuels slowed in 1990 and ceased in 1991 with the twin impacts of the Gulf crisis and recession, with some recovery being seen in 1992.

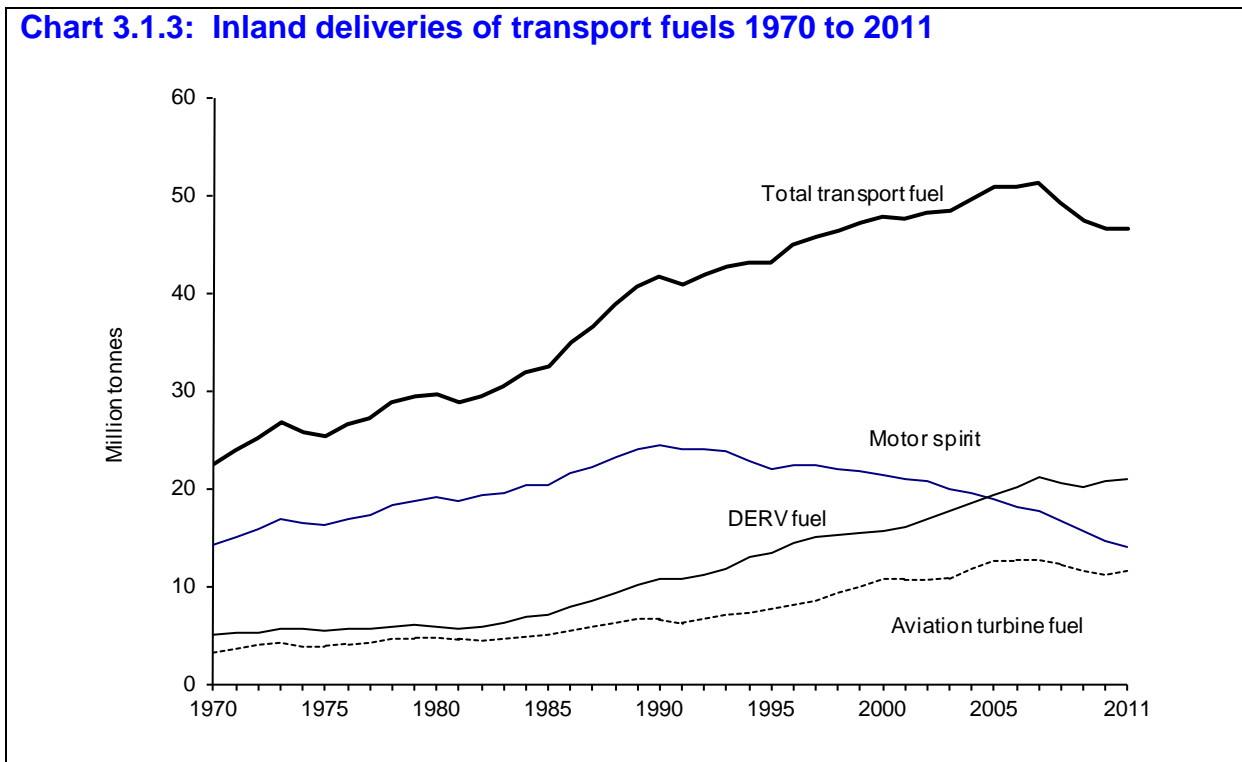
3.1.12 Since 1992, motor spirit deliveries have generally declined each year. In 2010 deliveries of motor spirit were a third lower than in 2000. These changes reflect the switch to diesel-engine cars and are mirrored by the pattern of increases in deliveries of DERV fuel since 1990. Consumption of motor spirit is also lowered by a more efficient road fleet. In 2005, deliveries of DERV fuel exceeded motor spirit in mass terms for the first time, and in 2007 DERV deliveries surpassed motor spirit in terms of both mass and volume, which has continued into 2011. Deliveries of aviation turbine fuel also increased each year from 1992 to 2000. However deliveries of aviation turbine fuel fell in 2001 due to the terrorist attacks on the United States on 11th September 2001 that caused a downturn in the global aviation industry. Developments in Afghanistan and Iraq during 2002 also impacted on the aviation industry with deliveries of aviation turbine fuel in 2002 being 1 per cent lower than in 2001. Deliveries of aviation turbine fuel increased by two thirds between 1990 and 2010. Deliveries increased year on year between 2003 and 2006, but fell year on year between 2007 and 2010. These recent falls in consumption reflect the impacts of the economic downturn, and specific drops in aviation fuel

consumption as a result of poor weather and the ash eruption from the Eyjafjallajökull volcano in 2010. In 2011, consumption of aviation turbine was 4 per cent higher than in 2010. Chart 3.1.3 shows the trends in deliveries of all transport fuels from 1970 to 2011.

3.1.13 By the end of the 1980s and during the 1990s deliveries for non-energy uses were not far off their peak of the early to mid-1970s. Non-energy use has declined steadily in recent years, and is down a third on the most recent peak, in 2004.

3.1.14 The right hand columns of Table 3.1.2 (headed “Energy industry use” and “Final users”) show a sector-by-sector breakdown of the total deliveries for energy use given in the left hand columns. Fuels used in blast furnaces are included in the “other energy industry uses” column rather than in the iron and steel column. Total uses by the transport sector are now roughly double the amount delivered in 1970 as Chart 3.1.3 shows. Deliveries to every other major sector are below 1973 levels - well below for electricity generators, iron and steel and ‘other industries’, and other final users (mainly agriculture, public administration and commerce).

Chart 3.1.3: Inland deliveries of transport fuels 1970 to 2011



3.1.15 Additional analysis to that presented in this publication has been conducted on the information provided in Tables 3.1.1 and 3.1.2. The main purpose of this analysis was to extend the information provided back as far as possible, which has meant back to 1870 for some information. The tables are at the link below and an article containing this analysis was published in the March 2007 edition of Energy Trends which is available on request from DECC:

www.decc.gov.uk/en/content/cms/statistics/blue_stats/source/oil/oil.aspx

A publication marking the 60th anniversary of the Digest of UK Energy Statistics is also available:

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

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3.1.1 Crude oil and petroleum products: production, imports and exports⁽¹⁾⁽²⁾

	Thousand tonnes								
	Crude oil (3)					Oil products			
	Imports	Indigenous production		Exports	Refinery throughput	Refinery output (4)	Exports	Imports	Inland deliveries (4)
	Total	Landward							
1970	102,155	156	83	1,182	101,911	94,696	17,424	20,428	91,151
1971	107,736	212	85	1,569	105,342	98,245	17,166	19,369	91,991
1972	107,706	333	85	3,558	106,980	99,368	15,979	20,827	98,469
1973	115,472	372	88	3,235	114,338	105,954	17,404	18,300	99,786
1974	112,822	410	107	1,404	111,217	103,060	14,631	14,537	93,409
1975	91,366	1,564	99	1,524	93,597	86,647	13,924	12,786	82,824
1976	80,466	12,169	99	4,285	97,784	90,284	15,988	10,709	81,579
1977	70,697	38,265	99	16,793	93,615	86,338	14,160	13,050	82,759
1978	68,144	54,006	88	25,200	96,390	89,156	13,194	11,586	84,141
1979	60,380	77,748	121	40,569	97,806	90,583	12,988	12,035	84,554
1980	46,717	80,467	237	40,180	86,341	79,227	14,110	9,245	71,177
1981	36,855	89,454	232	52,206	78,287	72,006	12,256	9,402	66,256
1982	33,754	103,211	253	61,670	77,130	70,747	12,637	12,524	67,246
1983	30,324	114,960	316	69,923	76,876	70,927	13,331	9,907	64,464
1984	32,272	126,065	345	80,143	79,117	73,187	12,478	23,082	81,435
1985	35,576	127,611	380	82,980	78,431	72,904	14,828	13,101	69,781
1986	41,209	127,068	504	87,437	80,155	74,089	15,283	11,767	69,227
1987	41,541	123,351	578	83,220	80,449	74,656	14,980	8,570	67,701
1988	44,272	114,459	761	73,330	85,662	79,837	15,802	9,219	72,317
1989	49,500	91,710	722	51,664	87,669	81,392	16,683	9,479	73,028
1990	52,710	91,604	1,758	56,999	88,692	82,286	16,899	11,005	73,943
1991	57,084	91,261	3,703	55,131	92,001	85,476	19,351	10,140	74,506
1992	57,683	94,251	3,962	57,627	92,334	85,783	20,250	10,567	75,470
1993	61,701	100,189	3,737	64,415	96,273	89,584	23,031	10,064	75,790
1994	53,096	126,542	4,649	82,393	93,161	86,644	22,156	10,441	74,957
1995	48,749	129,894	5,051	84,577	92,743	86,133	21,614	9,878	73,694
1996	50,099	129,742	5,251	81,563	96,660	89,885	23,681	9,315	75,390
1997	49,994	128,234	4,981	79,400	97,023	90,366	26,755	8,706	72,501
1998	47,958	132,633	5,161	84,610	93,797	86,615	24,375	11,418	72,261
1999	44,869	137,099	4,285	91,797	88,286	81,195	21,730	13,896	72,436
2000	54,386	126,245	3,247	92,917	88,013	81,130	20,677	14,212	71,944
2001	53,551	116,678	2,921	86,930	83,343	77,051	19,088	17,234	71,354
2002	56,968	115,944	2,673	87,144	84,784	78,319	23,444	14,900	70,557
2003	54,177	106,073	2,198	74,898	84,585	79,073	23,323	16,472	71,697
2004	62,517	95,374	1,938	64,504	89,821	84,411	30,495	18,545	73,649
2005	58,885	84,721	1,648	54,099	86,134	80,145	29,722	22,481	75,496
2006	59,443	76,578	1,380	50,195	83,213	77,960	28,945	26,836	74,895
2007	57,357	76,575	1,271	50,999	81,477	76,503	29,983	25,110	72,742
2008	60,041	71,665	1,248	48,401	80,740	75,673	28,791	24,186	71,118
2009	54,387	68,199	1,181	45,202	75,225	70,496	25,733	22,172	67,469
2010	54,587	62,962	941	42,196	73,200	68,397	26,065	23,979	66,699
2011	57,586	51,972	678	33,745	74,709	70,104	27,800	22,804	65,095

(1) Aggregate monthly data on crude oil production and trade in oil and oil products are available - see Chapter 3 paragraph 3.73 and Annex C.

(2) See paragraphs 3.1.2 to 3.1.9.

(3) Includes natural gas liquids and feedstocks.

(4) Excludes products used as fuels within refinery processes.

3.1.1 Crude oil and petroleum products: production, imports and exports⁽¹⁾⁽²⁾ (continued)

Net exports			Crude oil			Oil products	
Crude oil (5)	Oil products (5)	Total (5)	Ratio of imports to ref. throughput	Ratio of indigenous production to ref. throughput	Ratio of exports to indigenous production	Imports: Share of inland deliveries	
Thousand tonnes			Ratio			Percentage	
-100,973	-3,004	-103,977	1.002	0.001	7.577	22.4	1970
-106,167	-2,203	-108,370	1.023	0.001	7.401	21.1	1971
-104,148	-4,848	-108,996	1.007	0.002	10.685	21.2	1972
-112,237	-896	-113,133	1.010	0.002	8.696	18.3	1973
-111,418	94	-111,324	1.014	0.002	3.424	15.6	1974
-89,842	1,138	-88,704	0.976	0.012	0.974	15.4	1975
-86,181	5,279	-80,902	0.925	0.118	0.352	13.1	1976
-53,904	1,110	-52,794	0.755	0.409	0.439	15.8	1977
-42,944	1,608	-41,336	0.707	0.560	0.467	13.8	1978
-19,811	953	-18,858	0.617	0.796	0.522	14.2	1979
-6,537	4,865	-1,672	0.541	0.932	0.499	13.0	1980
15,351	2,854	18,205	0.471	1.143	0.583	14.2	1981
27,916	113	28,029	0.438	1.338	0.597	18.6	1982
39,599	3,424	43,023	0.394	1.497	0.608	15.4	1983
48,141	-10,604	37,537	0.408	1.593	0.638	28.3	1984
47,404	1,727	49,131	0.454	1.627	0.650	18.8	1985
46,228	3,516	49,744	0.514	1.585	0.688	17.0	1986
41,679	6,410	48,089	0.516	1.533	0.675	12.7	1987
29,057	6,583	35,640	0.517	1.336	0.641	12.7	1988
2,164	7,204	9,368	0.565	1.046	0.563	13.0	1989
4,289	5,894	10,183	0.594	1.033	0.622	14.9	1990
-1,953	9,211	7,258	0.620	0.992	0.604	13.6	1991
-56	9,683	9,627	0.625	1.021	0.611	14.0	1992
2,714	12,967	15,681	0.641	1.041	0.643	13.3	1993
29,297	11,715	41,012	0.570	1.359	0.651	13.9	1994
35,828	11,736	47,564	0.526	1.401	0.651	13.4	1995
31,464	14,366	45,830	0.518	1.342	0.629	12.1	1996
29,406	18,037	47,443	0.515	1.322	0.619	12.0	1997
36,652	12,957	49,609	0.511	1.414	0.638	15.8	1998
46,928	7,834	54,762	0.508	1.553	0.670	19.2	1999
38,531	6,464	44,995	0.618	1.434	0.736	19.8	2000
33,378	1,854	35,232	0.643	1.400	0.745	24.2	2001
30,176	8,544	38,720	0.672	1.368	0.752	21.1	2002
20,720	6,851	27,571	0.641	1.254	0.706	23.0	2003
1,987	11,950	13,937	0.696	1.062	0.676	25.2	2004
-4,786	7,241	2,455	0.684	0.984	0.639	29.8	2005
-9,249	2,109	-7,140	0.714	0.920	0.655	35.8	2006
-6,357	4,874	-1,484	0.704	0.940	0.666	34.5	2007
-11,640	4,604	-7,036	0.744	0.888	0.675	34.0	2008
-9,185	3,561	-5,624	0.723	0.907	0.663	32.9	2009
-12,391	2,087	-10,304	0.746	0.860	0.670	36.0	2010
-23,841	4,996	-18,845	0.771	0.696	0.649	35.0	2011

(5) A minus (-) signifies that in that particular year imports were greater than exports.

3.1.2 Inland deliveries of petroleum ⁽¹⁾⁽²⁾

Million tonnes										
	Total	Deliveries for energy uses							Total for energy uses (5)	Deliveries for non-energy uses
		Motor spirit	DERV fuel	Aviation turbine fuel	Burning oil	Gas oil (3)	Fuel oils (4)	Petroleum gases		
1970	97.18	14.24	5.04	3.25	2.48	11.56	42.12	3.54	87.05	10.13
1971	98.17	14.96	5.19	3.67	2.57	12.13	42.74	3.84	88.04	10.13
1972	104.89	15.90	5.25	3.93	2.93	14.56	44.85	4.08	94.21	10.68
1973	106.84	16.93	5.66	4.20	3.18	14.60	43.40	4.43	95.25	11.59
1974	100.39	16.48	5.52	3.69	2.78	13.12	40.71	3.80	88.53	11.86
1975	88.85	16.13	5.41	3.83	2.63	12.61	33.81	3.51	79.41	9.44
1976	87.92	16.88	5.59	3.99	2.62	12.53	30.90	3.85	77.81	10.11
1977	89.00	17.34	5.71	4.17	2.62	13.38	30.74	3.88	79.28	9.72
1978	90.56	18.35	5.88	4.51	2.65	13.19	31.50	3.84	81.16	9.40
1979	91.09	18.69	6.06	4.67	2.70	13.49	30.95	3.88	81.56	9.53
1980	77.50	19.15	5.85	4.69	2.10	11.62	22.69	3.52	70.50	7.00
1981	71.70	18.72	5.55	4.50	1.91	10.93	18.64	3.15	64.15	7.55
1982	72.79	19.25	5.73	4.47	1.75	10.50	19.16	3.45	65.19	7.60
1983	69.77	19.57	6.18	4.57	1.66	9.88	15.03	3.84	61.75	8.02
1984	86.79	20.23	6.76	4.83	1.71	9.92	30.26	3.79	78.61	8.18
1985	74.96	20.40	7.11	5.01	1.87	9.71	18.19	3.15	66.48	8.48
1986	74.62	21.47	7.87	5.50	2.02	9.22	14.64	3.46	65.26	9.36
1987	72.92	22.18	8.47	5.82	2.03	8.51	11.90	3.45	63.52	9.40
1988	77.80	23.25	9.37	6.20	1.99	8.39	13.83	3.62	67.80	10.00
1989	78.85	23.92	10.12	6.56	1.94	8.26	13.14	3.88	68.97	9.88
1990	79.78	24.31	10.65	6.59	2.06	8.03	14.02	3.88	70.61	9.17
1991	80.56	24.02	10.69	6.18	2.38	8.02	14.17	4.00	70.61	9.95
1992	81.55	24.04	11.13	6.67	2.47	7.86	13.74	3.84	70.92	10.63
1993	82.18	23.77	11.81	7.11	2.63	7.78	13.13	4.05	71.45	10.73
1994	81.22	22.84	12.91	7.28	2.66	7.51	11.73	4.06	70.04	11.18
1995	80.17	21.95	13.46	7.66	2.77	7.25	10.30	4.26	68.85	11.32
1996	82.01	22.41	14.37	8.05	3.34	7.65	9.15	4.55	70.72	11.29
1997	79.25	22.25	14.98	8.41	3.34	7.38	6.25	4.22	68.30	10.95
1998	78.44	21.85	15.14	9.24	3.57	7.31	5.35	4.05	67.75	10.69
1999	77.97	21.79	15.51	9.94	3.63	6.73	4.45	3.97	67.24	10.73
2000	77.20	21.40	15.63	10.81	3.84	6.81	3.35	3.99	67.14	10.05
2001	76.41	20.94	16.06	10.61	4.24	6.60	4.26	3.76	67.53	8.89
2002	76.23	20.81	16.93	10.52	3.58	5.94	3.77	3.84	66.56	9.67
2003	77.15	19.92	17.71	10.76	3.57	6.24	3.56	3.90	66.74	10.41
2004	79.07	19.48	18.51	11.64	3.95	5.97	3.74	4.11	68.48	10.58
2005	81.10	18.85	19.38	12.50	3.87	6.83	3.78	4.19	70.66	10.44
2006	79.77	18.09	20.16	12.64	4.02	6.31	3.25	4.15	70.02	9.76
2007	77.42	17.61	21.04	12.57	3.63	6.12	3.23	3.88	69.46	7.97
2008	75.87	16.54	20.50	12.22	3.69	5.97	3.31	4.11	67.84	8.03
2009	71.87	15.61	20.11	11.53	3.73	5.35	2.60	3.77	64.50	7.37
2010	71.17	14.60	20.74	11.12	4.01	5.23	2.40	4.05	63.64	7.53
2011	69.49	13.89	20.99	11.57	3.29	5.09	2.07	3.96	62.23	7.25

(1) Aggregate monthly and quarterly data on inland deliveries of oil products are available - see Chapter 3, paragraph 3.73 and Annex C.

(2) This table has been revised from previous editions to be fully compliant with the commodity balances format used in Chapter 3, Tables 3.2 to 3.4. This has involved adding in the refinery fuel elements into the above product totals, and an adjustment to the data for fuels used by the iron and steel industry as detailed in footnote (6) below.

(3) Other than DERV fuel. From 1999 includes marine diesel oil.

3.1.2 Inland deliveries of petroleum ⁽¹⁾⁽²⁾ (continued)

Million tonnes

Energy industry use				Final users					
Electricity generators	Gas works	Refineries	Other energy industry uses (6)	Iron & steel	Other industries	Transport	Domestic	Other final users (7)	
12.60	4.56	6.03	4.25	1.42	21.55	25.00	3.05	8.59	1970
14.68	2.59	6.18	3.97	1.32	21.55	26.07	3.01	8.67	1971
18.87	2.21	6.42	3.78	1.26	22.14	27.14	3.48	8.91	1972
16.95	2.32	7.05	3.74	1.25	22.18	28.96	3.80	9.00	1973
17.21	1.28	6.95	3.02	1.01	19.82	27.92	3.38	7.95	1974
12.82	0.59	6.03	2.48	0.83	17.89	27.57	3.27	7.93	1975
10.18	0.25	6.34	2.48	0.83	18.06	28.60	3.27	7.80	1976
10.60	0.16	6.24	2.21	0.74	18.06	29.37	3.31	8.60	1977
11.64	0.35	6.42	2.12	0.71	17.55	30.87	3.26	8.24	1978
11.12	0.42	6.49	2.14	0.71	17.62	31.58	3.21	8.27	1979
6.52	0.31	6.27	1.19	0.40	14.51	31.74	2.55	7.01	1980
4.86	0.25	5.45	1.00	0.33	12.67	30.63	2.31	6.65	1981
6.87	0.21	5.55	0.89	0.30	11.64	31.31	2.15	6.28	1982
4.65	0.16	5.30	0.77	0.26	10.23	32.25	2.14	6.00	1983
20.91	0.16	5.35	0.63	0.21	9.39	33.82	2.14	6.00	1984
9.72	0.15	5.18	0.52	0.17	8.43	34.46	2.20	5.65	1985
5.66	0.17	5.40	0.50	0.17	9.02	36.66	2.32	5.36	1986
5.36	0.09	5.05	0.42	0.14	7.36	38.22	2.21	4.67	1987
6.07	0.06	5.29	0.55	0.18	8.23	40.62	2.13	4.67	1988
6.17	0.05	5.62	0.56	0.19	7.52	42.54	2.11	4.21	1989
7.98	0.05	5.07	0.53	0.18	7.03	43.45	2.22	4.11	1990
7.56	0.05	5.26	0.53	0.18	7.49	42.86	2.52	4.17	1991
8.32	0.04	4.16	0.51	0.17	7.13	43.79	2.58	4.22	1992
6.02	0.04	5.89	0.64	0.21	7.17	44.56	2.71	4.21	1993
4.04	0.05	6.04	0.67	0.22	7.47	44.82	2.70	4.03	1994
4.37	0.05	5.99	0.62	0.21	6.41	44.81	2.70	3.69	1995
3.57	0.05	6.50	0.65	0.09	6.41	46.64	3.17	3.65	1996
2.24	0.05	6.16	0.57	0.11	5.68	47.32	3.06	3.12	1997
1.40	0.05	6.18	0.27	0.08	5.75	47.92	3.20	2.92	1998
1.17	0.05	5.54	0.98	0.06	5.28	48.85	2.85	2.47	1999
0.98	0.04	5.25	0.90	0.14	5.35	49.45	2.92	2.11	2000
0.97	-	5.06	0.82	0.08	5.98	49.11	3.18	2.32	2001
0.67	-	5.68	0.44	0.08	5.62	49.64	2.78	1.66	2002
0.54	-	5.46	0.38	0.02	6.25	50.29	2.76	1.05	2003
0.59	-	5.42	0.36	0.03	6.27	51.55	2.94	1.32	2004
1.26	-	5.60	0.33	0.02	5.92	52.77	2.78	1.62	2005
1.24	-	4.88	0.29	0.02	5.50	53.33	2.93	1.40	2006
1.13	-	4.68	0.26	0.06	5.43	53.49	2.59	1.41	2007
1.57	-	4.75	0.27	0.06	5.01	51.67	2.73	1.30	2008
1.57	-	4.40	0.13	0.05	4.53	49.52	2.71	1.14	2009
1.14	-	4.47	0.07	0.00	4.65	48.58	3.08	1.15	2010
0.83	-	4.39	0.06	0.00	4.08	48.68	2.40	1.25	2011

(4) Includes Orimulsion from 1989. Imports / deliveries of Orimulsion ceased in February 1997.

(5) Includes aviation spirit, naphtha (LDF) for gasworks and wide cut gasoline.

(6) Use of gas oil & fuel oil by iron & steel industry in blast furnaces. Data from 1999 provided by the Iron & Steel Statistics Bureau and include estimates of fuel used to generate heat that is sold to third parties.

(7) Mainly agriculture, public administration, commerce and other services.

Chapter 4: Long term trends

Gas

Natural gas and colliery methane production and consumption (Table 4.1.1)

4.1.1 Table 4.1.1 shows data for production, imports, exports, and the consumption of natural gas and colliery methane by major sector in each year from 1970 to 2011. Separate figures are shown for consumption of town gas and methane.

4.1.2 Total consumption in Table 4.1.1 is defined to match the definition of gas consumption used in the gas tables before the 1999 Digest. This enables a consistent long term series to be presented. In 2011, total consumption of natural gas and colliery methane in this table is related to total UK consumption of natural gas in Table 4.3 of Chapter 4 of the main Digest as follows:

Total consumption (Table 4.1.1)	GWh 891,874
<i>less</i> Colliery methane	<u>- 669</u>
<i>equals</i>	
Total consumption of natural gas	891,205
<i>less</i> Producers' own use	- 53,163
<i>less</i> Operators' own use	<u>- 1,791</u>
<i>equals</i>	
Total UK consumption (Table 4.3)	836,252

Paragraph 4.10 of Chapter 4 of the main Digest shows how natural gas consumption in Table 4.3 relates to total demand in the balances Tables 4.1 and 4.2.

4.1.3 Chart 4.1.1 illustrates the data in Table 4.1.1. It shows how the supply of natural gas became established during the first part of the 1970s. Thereafter, the supply of natural gas continued to grow less rapidly, with indigenous production bolstered from 1977 by increasing imports from the Norwegian sector of the North Sea. By 1998 imports had fallen to only 7 per cent of their peak in the mid-1980s. This was not only due to the depletion of the (mainly Norwegian) Frigg field (which ceased production in October 2004), but also resulted from the resurgence of UK production, which achieved a new record each year from 1989 to 2000. Since 2000, UK production has fallen by almost 50 per cent, as UK reserves deplete. In 2011 production was almost 21 per cent lower than in 2010. This was the largest fall in production since production peaked in 2000 and reflected a number of unexpected problems on the UK Continental Shelf (UKCS). As a result, imports exceeded production for the first time since large scale gas extraction began.

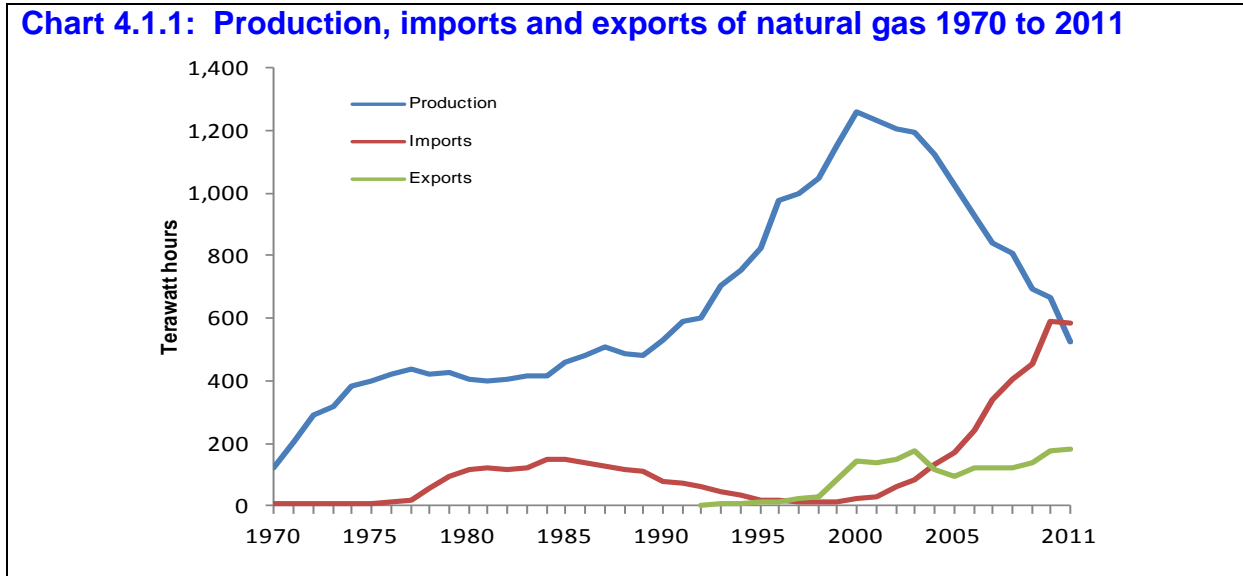
4.1.4 The first exports of natural gas were seen in 1992 from the United Kingdom's share of the Markham gas field to the Netherlands. In 1995, these were supplemented by the first exports to the Republic of Ireland, followed by the start of gas exports from the Windermere field via the Markham field during 1997, and exports via the UK-Belgium interconnector during 1998. By 2000, exports were almost six times the volume of imports. The total volumes of gas traded in 2011 was at its highest ever level. This was a small increase on 2010 record high figure, and some five times larger than 2000.

4.1.5 In October 2001, new gas supplies began to arrive from the Norwegian sector of the North Sea via the newly commissioned Vesterled pipeline. In December 2003 imports re-commenced from the UK/Norway trans-median line Staffjord field. These additional supplies of gas from the Norwegian sector of the North Sea saw the UK become a net importer of gas in 2004 for the first time since 1996. In 2005, imports of liquefied natural gas (LNG) via the Isle of Grain import/storage facility began increasing UK net imports. In October 2006, the first gas flowed through the Langeled pipeline giving the UK additional access to Norwegian gas fields. Also in October 2006, the compressors at Zeebrugge were upgraded increasing the import capacity through UK-Belgium interconnector. In December 2006, a second interconnector from Balgzand in the Netherlands to Bacton gave the UK access to the Dutch Continental Shelf. In 2007 three new fields, Chiswick, Grove and Minke, joined

Markham and Windermere in exporting gas directly to the Netherlands. 2007 also saw gas exports to Norway, ie UK gas from the Blane field to the Norwegian Ula field for injection into the Ula reservoir. In 2008 additional direct exports of gas to the Netherlands began from the new Stamford field.

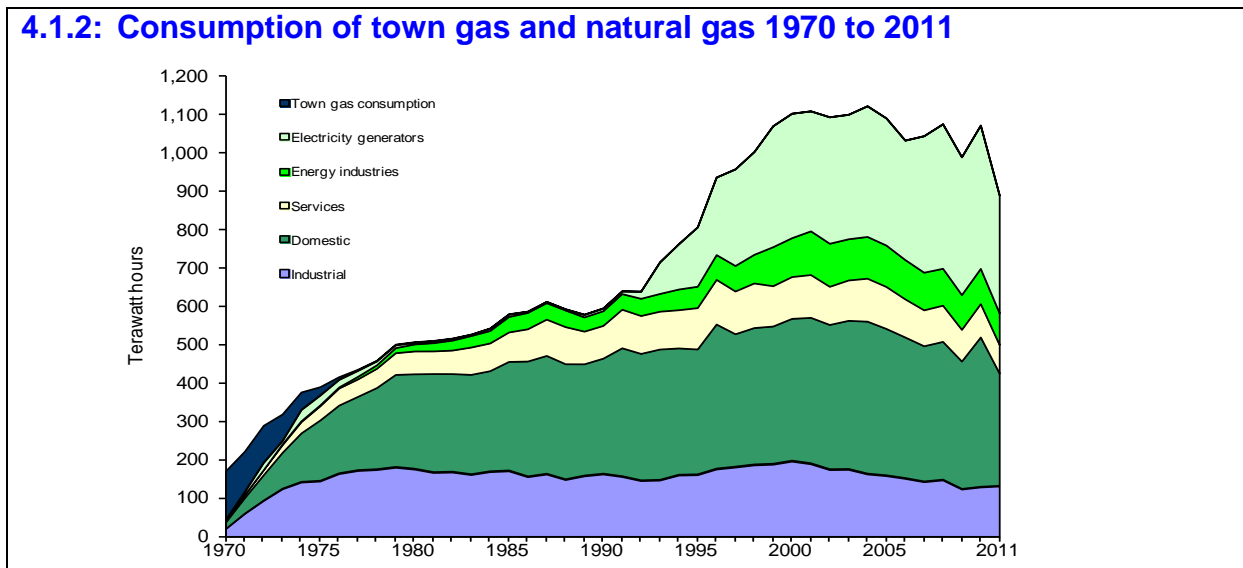
4.1.6 In 2009 two new LNG import facilities became operational. As a result, LNG’s share of total gas imports rose from 25 per cent in 2009 to 35 per cent in 2010, and to 47 per cent in 2011.

Chart 4.1.1: Production, imports and exports of natural gas 1970 to 2011



4.1.7 Chart 4.1.2 shows where natural gas has been consumed. The bulk of the rapid growth in consumption in the 1970s was in the domestic and industrial sectors. In the 1980s and early 1990s, there was a fall in industrial use. However, gas consumption by industry was on an upward trend from 1992 to 2000, when it exceeded the previous peak of 1985 by 14 per cent. Since then, industrial use of gas has fallen back, and in 2011 was a third lower than in 2000. The biggest fall occurred between 2008 and 2009 when industrial consumption fell 16 per cent due to adverse economic conditions. Between 1980 and 2004, gas consumption by the service sector¹ increased by almost 90 per cent. Since 2004 gas consumption in this sector has decreased steadily. Domestic gas consumption was 25 per cent lower in 2011 than in 2010, as a result of the warm weather conditions in 2011 – contrasting with a colder 2010.

4.1.2: Consumption of town gas and natural gas 1970 to 2011



¹ 'Services' is defined in table 4.1.1 as including public administration, commercial activities and agriculture,

4.1.8 The largest increase in gas consumption occurred in the 1990s with the growth of gas fired generation (see Chart 4.1.2). Gas use for generation grew from 6.5 TWh in 1990 to 324.6 TWh in 2000. Since then, its level has fluctuated but has remained around a third of gas use. In 2011, gas use for electricity generation was 18 per cent lower than in 2010. However, even if consumption by electricity generators is excluded, consumption of natural gas grew by 56 per cent from 1980 to its peak in 2004. Since then, it has fallen, and in 2011 was 25 per cent below the peak.

4.1.9 A more detailed examination of historical gas statistics was published in the December 2001 issue of Energy Trends. This looked at trends since 1882 in gas production, gas consumption and fuel used in the past to manufacture gas. The updated data set on which the article is based is available on the DECC web site at:

www.decc.gov.uk/en/content/cms/statistics/energy_stats/source/gas/gas.aspx

The original article is to be found at:

<http://webarchive.nationalarchives.gov.uk/+http://www.berr.gov.uk/files/file30456.pdf> (on page 34).

4.1.10 Analysis of gas statistics from 1948 to 2008 can also be found in chapter 4 of the DUKES: 60th anniversary article, available at:

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

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4.1.1 Natural gas and colliery methane production and consumption

GWh									
	Production		Imports	Exports	Total for consumption			Domestic	
	Town gas (1)	Methane (2)	Methane (3)	Methane	Total	Town gas	Methane (2)	Town gas	Methane
1970	49,617	121,712	9,759	-	171,564	125,933	45,631	85,430	18,376
1971	24,882	201,721	9,730	-	222,616	104,245	118,371	73,502	41,675
1972	17,848	291,078	8,968	-	290,287	95,834	194,453	64,974	67,172
1973	21,336	317,132	8,587	-	319,917	68,286	251,631	46,598	94,515
1974	12,221	382,253	7,122	-	377,388	44,840	332,548	30,450	127,339
1975	5,393	397,932	9,818	-	391,250	20,984	370,237	14,507	158,141
1976	1,700	421,700	11,254	-	417,655	6,272	411,120	4,250	177,279
1977	762	440,544	19,548	-	436,793	2,051	434,742	1,290	191,844
1978	615	422,257	55,361	-	460,297	938	459,359	557	212,242
1979	674	425,832	95,424	-	502,382	1,055	501,327	586	240,465
1980	586	404,760	116,291	-	508,684	909	507,775	557	246,766
1981	557	401,742	124,262	-	512,112	791	511,321	469	256,379
1982	557	405,815	115,001	-	518,149	674	517,475	410	255,118
1983	586	416,454	124,497	-	528,642	528	528,114	322	259,661
1984	557	414,314	147,415	-	544,584	498	544,086	293	261,507
1985	498	461,851	147,122	-	581,717	469	581,248	293	283,517
1986	440	483,040	137,099	-	588,691	410	588,281	234	299,929
1987 (4)	322	508,126	128,893	-	614,247	322	613,925	147	307,578
1988	88	489,133	115,441	-	594,766	88	594,678	29	300,515
1989	-	478,931	113,770	-	580,522	-	580,522	-	290,557
1990	-	528,843	79,833	-	597,046	-	597,046	-	300,410
1991	-	588,822	72,007	-	641,763	-	641,763	-	333,963
1992	-	598,761	61,255	620	640,818	-	640,818	-	330,101
1993	-	703,971	48,528	6,824	717,357	-	717,357	-	340,162
1994	-	751,588	33,053	9,557	764,667	-	764,667	-	329,710
1995	-	823,336	19,457	11,232	808,786	-	808,786	-	326,010
1996	-	979,019	19,804	15,203	938,848	-	938,848	-	375,841
1997	-	998,871	14,062	21,666	960,243	-	960,243	-	345,532
1998	-	1,048,859	10,582	31,604	1,005,306	-	1,005,306	-	355,895
1999	-	1,152,635	12,862	84,433	1,072,963	-	1,072,963	-	358,066
2000	-	1,260,656	26,032	146,342	1,105,537	-	1,105,537	-	369,909
2001	-	1,231,263	30,464	138,330	1,111,729	-	1,111,729	-	379,426
2002	-	1,205,405	60,493	150,731	1,096,267	-	1,096,267	-	376,372
2003	-	1,197,846	86,298	177,039	1,102,774	-	1,102,774	-	386,486
2004	-	1,121,257	133,033	114,112	1,124,996	-	1,124,996	-	396,411
2005	-	1,025,989	173,328	96,181	1,093,331	-	1,093,331	-	381,879
2006	-	930,538	244,029	120,591	1,035,325	-	1,035,325	-	366,928
2007	-	838,809	338,026	123,158	1,046,817	-	1,046,817	-	352,868
2008	-	810,385	407,054	122,670	1,077,977	-	1,077,977	-	359,554
2009	-	694,740	455,789	137,100	991,769	-	991,769	-	332,499
2010	-	665,083	589,497	176,399	1,074,523	-	1,074,523	-	389,595
2011	-	526,699	584,414	183,689	891,874	-	891,874	-	292,971

(1) In most years production of town gas is less than consumption because of transfers into town gas of North Sea and imported methane.

(2) Includes colliery methane.

(3) Before 1977 imports were of liquefied natural gas. These imports continued until the early 1980s.

(4) From 1987 data for industrial use of gas exclude gas used for electricity generation within industry (see Chapter 1, paragraph 1.27).

4.1.1 Natural gas and colliery methane production and consumption (continued)

							GWh
Analysis of consumption							
Industrial (5)		Electricity generators	Other energy industries (6)		Services (7)		
Town gas	Methane (2)	Methane (2)	Town gas (8)	Methane (2)	Town gas	Methane	
20,691	20,808	1,858	-	1,160	19,812	3,428	1970
12,075	60,431	7,808	-	926	18,669	7,531	1971
13,423	94,662	18,563	-	633	17,438	13,423	1972
9,173	125,552	8,453	-	2,743	12,514	20,369	1973
5,744	143,341	28,967	-	3,094	8,646	29,806	1974
2,579	146,067	25,245	-	3,241	3,898	37,542	1975
791	165,644	19,501	-	3,563	1,231	45,132	1976
352	173,820	15,310	-	7,637	410	46,131	1977
176	176,253	10,006	-	9,952	205	50,906	1978
205	182,232	7,104	-	14,143	264	57,382	1979
147	177,513	4,027	-	19,096	205	60,373	1980
147	168,574	4,174	-	22,320	176	59,874	1981
88	169,717	3,793	-	26,657	176	62,190	1982
59	163,123	2,357	-	30,819	147	72,154	1983
59	170,831	5,317	-	33,193	147	73,238	1984
29	172,941	5,873	-	41,135	147	77,781	1985
29	157,496	2,269	-	43,421	147	85,166	1986
29	164,442	2,415	-	43,743	147	95,746	1987 (4)
-	149,935	2,407	-	44,109	59	97,712	1988
-	159,701	6,210	-	37,850	-	86,204	1989
-	164,595	6,513	-	39,159	-	86,369	1990
-	157,932	6,650	-	41,472	-	101,746	1991
-	147,218	17,969	-	45,660	-	99,871	1992
-	148,522	81,848	-	47,006	-	99,819	1993
-	161,815	117,606	-	54,700	-	100,836	1994
-	162,797	154,393	-	56,565	-	109,020	1995
-	177,794	201,969	-	65,336	-	117,908	1996
-	182,867	251,822	-	67,245	-	112,777	1997
-	188,595	267,733	-	75,459	-	117,624	1998
-	190,415	315,493	-	102,502	-	106,487	1999
-	198,506	324,563	-	102,103	-	110,456	2000
-	191,600	312,939	-	114,653	-	113,111	2001
-	176,168	329,847	-	113,047	-	100,833	2002
-	176,778	324,580	-	108,197	-	106,733	2003
-	164,702	340,824	-	109,584	-	113,475	2004
-	160,295	331,658	-	108,709	-	110,791	2005
-	153,065	311,408	-	103,270	-	100,654	2006
-	144,298	355,878	-	98,946	-	94,827	2007
-	148,989	376,810	-	96,988	-	95,636	2008
-	124,860	359,303	-	91,372	-	83,735	2009
-	130,451	373,586	-	92,627	-	88,264	2010
-	132,960	307,265	-	83,246	-	75,433	2011

(5) Industrial consumption in Chapter 4, Tables 4.1 and 4.2 plus use in coke manufacture and blast furnaces and non energy gas use.

(6) Energy industry use in Chapter 4, Tables 4.1 and 4.2 less use in coke manufacture and blast furnaces plus gas transferred to heat for sale.

(7) Public administration, commercial, agriculture and miscellaneous in Chapter 4, Tables 4.1 and 4.2.

(8) Town gas consumption by the energy industries is included with the industrial sector.

Chapter 5: Long term trends

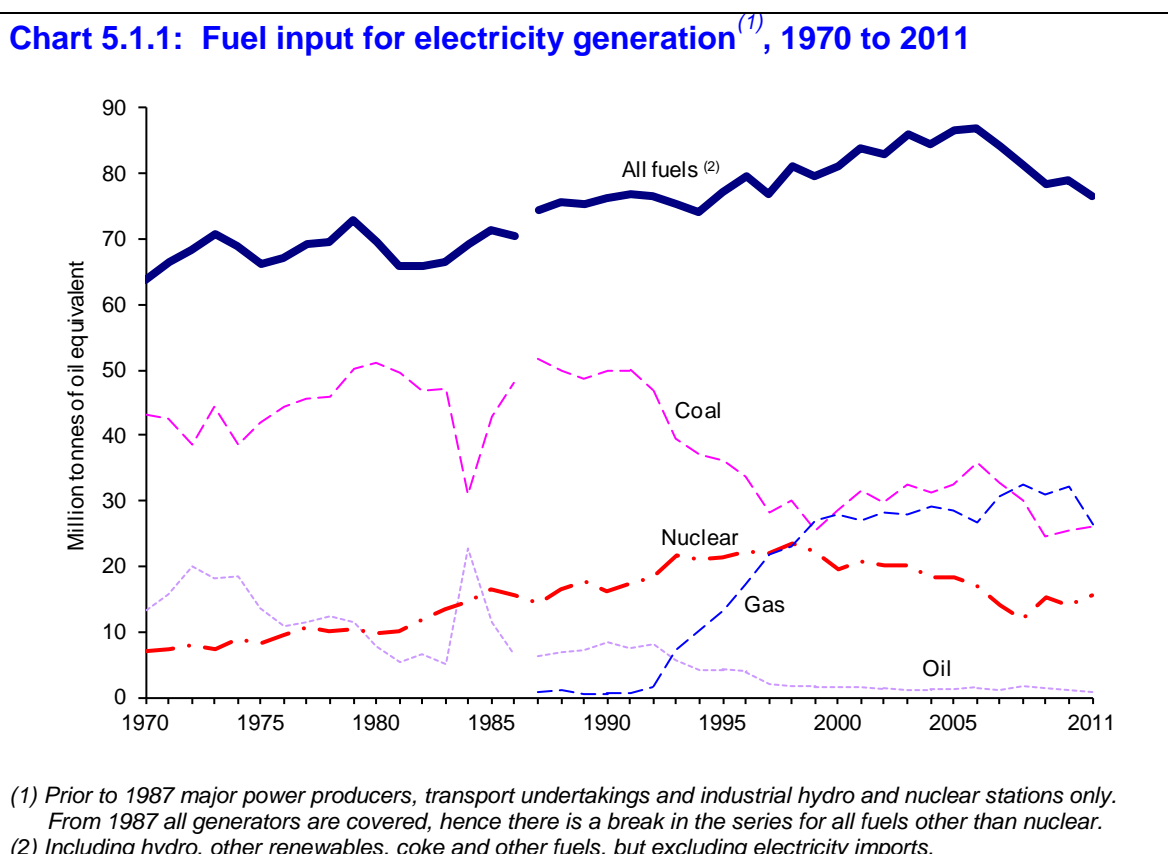
Electricity

Fuel input for electricity generation (Table 5.1.1)

5.1.1 This table extends the series shown in Table 5.4 of Chapter 5 of the main Digest back to 1970. For the period up to 1987, only fuel inputs for electricity generation at stations owned by the major power producers, transport undertakings, and industrial hydro-electric and nuclear power stations are given; data for conventional thermal electricity generated by industrial producers are not available for this period. From 1987 onwards the table covers **all** generating companies.

5.1.2 The unit of measurement used in this table is the tonne of oil equivalent. An outline of the method used for converting both fossil and non-fossil fuel energy sources to this unit is given in paragraph 5.74 of Chapter 5 of the main Digest.

5.1.3 Trends in fuel input for electricity generation are shown in Chart 5.1.1 and trends in percentage shares in Chart 5.1.2.



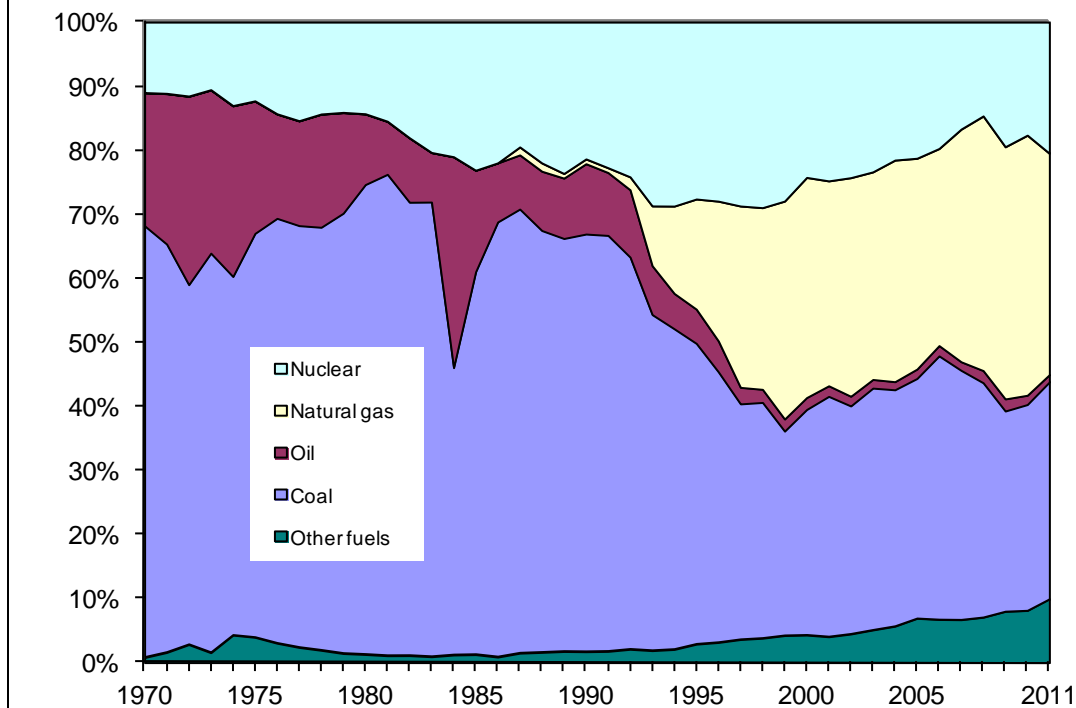
5.1.4 In 1970, coal provided over two thirds of the fuel input for electricity generation, with oil making up two thirds of the rest. Oil use reached a peak in 1972 when it accounted for 29 per cent of fuel input, but after the oil supply crisis in the following year, its use declined, apart from a temporary increase, to 33 per cent of fuel input, during the 1984/85 coal miners' dispute. Oil fell from 11 per cent of fuel input in 1990 to a record low of 1.3 per cent in 2004. However, between 2004 and 2009, with the exception of 2007, oil's share increased to between 1.5 and 1.9 per cent, due to several stations co-firing petroleum coke with coal. Since then, petroleum coke use has declined, with oil's share falling to a new low of 1.2 per cent in 2011.

5.1.5 Nuclear generation grew steadily from 11 per cent in 1970 until 1998 when it reached a peak when its oil equivalent input amounted to 29 per cent of total fuel input. In subsequent years, higher levels of outages for maintenance, repair and safety case work reduced this proportion, as did the closure of some older stations. After stabilizing at around 24 per cent in 2000 to 2003, nuclear declined to 14 per cent in 2008, with maintenance outages again impacting significantly, but increased back to 19 per cent in 2009 as stations returned to operation. In 2010, however, extensive maintenance outages again reduced the share,

to 18 per cent, before increased availability in 2011 resulted in an increase to 20 per cent, its highest share of the fuel input since 2005.

5.1.6 Between 1975 and 1990, a European Community directive limited the use of natural gas in public supply power stations. After 1991, the role of gas in electricity generation grew rapidly, its share rising from 2 per cent in 1992 to 17 per cent in 1995, and 28 per cent in 1998, before exceeding coal and nuclear in 1999, at 34 per cent.

Chart 5.1.2 Percentage shares of fuel input for electricity generation, 1970 to 2011



5.1.7 Between 2000 and 2005, gas's share remained between 32 and 35 per cent, but in 2006 high gas prices paid by generators reduced the share to 31 per cent, the lowest level since 1998. Since 2006, gas's share has generally increased, and in 2010 hit a record high share of fuel use of 41 per cent. In 2011, with high prices and increased nuclear availability, the share fell back again to 35 per cent.

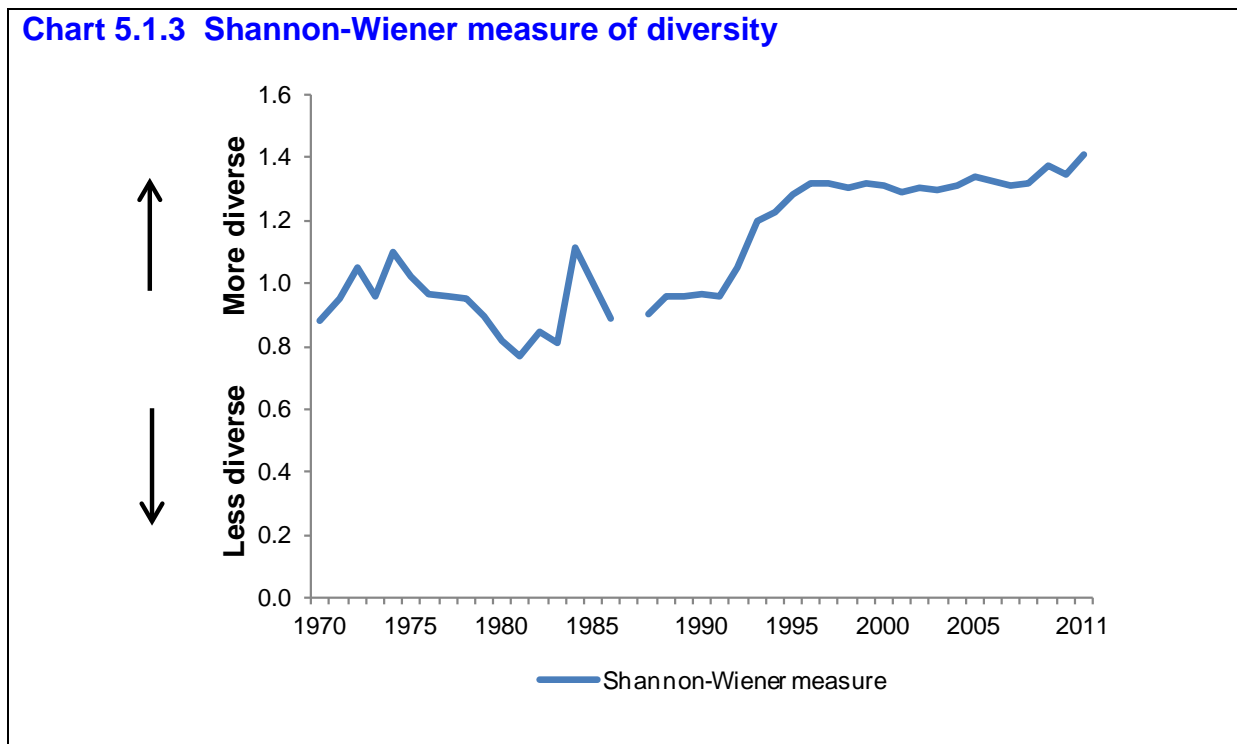
5.1.8 Throughout the 1970s, 1980s and early 1990s, coal provided the largest input to generation, but by 1999 its share had fallen to 32 per cent, having been 50 per cent as recently as 5 years earlier, and 65 per cent 10 years earlier. Since 2000, coal has been called upon to make up for unavailable nuclear and gas fired stations and then as a substitute for high priced gas, so its share recovered to 38 per cent of fuel input in 2001, remaining at between 36 and 38 per cent for the next four years. Coal's share rose further in 2006 to 41 per cent as gas prices rose significantly higher, before falling back over the next three years to stand at 31 per cent in 2009. In 2010, maintenance outages at nuclear stations, as well as high final quarter electricity demand, led to a rise in coal's share, to 32 per cent. In 2011, with high gas prices making coal generation more favourable, the share rose again to 34 per cent.

5.1.9 Since the early 1990s, the share of other fuels in the overall fuel input for generation has gradually increased, from 1.7 per cent in 1990 to 9.2 per cent in 2011. This is largely as a result of an increasing use of renewables, particularly thermal sources such as landfill gas, co-firing with fossil fuels and waste combustion. Almost half of the growth since 2000, however, has been due to a substantial increase in generation from wind.¹ Further information on the increase in the use of renewables since 1990 can be found in Chapter 6 of the Digest's Long Term Trends section.

¹ The impact from increased generation from wind is lessened, compared with thermal fuels, which, due to conversion losses, use more fuel per unit of generation (for primary sources, such as wind and hydro, the amount of fuel used is assumed to be the same as the amount of generation).

5.1.10 The changes in fuel shares are represented in the Shannon-Wiener measure of diversity (see chart 5.1.3). The diversity index is affected by the number of fuels used in the mix and the evenness of their distribution, so at the beginning of the 1990's fuel diversity was low as the generation mix was dominated by two fuels (coal and nuclear). The increase in use of gas during the 1990's meant that by the late 1990's coal, gas and nuclear had a roughly equal share in the generation mix which is reflected in the higher diversity index. The measure remained around the 1.3 value for most of the 2000s as the three main fuels continued to dominate. However, despite fluctuations, the measure of diversity over the last three years has been on an upward trend, reaching 1.4 in 2011, as wind and other renewables' shares of fuel use have begun to increase, at the expense of the combined three major fuels. If all fuels currently used for electricity generation had an even contribution to the mix the diversity index would be 1.9.

Chart 5.1.3 Shannon-Wiener measure of diversity



Electricity supply, availability and consumption (Table 5.1.2)

5.1.11 Figures for the supply, availability and consumption of electricity are given in Table 5.1.2. This table retains the nomenclature of electricity chapters in the 1999 and earlier Digests, whereas the balance methodology has introduced a new nomenclature (see Chapter 5 of the main Digest, paragraph 5.33 and Table 5.5). The series in Table 5.1.2 are extended back to 1970.

5.1.12 For the period up to 1986, the data for electricity supplied covered major power producers, transport undertakings and industrial hydro and nuclear stations only. Purchases from other electricity producers are also included, along with net imports, to give electricity available. Losses are deducted from electricity available to give consumption, which is shown by type of consumer. Availability and consumption before 1986 exclude electricity consumed or sold by other generators without passing through the public distribution system.

5.1.13 The table shows that virtually all electricity available came from home supply until 1986 when the interconnector between France and England commenced operations. At their peak in 1994, net imports from France contributed over 5 per cent of total electricity available in the UK. Net imports remained at this high level (supplemented with net imports into Northern Ireland from the Irish Republic over the interconnector reinstated in 1996) until 1997 but then declined. By 2002 the proportion of electricity available had fallen to 2 per cent mainly because, under NETA, electricity prices fell, removing the cost advantages previously enjoyed by French electricity. In 2003, exports of electricity to continental Europe, fostered by higher electricity prices there, became a more prominent feature, reducing net imports to only 0.6 per cent of electricity available. Between 2004 and 2006, the share of net imports returned to 2 per cent, but in 2007 fell back to 1.4 per cent with higher exports to continental Europe. After doubling in 2008, to stand at 2.9 per cent of electricity available, net imports fell to less than one per cent 2009 and 2010, with imports in 2010 falling to almost half of 2008's level and exports more than trebling. In 2011, a new interconnector was opened, linking England with the Netherlands. As with the France interconnector, in 2011, the Netherlands

was mainly used for imports, with total imports to the UK increasing by 20 per cent on 2010's levels, and exports almost halving. This resulted in net imports increasing once more, to 1.8 per cent of electricity available, with imports.

5.1.14 Consumption of electricity by industry accounted for around a third of total consumption in 1975 and the current proportion is still around a third, despite the growth of the service sector in the economy. There was a 55 per cent increase in electricity consumption by industry in the 30 years to 2005. In each of 2006 and 2007, industrial electricity consumption fell by between one and two per cent, before a small increase of around 1 per cent in 2008. The economic slowdown in 2009 resulted in a 13 per cent fall, to 100.3 TWh, the lowest level since 1994, and 14 per cent below 2005's record high level. Consumption increased by 4.6 per cent in 2010, as the sector recovered, but fell again in 2011, to 102.8 TWh, still 10 per cent below 2008's level.

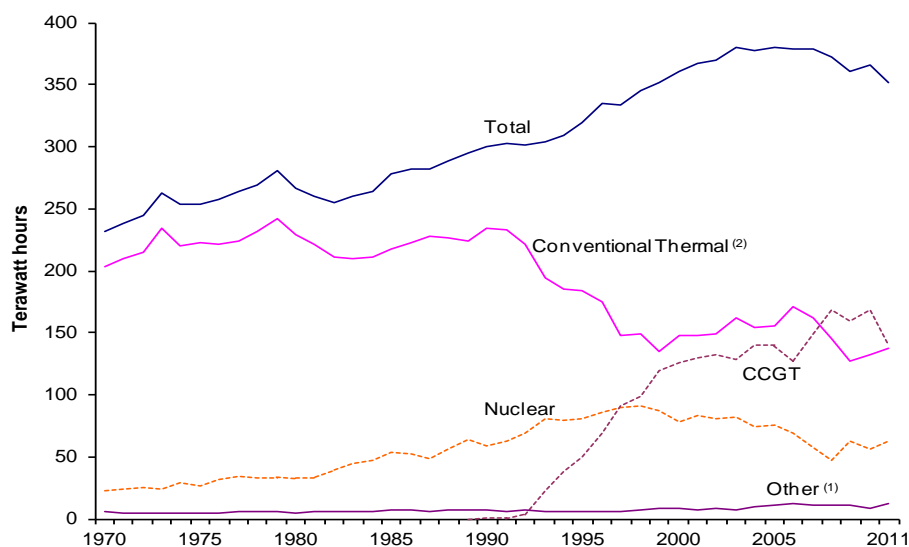
5.1.15 The domestic sector's share of total consumption was around 40 per cent during the 1970's, before declining to just over one third in the 1980's. Domestic's share remained around one third, increasing slightly over the early 2000s (at the expense of industrial consumption) to reach an 18 year high share in 2004 of 36 per cent. Since then, it has remained around 34 to 35 per cent, with the exception of an increase in 2009 to 36 per cent, as industrial consumption was hit by the recession. In 2011, despite falling to its lowest level in 12 years, the volume of electricity consumed in the domestic sector has increased by 30 per cent since 1980. The biggest growth in consumption has been in the services sector which, in 2011, was 78 per cent higher than in 1980. Services' share of consumption rose from 25 per cent in 1980 to 31 per cent in 1998, and has remained around 30 to 31 per cent since, with 2011 showing a new high share of 32 per cent.

Electricity generated and supplied (Table 5.1.3)

5.1.16 Figures for the generation and supply of electricity are given in Table 5.1.3. This table retains the nomenclature of electricity chapters in the 1999 Digest and earlier, whereas the balance methodology has introduced a new nomenclature (see Chapter 5 of the main Digest, paragraph 5.33 and Table 5.5). Data are given for major power producers, for other generators and for all generators in total, with separate series for the different types of power station.

5.1.17 Over the whole period 1970 to 2011, total gross electricity supplied by all generating companies has increased at an average annual rate of 1.0 per cent. However, within these 42 years, there was growth at 2.3 per cent a year in the early 1970s, 2.0 per cent a year in the late 1970s, a decline of 0.9 per cent a year on average during the early 1980s, 1.4 per cent growth in the late 1980s, and 1.8 per cent growth in the 1990s. Between 2000 and 2005, growth slowed to 1.1 per cent a year, before falling to a decline of 1.4 per cent between 2005 and 2009. As demand from an improving economy increased in 2010, electricity supplied increased by 1.5 per cent, before falling by 3.9 per cent in 2011.

Chart 5.1.4: Gross electricity supplied by all generating companies by type of plant, 1970 to 2011



(1) Other is hydro, wind and other non-thermal renewable sources

(2) Includes electricity supplied by gas turbines, oil engines and thermal renewable sources.

5.1.18 In the period between 1970 and 1994 electricity output by generators other than the major producers fluctuated between 11,000 and 18,000 GWh, but moved up to over 20,000 GWh in 1995. Subsequently, it increased every year to reach almost 34,000 GWh in 2000, mainly as a result of the greater capacity of combined heat and power (CHP) schemes now in use (see main Digest, Chapter 7). However, in 2001 electricity supplied by other generators fell back to 30,400 GWh, mainly because high gas prices discouraged generation, but since then it increased in most years to 34,600 GWh in 2006, aided by growth in generation from renewables. The contribution of other generators to total supply was under 7 per cent in 1970 and fell to just over 5 per cent in 1990, but then increased again to reach 9.4 per cent in 2000. In 2001, it fell back to 8.3 per cent, before increasing again and reaching just over 9 per cent in 2006. From 2007, major wind farm companies are included under Major Power Producers, so these are no longer included under 'other generators' (see paragraph 5.67 in the main Digest). Despite this, other generators' share has remained at around the 9 per cent mark. In 2011, other generators' supplied 33,517 GWh, around one per cent less than in 2007 (on account of less generation from CHP and non-renewable schemes), but, with 7.3 per cent less total supply, this represented a record 9.5 per cent share.

5.1.19 Trends in electricity supplied by all generators by type of plant are illustrated in Chart 5.1.4. In 1970, conventional thermal power stations produced 88 per cent of the gross electricity supplied. Output from these stations reached a peak in 1990 before falling back because of the development of new generating technologies. Firstly there was the development of nuclear generation, which supplied only 10 per cent of total gross electricity supplied by United Kingdom generators in 1970 but by 1997 accounted for 27 per cent. Subsequently, nuclear's share has been on a downward trend and its 13 per cent share in 2008 was the lowest since 1981. However, nuclear's share grew again in 2009 to 17 per cent as stations returned from outages for repairs and maintenance, before falling to 15 per cent in 2010, again due to maintenance outages. In 2011, the share increased to 18 per cent, a five year high, as availability once again improved. Secondly there was the growth of combined cycle gas turbine stations (CCGTs), which overtook nuclear in 1997 and in 2002, supplied 36 per cent, falling back in 2003 and 2006 because of high gas prices, but climbing to a record 39 per cent share in 2007, and then to 46 per cent in 2010. In 2011, with high gas prices and increased nuclear availability, the share fell to a four year low of 40 per cent. In recent years, there has been high growth in the share of non-thermal renewables (including hydro and wind). Between 1970 and 2005, non-thermal renewables' share of electricity supplied was between one and two per cent each year. However, since then, driven by a large expansion in wind generation capacity, this has increased each year (except for 2010, due to especially low rainfall reducing hydro output), to stand at 6.1 per cent of electricity supplied in 2011.²

5.1.20 A more detailed examination of historical electricity statistics was published in the September 2002 issue of Energy Trends. This looked at trends in the generation, supply and consumption of electricity over the last 80 years. The updated data set on which the article is based is available on the DECC energy statistics website at:

www.decc.gov.uk/en/content/cms/statistics/energy_stats/source/electricity/electricity.aspx

The original article is to be found at:

<http://webarchive.nationalarchives.gov.uk/+http://www.berr.gov.uk/files/file11864.pdf> (on page 20).

5.1.21 Analysis of electricity statistics from 1948 to 2008 can also be found in chapter 5 of the DUKES: 60th anniversary article, available at:

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

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0300 068 5042

² Thermal renewables, such as biomass, landfill gas, sewage gas, wastes and co-firing with fossil fuels, is included in conventional thermal.

5.1.1 Fuel input for electricity generation

Million tonnes of oil equivalent

	Total all fuels	Coal	Oil (1)	Natural gas (2)	Electricity			Coke and breeze	Other fuels (4)	Shannon-Weiner measure of diversity
					Nuclear	Natural flow hydro (3)	Wind (3)			
1970	63.84	43.07	13.27	0.11	7.00	0.39	-	-	-	0.88
1971	66.46	42.42	15.63	0.64	7.37	0.29	-	0.11	-	0.95
1972	68.37	38.47	20.13	1.61	7.87	0.29	-	-	-	1.05
1973	70.93	44.30	18.09	0.64	7.46	0.33	-	0.11	-	0.96
1974	69.01	38.71	18.41	2.46	8.97	0.35	-	0.11	-	1.10
1975	66.25	41.85	13.70	2.14	8.12	0.33	-	0.11	-	1.02
1976	66.97	44.49	10.92	1.61	9.56	0.39	-	-	-	0.96
1977	69.32	45.71	11.35	1.28	10.64	0.34	-	-	-	0.96
1978	69.64	46.05	12.31	0.86	9.96	0.35	-	0.11	-	0.95
1979	72.80	50.10	11.45	0.54	10.23	0.37	-	0.11	-	0.90
1980	69.46	51.01	7.67	0.42	9.91	0.34	-	0.11	-	0.81
1981	65.98	49.64	5.46	0.21	10.18	0.38	-	0.11	-	0.77
1982	65.98	46.75	6.64	0.21	11.88	0.39	-	0.11	-	0.84
1983	66.37	47.16	5.14	0.21	13.47	0.39	-	-	-	0.81
1984	69.18	31.07	22.80	0.42	14.50	0.39	-	-	-	1.11
1985	71.54	42.81	11.35	0.54	16.50	0.34	-	-	-	1.00
1986	70.46	47.91	6.51	0.18	15.44	0.41	-	-	-	0.89
1987 (5)	70.50	50.37	5.14	0.19	14.44	0.36	-	-	-	0.80
1987 (5)	74.31	51.58	6.30	0.91	14.44	0.36	-	-	0.72	0.91
1988	75.57	49.83	7.01	0.97	16.57	0.42	-	-	0.77	0.96
1989	75.27	48.59	7.11	0.54	17.74	0.41	-	-	0.88	0.96
1990	76.34	49.84	8.40	0.56	16.26	0.44	-	-	0.84	0.97
1991	76.87	49.98	7.56	0.57	17.43	0.39	-	-	0.94	0.96
1992	76.57	46.94	8.07	1.54	18.45	0.46	-	-	1.09	1.05
1993	75.40	39.61	5.78	7.04	21.58	0.37	-	-	1.02	1.20
1994	74.01	37.10	4.11	10.10	21.20	0.44	-	-	1.06	1.23
1995	77.15	36.29	4.15	13.27	21.25	0.40	-	-	1.79	1.28
1996	79.56	33.67	3.87	17.37	22.18	0.29	0.04	-	2.14	1.32
1997	76.76	28.30	2.01	21.74	21.98	0.38	0.06	-	2.29	1.32
1998	81.14	29.94	1.69	23.02	23.44	0.44	0.08	-	2.52	1.31
1999	79.72	25.51	1.54	27.13	22.22	0.46	0.07	-	2.79	1.32
2000	81.21	28.67	1.55	27.91	19.64	0.44	0.08	-	2.93	1.31
2001	84.01	31.61	1.42	26.87	20.77	0.35	0.08	-	2.91	1.29
2002	83.00	29.63	1.29	28.33	20.10	0.41	0.11	-	3.13	1.30
2003	85.95	32.54	1.19	27.85	20.04	0.28	0.11	-	3.93	1.30
2004	84.57	31.31	1.10	29.25	18.16	0.42	0.17	-	4.15	1.31
2005	86.68	32.58	1.31	28.52	18.37	0.42	0.25	-	5.23	1.34
2006	87.06	35.94	1.43	26.78	17.13	0.39	0.36	-	5.02	1.33
2007	84.28	32.92	1.16	30.60	14.04	0.44	0.46	-	4.67	1.31
2008	81.54	29.96	1.58	32.40	11.91	0.44	0.61	-	4.64	1.32
2009	78.49	24.66	1.51	30.89	15.23	0.45	0.80	-	4.94	1.38
2010	79.14	25.56	1.18	32.12	13.93	0.31	0.88	-	5.16	1.35
2011	76.50	26.03	0.90	26.42	15.63	0.49	1.35	-	5.67	1.41

(1) Includes oil used in gas turbine and diesel plant or for lighting up coal fired boilers, Orimulsion (until 1997), and refinery gas (from 1987).

(2) Includes colliery methane from 1987 onwards.

(3) Fuel inputs have been calculated on an energy supplied basis - see explanatory notes at Chapter 5, paragraph 5.74.

(4) Main fuels included are coke oven gas, blast furnace gas, waste products from chemical processes, refuse derived fuels and other renewable sources.

(5) Data for all generating companies are only available from 1987 onwards, and the figures for 1987 to 1989 include a high degree of estimation. Before 1987 the data are for major power producers, transport undertakings and industrial hydro and nuclear stations only.

5.1.2 Electricity supply, availability and consumption

	TWh										
	Electricity supplied (net)	Purchases from other producers	Net imports (1)	Electricity available	Losses in transmission etc (2)	Electricity consumption					
						Total	Fuel industries	Final users (5)			Total
								Industrial	Domestic	Other (3)	
1970	215.76	0.19	0.55	216.50	17.50	199.00	6.59	72.99	77.04	42.38	192.41
1971	222.92	0.53	0.12	223.57	19.01	204.56	6.60	73.43	80.67	43.86	197.96
1972	229.45	0.53	0.48	230.46	18.91	211.55	6.37	73.16	86.89	45.13	205.18
1973	245.42	0.59	0.06	246.07	19.59	226.48	6.67	80.07	91.30	48.44	219.81
1974	237.21	0.60	0.05	237.86	18.22	219.64	6.12	75.81	92.63	45.08	213.52
1975	237.76	0.70	0.08	238.54	19.47	219.07	6.29	75.36	89.21	48.21	212.78
1976	240.22	0.61	-0.10	240.73	18.73	222.00	6.39	80.84	85.12	49.65	215.61
1977	246.82	0.74	-	247.56	20.76	226.80	6.41	82.06	85.90	52.43	220.39
1978	252.65	0.66	-0.08	253.23	21.81	231.42	6.52	84.00	85.80	55.10	224.90
1979	264.34	0.63	-	264.97	22.97	242.00	6.78	87.55	89.67	58.00	235.22
1980	252.02	0.61	-	252.63	21.53	231.11	6.86	79.73	86.11	58.41	224.25
1981	246.60	0.74	-	247.34	20.13	227.21	6.86	77.03	84.44	58.88	220.35
1982	242.48	0.82	-	243.30	20.48	222.82	6.81	73.91	82.79	59.31	216.01
1983	246.15	1.15	-	247.30	21.21	226.09	6.69	74.17	82.95	62.28	219.40
1984	251.47	0.55	-	252.02	21.06	230.96	6.64	78.64	83.90	61.78	224.32
1985	263.56	0.92	-	264.48	22.63	241.85	7.76	79.53	88.23	66.33	234.09
1986(4)	266.81	1.10	4.26	272.17	22.83	249.34	7.68	80.15	91.83	69.68	241.66
1986(4)	278.48	-	4.26	282.73	22.91	259.82	9.51	88.80	91.83	69.68	250.31
1987	279.71	-	11.64	291.34	22.96	268.38	9.49	93.14	93.25	72.50	258.89
1988	285.71	-	12.14	297.85	23.35	274.50	9.16	97.14	92.36	75.84	265.34
1989	291.75	-	12.63	304.38	24.98	279.40	9.00	99.42	92.27	78.71	270.40
1990	297.50	-	11.91	309.41	24.99	284.42	9.99	100.64	93.79	80.00	274.43
1991	300.65	-	16.41	317.06	26.22	290.84	9.79	99.57	98.10	83.38	281.05
1992	298.55	-	16.69	315.24	23.79	291.45	9.98	95.28	99.48	86.71	281.47
1993	301.87	-	16.72	318.59	22.84	295.75	9.62	96.84	100.46	88.83	286.13
1994	306.94	-	16.89	323.83	31.00	292.83	7.52	96.12	101.41	87.78	285.31
1995	317.63	-	16.61	334.24	30.32	303.92	8.07	101.78	102.21	91.86	295.85
1996	332.36	-	16.76	349.11	29.34	319.78	9.21	107.63	107.51	95.42	310.57
1997	331.63	-	16.57	348.20	27.14	321.07	8.62	108.10	104.46	99.88	312.44
1998	342.70	-	12.47	355.17	29.82	325.35	8.41	108.44	109.41	99.09	316.94
1999	347.67	-	14.24	361.92	29.86	332.05	8.04	112.25	110.31	101.46	324.02
2000	357.27	-	14.17	371.44	31.14	340.30	9.70	115.29	111.84	103.47	330.59
2001	364.17	-	10.40	374.57	32.07	342.50	8.63	112.50	115.34	106.05	333.88
2002	366.66	-	8.41	375.07	30.96	344.11	10.06	110.82	120.01	103.22	334.05
2003	376.53	-	2.16	378.69	32.07	346.62	9.75	109.93	123.00	103.94	336.87
2004	373.40	-	7.49	380.89	33.18	347.71	8.14	112.09	124.20	103.28	339.57
2005	376.78	-	8.32	385.10	27.90	357.20	7.85	116.70	125.71	106.94	349.35
2006	373.86	-	7.52	381.38	27.52	353.86	8.00	115.53	124.70	105.63	345.87
2007	374.06	-	5.22	379.28	27.83	351.45	9.19	113.41	123.08	105.78	342.26
2008	367.27	-	11.02	378.29	28.20	350.10	7.71	114.72	119.80	107.87	342.39
2009	355.36	-	2.86	358.22	28.20	330.02	7.67	100.34	118.54	103.47	322.35
2010	361.45	-	2.66	364.12	26.66	337.46	8.25	104.94	118.82	105.44	329.20
2011	347.51	-	6.22	353.73	27.86	325.86	7.49	102.77	111.59	104.03	318.38

(1) Net transfers between the Irish Republic and Northern Ireland (ceased in 1981 and recommenced in 1996), between France and England (from 1986), and the Netherlands and England (from 2011)

(2) Losses on the public distribution system (grid system and local networks) and other differences between data collected on sales and data collected on availability.

(3) Public administration, transport, agricultural and commercial sectors.

(4) Data for all generating companies are only available from 1986 onwards. Before 1986 the data are for major power producers, transport undertakings and industrial hydro and nuclear stations only.

(5) Industry includes iron and steel consumption counted as energy industry use in the main DUKES tables

5.1.3 Electricity generated and supplied

GWh

Major power producers (1)											
Year	Electricity generated	Electricity used on works	Electricity supplied (gross) (2)							Electricity used in pumping at pumped storage stations	Electricity Supplied (net) (4)
			Total	Conventional thermal and other (3)	CCGT	Nuclear	Hydro		Wind		
							Natural flow	Pumped storage			
1970	232,378	16,429	215,949	188,175	-	22,805	3,846	1,123	-	1,487	214,462
1971	240,080	17,143	222,937	195,181	-	24,013	2,835	908	-	1,209	221,728
1972	246,843	17,439	229,404	200,048	-	25,639	2,847	870	-	1,184	228,220
1973	263,140	18,157	244,983	216,796	-	24,310	3,214	663	-	882	244,101
1974	254,688	17,763	236,925	203,478	-	29,232	3,520	695	-	896	236,029
1975	255,084	17,136	237,948	207,159	-	26,463	3,186	1,140	-	1,430	236,518
1976	258,656	17,962	240,694	205,048	-	31,153	3,128	1,365	-	1,729	238,965
1977	265,649	18,468	247,181	207,904	-	34,660	3,320	1,297	-	1,608	245,573
1978	270,677	17,907	252,770	215,761	-	32,462	3,378	1,169	-	1,429	251,341
1979	283,186	18,744	264,442	226,329	-	33,335	3,617	1,161	-	1,424	263,018
1980	269,945	17,765	252,180	215,418	-	32,291	3,298	1,173	-	1,453	250,727
1981	263,658	16,983	246,675	208,589	-	33,191	3,906	989	-	1,196	245,479
1982	259,410	16,940	242,470	198,822	-	38,721	3,873	1,054	-	1,272	241,198
1983	264,589	17,380	247,209	197,600	-	43,911	3,882	1,816	-	2,337	244,872
1984	270,471	17,643	252,828	200,240	-	47,256	3,358	1,974	-	2,613	250,215
1985	284,712	18,903	265,809	205,906	-	53,767	3,435	2,701	-	3,494	262,315
1986	287,330	18,819	268,511	210,452	-	51,843	4,087	2,129	-	2,993	265,518
1987	287,701	18,740	268,961	215,290	-	48,205	3,460	2,006	-	2,804	266,157
1988	293,100	19,341	273,759	211,932	-	55,642	4,160	2,025	-	2,888	270,871
1989	297,890	19,315	278,575	209,169	-	63,602	3,992	1,812	-	2,572	276,003
1990	302,936	18,632	284,304	219,364	-	58,664	4,384	1,892	-	2,626	281,678
1991	305,704	19,142	286,562	218,260	309	62,761	3,767	1,465	-	2,109	284,453
1992	303,715	19,157	284,558	206,245	2,964	69,135	4,579	1,635	-	2,257	282,301
1993	305,433	18,170	287,264	178,773	22,611	80,979	3,513	1,388	-	1,948	285,316
1994	307,476	16,696	290,780	168,321	36,815	79,962	4,265	1,417	-	2,051	288,729
1995	315,510	16,510	299,000	164,324	48,525	80,598	4,051	1,502	-	2,282	296,718
1996	326,235	14,967	311,268	155,574	65,604	85,820	2,763	1,507	-	2,430	308,838
1997	324,133	15,411	308,722	127,961	86,682	89,341	3,299	1,439	-	2,477	306,245
1998	333,764	16,140	317,624	128,235	93,005	90,590	4,225	1,569	-	2,594	315,030
1999	336,608	15,461	321,147	113,493	112,768	87,672	4,409	2,804	-	3,774	317,373
2000	341,783	14,952	326,831	125,468	116,110	78,334	4,316	2,603	-	3,499	323,332
2001	353,057	16,066	336,991	127,119	121,344	82,985	3,203	2,340	-	3,210	333,781
2002	353,994	15,746	338,248	128,795	121,886	81,090	3,914	2,562	-	3,463	334,785
2003	362,600	16,747	345,853	140,196	118,546	81,911	2,559	2,641	-	3,546	342,308
2004	358,313	15,582	342,732	133,607	128,983	73,682	3,901	2,559	-	3,497	339,235
2005	362,212	16,265	345,947	135,999	128,179	75,173	3,821	2,776	-	3,707	342,240
2006	361,232	17,031	344,201	151,866	115,695	69,237	3,680	3,722	-	4,918	339,283
2007	361,317	16,090	345,227	138,793	137,657	57,249	4,114	3,846	3,569	5,071	340,156
2008	355,209	14,662	340,547	121,816	157,417	47,673	4,209	4,075	5,357	5,371	335,175
2009	342,374	14,750	327,624	101,100	148,907	62,762	4,279	3,672	6,904	4,843	322,781
2010	347,649	14,403	333,246	105,148	157,818	56,442	2,748	3,139	7,950	4,212	329,034
2011	332,312	14,480	317,832	105,359	129,669	62,655	4,578	2,895	12,675	3,843	313,988

(1) From 2007, major wind farm companies are included under Major Power Producers, see paragraph 5.67 in the main Digest, previously all wind was covered under other generatots.

(2) Electricity generated less electricity used on works.

(3) Includes electricity supplied by gas turbines and oil engines. From 1988 also includes electricity produced by plants using thermal renewable sources.

5.1.3 Electricity generated and supplied

GWh

Other generators (1)				All generating companies							
Electricity supplied (gross) (2)				Electricity supplied (gross)							
Total	Conventional thermal and other (3)	CCGT	Non-thermal renewables (5)	Total	Conventional thermal and other (3)	CCGT	Nuclear	Non-thermal renewables (5)	Pumped storage	Electricity supplied (net) (4)	
15,674	14,996	-	678	231,623	203,171	-	22,805	4,524	1,123	230,136	1970
15,388	14,837	-	551	238,325	210,018	-	24,013	3,386	908	237,116	1971
15,746	15,175	-	571	245,150	215,223	-	25,639	3,418	870	243,966	1972
17,655	17,008	-	647	262,638	233,804	-	24,310	3,861	663	261,756	1973
17,222	16,660	-	562	254,147	220,138	-	29,232	4,082	695	253,251	1974
15,766	15,175	-	591	253,714	222,334	-	26,463	3,777	1,140	252,284	1975
17,013	16,414	-	599	257,707	221,462	-	31,153	3,727	1,365	255,978	1976
16,434	15,848	-	586	263,615	223,752	-	34,660	3,906	1,297	262,007	1977
16,034	15,387	-	647	268,804	231,148	-	32,462	4,025	1,169	267,375	1978
15,720	15,062	-	658	280,162	241,391	-	33,335	4,275	1,161	278,738	1979
14,132	13,509	-	623	266,312	228,927	-	32,291	3,921	1,173	264,859	1980
13,264	12,801	-	463	259,939	221,390	-	33,191	4,369	989	258,743	1981
12,613	11,943	-	670	255,083	210,765	-	38,721	4,543	1,054	253,811	1982
12,152	11,486	-	666	259,361	209,086	-	43,911	4,548	1,816	257,024	1983
11,319	10,685	-	634	264,147	210,925	-	47,256	3,992	1,974	261,534	1984
12,112	11,467	-	645	277,921	217,373	-	53,767	4,080	2,701	274,427	1985
12,957	12,278	-	679	281,468	222,730	-	51,843	4,766	2,129	278,475	1986
13,551	12,831	-	720	282,512	228,121	-	48,205	4,180	2,006	279,708	1987
14,840	14,085	-	755	288,599	226,017	-	55,642	4,915	2,025	285,711	1988
15,747	15,007	-	740	294,322	224,176	-	63,602	4,732	1,812	291,750	1989
15,824	14,729	280	815	300,128	234,093	280	58,664	5,199	1,892	297,502	1990
16,202	15,056	298	848	302,764	233,316	607	62,761	4,615	1,465	300,655	1991
16,246	14,987	394	865	300,804	221,232	3,358	69,135	5,444	1,635	298,547	1992
16,552	14,979	584	989	303,816	193,752	23,195	80,979	4,502	1,388	301,868	1993
18,207	16,356	738	1,113	308,987	184,677	37,553	79,962	5,378	1,417	306,936	1994
20,909	18,851	933	1,125	319,909	183,175	49,458	80,598	5,176	1,502	317,627	1995
23,519	19,091	3,358	1,070	334,786	174,664	68,962	85,820	3,833	1,507	332,356	1996
25,384	19,703	4,192	1,489	334,107	147,665	90,874	89,341	4,788	1,439	331,630	1997
27,669	20,766	5,157	1,746	345,293	149,001	98,162	90,590	5,971	1,569	342,699	1998
30,299	21,769	6,785	1,745	351,446	135,263	119,553	87,672	6,154	2,804	347,672	1999
33,934	21,926	10,318	1,690	360,765	147,394	126,428	78,334	6,006	2,603	357,266	2000
30,391	20,066	8,531	1,794	367,382	147,185	129,875	82,985	4,997	2,340	364,173	2001
31,873	19,716	10,049	2,108	370,120	148,511	131,935	81,090	6,022	2,562	366,657	2002
34,220	21,942	10,336	1,941	380,073	162,138	128,882	81,911	4,500	2,641	376,528	2003
34,165	20,046	11,260	2,859	376,896	153,653	140,243	73,682	6,760	2,559	373,399	2004
34,539	19,494	11,204	3,842	380,486	155,493	139,382	75,173	7,662	2,776	376,780	2005
34,578	18,598	10,859	5,121	378,779	170,464	126,554	69,237	8,802	3,722	373,861	2006
33,908	19,801	11,471	2,637	379,136	158,594	149,127	57,249	10,320	3,846	374,064	2007
32,097	18,478	10,947	2,672	372,643	140,294	168,364	47,673	12,238	4,075	367,272	2008
32,578	18,976	10,251	3,350	360,202	120,076	159,159	62,762	14,533	3,672	355,359	2009
32,420	19,205	10,079	3,135	365,666	124,353	167,898	56,442	13,834	3,139	361,454	2010
33,517	19,374	9,997	4,146	351,349	124,733	139,666	62,655	21,400	2,895	347,506	2011

(4) Electricity supplied (gross) less electricity used in pumping at pumped storage stations.

(5) Natural flow hydro, wind, wave and solar photovoltaics.

Chapter 6: Long term trends

Renewables

Renewables sources used to generate electricity, heat and for transport; and electricity generated from renewable sources (Table 6.1.1)

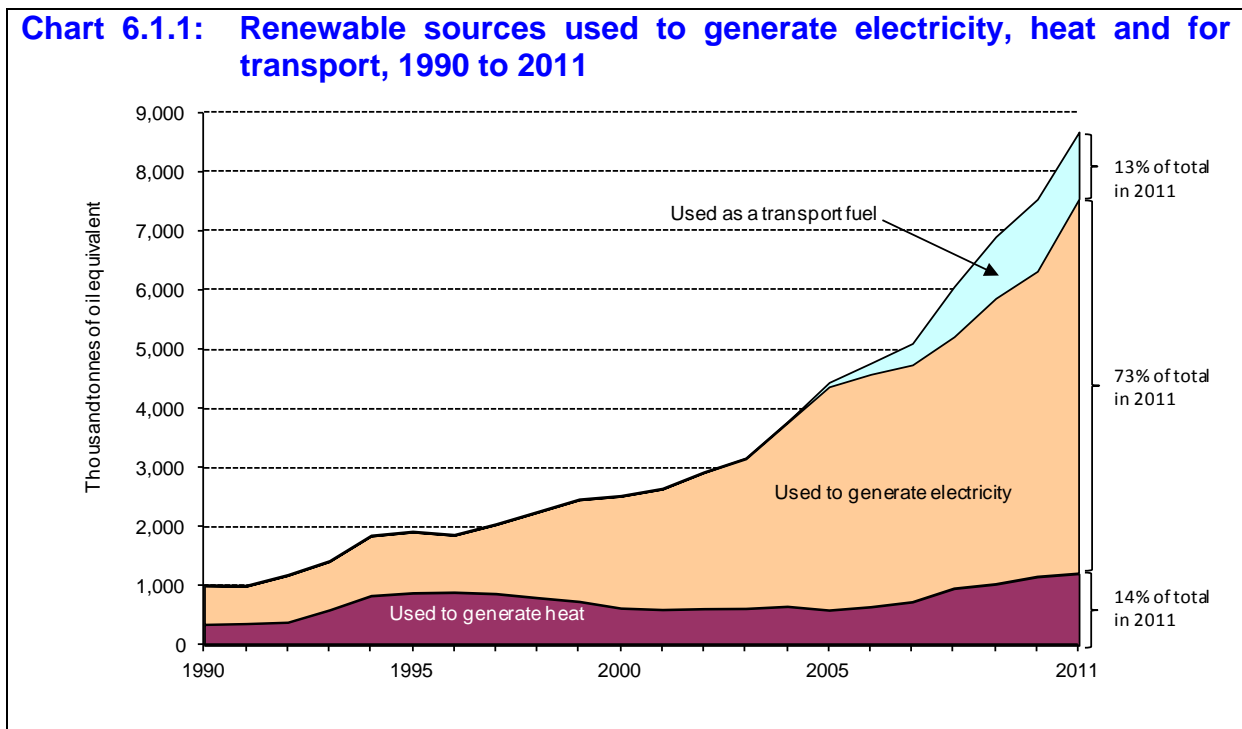
6.1.1 This table extends the series shown in Tables 6.4 and 6.6 of Chapter 6 of the main Digest back to 1990, the earliest year for which comprehensive data on renewables and wastes are available.

6.1.2 Between 1990 and 1996 the volume of renewables used to generate electricity grew at an average rate of 6½ per cent a year. After 1996 the rate of increase quickened and over the seven years to 2003 it averaged 14½ per cent a year. Between 2003 and 2010 it fell back slightly to an average of 12 per cent a year. The rate of increase in the volume of renewables used is influenced by how fuels are used. Use of primary sources (mainly wind and hydro) are assumed to be equal to the electricity produced whereas biomass sources lose energy during their transformation into electricity. As a result in years where biomass was increasing, the volume of fuel used would increase by more than in years when wind increased.

6.1.3 Chart 6.1.1 shows the amount of primary renewable sources used for generating electricity, for heat, and as a transport fuel, whilst chart 6.1.2 shows how much electricity was generated from 5 main renewable categories.

6.1.4 Since 2000, the main contributors to the growth in electricity generated from renewables have been wind (+29 per cent a year on average), small scale hydro schemes (+11 per cent a year), landfill gas (+8 per cent a year), municipal solid waste (+7 per cent a year), and sewage sludge digestion (+7 per cent a year). Co-firing of biomass with fossil fuels was zero until 2002, but more than doubled each year between 2002 and 2005 before levelling off in 2006 and despite a decline until 2008, they co-firing exceeded the 2005 levels again in 2011. When combined, electricity generated from all forms of bioenergy increased by an average of 12 per cent a year since 2000. Between 2000 and 2011 the rate of growth in electricity generated from all renewables averaged 12 per cent a year, which incorporates a smaller (2 per cent) rise between 2009 and 2010, reflecting lower rainfall and wind speeds, and a larger (33 per cent) increase in the most recent year.

Chart 6.1.1: Renewable sources used to generate electricity, heat and for transport, 1990 to 2011

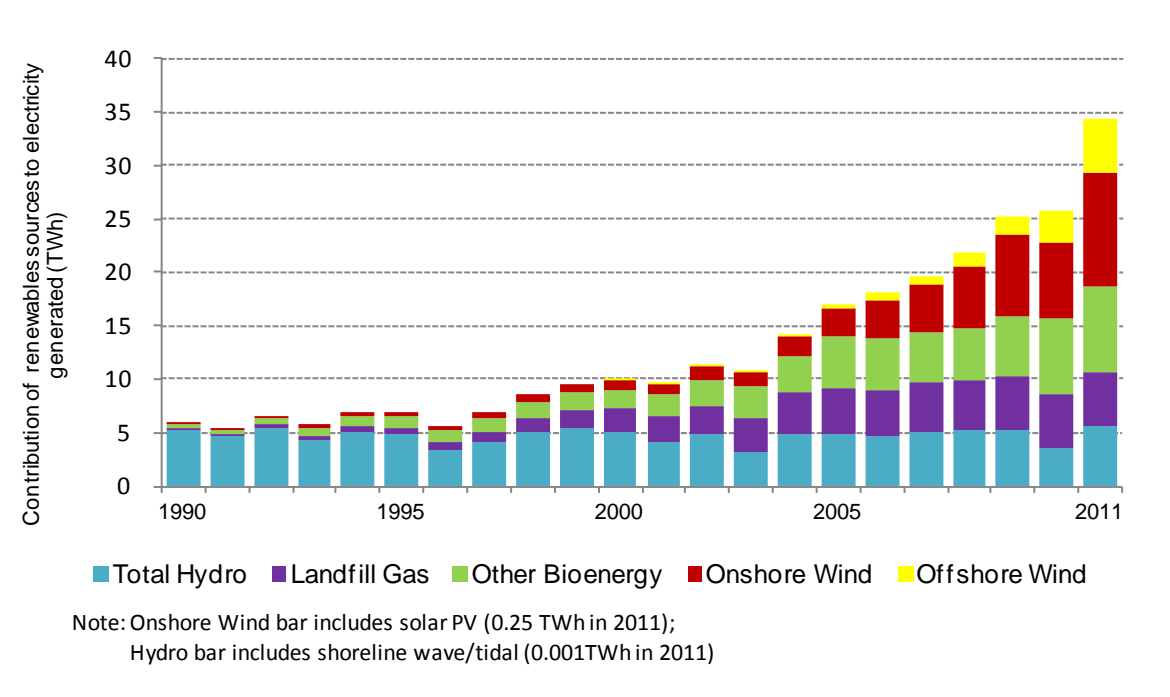


6.1.5 The use of renewables to generate heat reached a peak in 1996 having more than doubled over the previous 6 years. Over the next five years the use of renewables for heat generation

declined by one third, mainly because the use of industrial wood declined by over one-half due to the introduction of more stringent emission controls. More recently there has been an increase in renewable heat, due to policy incentives, and since 2000 it increased at an average annual rate of over 6 per cent. Since 2008 there has been more renewable heat than in the previous local peak during 1996.

6.1.6 Liquid biofuels for transport were first included in the energy mix through blending with fossil fuels in 2002. Since then there has been a steady increase, and over 1.1 million tonnes of oil equivalent was used during 2011.

Chart 6.1.2: Electricity generated from renewable sources, 1990 to 2011



Renewable orders and operational capacity (Table 6.1.2)

6.1.7 Table 6.1.2 brings together the information on contracted and live projects and their capacities contracted within the Non Fossil Fuel Orders in England, Wales and Northern Ireland and under the Scottish Renewables Orders. This information is no longer shown in the printed and bound Digest.

(a) Non Fossil Fuel Obligation (NFFO)

6.1.8 The 1989 Electricity Act empowered the Secretary of State to make orders requiring the Regional Electricity Companies in England and Wales (the RECs) to secure specified amounts of electricity from renewable energy sources.

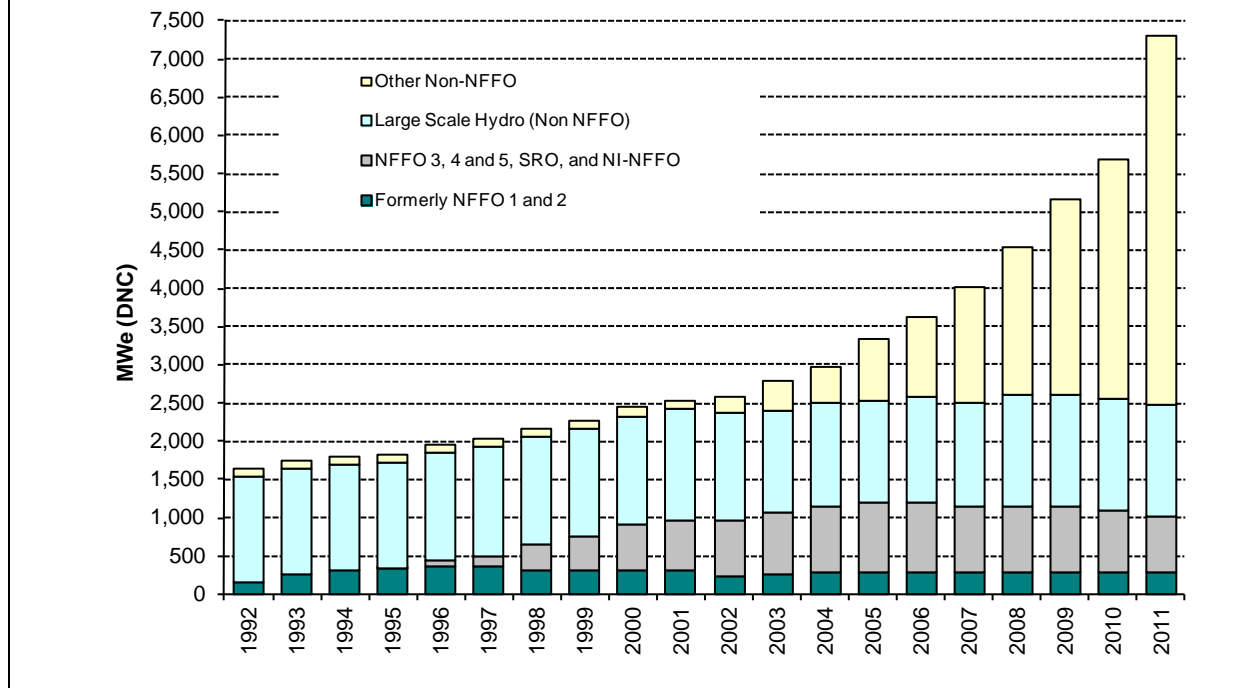
6.1.9 Five NFFO Orders were made, of which the first in 1990 was set for a total of 102 MW Declared Net Capacity (DNC). This first order actually resulted in contracts for 75 projects for 152 MW DNC and provided a premium price for the electricity produced which was funded from a levy on electricity sales in England and Wales. (The bulk of this levy was used to support electricity from nuclear stations).

6.1.10 The second Order, made in late 1991, was set for 457 MW DNC. This resulted in 122 separate contracts (for a total of 472 MW DNC) between the generators and the Non-Fossil Purchasing Agency (NFPA), which acted on behalf of the RECs. For landfill gas, sewage gas and waste-derived generation contracts were awarded at around 6p/kWh, while for wind-based generation a price of 11p/kWh was established. These prices reflected the limited period for the recovery of capital costs.

6.1.11 The third Order covers the period 1995 to 2014; this was for 627 MW DNC of contracted capacity at an average price of 4.35 p/kWh. The lower bid prices reflect the longer-term contracts, which are now available together with further developments that have led to improvements in the technologies. Taking into account factors such as the failure to gain planning permission, it is

estimated that around half the contracted DNC are likely to go forward for commissioning – the actual capacity at the end of 2011 for these projects was 255 MW DNC.

Chart 6.1.3: Renewable generating capacity from NFFO and former NFFO contracts (including equivalents in Scotland and Northern Ireland) and capacity outside of NFFO



6.1.12 The fourth Order was announced in February 1997. Contracts have been let to 195 projects with a total DNC of 843 MW, at an average price of 3.46 p/kWh. In the fifth and largest Order, which was announced in September 1998, contracts have been let to 261 projects with a total DNC of 1,177.2 MW, at an average price of 2.71 p/kWh.

6.1.13 Since the expiry of the NFFO 1 and 2 contracts on 31 December 1998, these projects are no longer included in the monitoring of NFFO Orders and DECC no longer receives any status/output data on them from the NFFPA. For some of these projects operational data have been obtained from other sources, while for the others estimates have been made based on output in 1998. From 2002 another source of information became available in the form of the Renewables Obligation data. This enabled AEA to identify which former NFFO 1 and 2 schemes were applying for ROCs and therefore were still running. Of the 114 NFFO 1 and 2 projects identified in this way as still live, 42 were contracted under the first order and 72 under the second order. It is appreciated that there may be some ex NFFO 1 and 2 schemes that are continuing to operate but whose output is too small to qualify for ROCs or which may need to re-furbish in order to qualify for ROCs. To that extent the estimates of NFFO capacity may be an underestimate.

6.1.14 As at the end of December 2011, 69 projects in the third Order were operational, with total capacities of 255 MW DNC. There were also 81 schemes with a capacity of 232 MW DNC commissioned from the fourth Order projects and 78 schemes totalling 169 MW DNC from the fifth Order. Table 6.1.2 sets out the technologies and capacities of schemes in all five Orders.

(b) Scottish Renewable Order (SRO)

6.1.15 In Scotland, the first Renewables Order was made in 1994 for approximately 76 MW DNC of new capacity and comprising 30 schemes. At the end of December 2011, 12 schemes were commissioned with a capacity of 21 MW DNC.

6.1.16 A second SRO was launched in 1995 and was made in March 1997 for 114 MW DNC of new capacity comprising 26 schemes. Under this Order, at the end of 2011 there were 9 commissioned schemes with a capacity of 34 MW DNC.

6.1.17 A third SRO was laid before Parliament in February 1999 for 145 MW DNC of new capacity comprising 53 schemes. Under this Order, at the end of 2011 there were 12 commissioned schemes with a capacity 19 MW DNC. Table 6.1.2 sets out the technologies and capacities of schemes in all three Scottish Orders.

(c) Northern Ireland Non Fossil Fuel Obligation (NI NFFO)

6.1.18 In Northern Ireland, a first Order was made in March 1994 for approximately 16 MW DNC comprising 20 schemes. The contracted schemes were spread throughout Northern Ireland and were divided into three technology bands. During 2010 all 15 schemes that had been operating in 2009 under the Obligation became out of contract, and remained so in 2011.

6.1.19 A second NI Order was made in 1996 for 10 schemes, totalling 16 MW DNC. At the end of 2010, 5 schemes were commissioned with a capacity of 3 MW DNC.

(d) Summary

6.1.20 In 1990, the first year of NFFO, projects contracted within NFFO accounted for about 32 per cent of the total capacity (excluding large-scale hydro). This percentage rose to a peak in 2001 of 91 per cent. Following the introduction of the Renewables Obligation it fell back as new capacity eligible for the RO outweighed the growth in NFFO 3, 4 and 5 and SRO and NI-NFFO projects, so that the NFFO capacity proportion (excluding large scale hydro) had more than halved, to account for 43 per cent in 2007, and has continued to fall, to 18 per cent during 2011.

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6.1.1 Renewable sources used to generate electricity and heat; electricity generated from renewable sources

	Thousand tonnes of oil equivalent														Total	Wastes (7)
	Wind (1)		Wave and Tidal (1)	Solar photo- voltaics	Hydro (1)		Bioenergy							Total		
	Onshore	Offshore			Small scale	Large scale (2)	Landfill gas	Sewage sludge digestion	Municipal solid waste combustion (3)	Animal Biomass (4)	Plant Biomass (5)	Anaerobic Digestion with fossil bioenergy (6)	Co-firing fuels			
Used to generate electricity																
1990	0.8	-	-	-	10.9	436.8	45.6	103.6	69.8	-	-	0.0	-	219.0	667.5	41.0
1991	0.7	-	-	-	12.2	385.4	68.2	107.6	70.5	0.5	-	0.1	-	246.9	645.2	41.4
1992	2.8	-	-	-	12.8	454.1	123.6	107.6	85.9	17.4	-	0.2	-	334.6	804.4	50.4
1993	18.7	-	-	-	13.6	356.2	146.6	123.8	119.1	52.3	-	0.2	-	442.0	830.5	76.4
1994	29.5	-	-	-	13.6	424.3	169.5	118.3	192.0	70.8	-	0.1	-	550.8	1,018.3	156.3
1995	33.7	-	-	-	14.2	401.7	184.3	134.6	198.6	71.2	-	0.1	-	588.7	1,038.4	178.6
1996	41.9	-	-	-	10.1	281.6	232.1	134.6	205.3	67.0	-	0.1	-	639.1	972.7	184.8
1997	57.4	-	-	-	14.1	344.4	301.1	133.7	258.2	67.8	-	0.0	-	760.8	1,176.6	236.0
1998	75.4	-	-	-	17.7	422.3	388.8	126.5	346.5	76.2	0.1	-	-	938.0	1,453.4	302.8
1999	73.1	-	-	-	17.8	441.0	558.4	134.6	345.0	156.8	0.2	-	-	1,195.0	1,726.9	272.5
2000	81.3	0.1	-	0.1	18.4	418.8	717.6	120.4	350.1	182.5	10.8	-	-	1,381.3	1,900.0	253.3
2001	82.5	0.4	0.0	0.2	18.1	330.7	822.2	119.0	387.1	205.3	80.7	-	-	1,614.4	2,046.3	266.2
2002	107.6	0.4	0.0	0.2	17.5	394.2	878.5	120.6	420.2	184.4	92.4	-	94.0	1,790.0	2,309.9	286.1
2003	109.7	0.8	0.0	0.3	12.9	256.9	1,074.5	129.3	445.8	169.4	136.7	3.0	197.3	2,156.1	2,536.7	273.8
2004	149.3	17.1	0.0	0.3	24.3	392.2	1,313.1	144.3	429.5	179.4	123.1	2.9	335.1	2,527.4	3,110.6	263.9
2005	215.1	34.6	0.0	0.7	38.2	385.0	1,407.2	152.8	426.3	158.9	129.4	2.6	830.7	3,107.8	3,781.4	262.0
2006	307.3	56.0	0.0	0.9	41.1	353.9	1,451.1	145.9	479.0	144.8	122.9	3.8	829.0	3,176.4	3,935.6	293.7
2007	386.2	67.3	0.0	1.2	45.0	391.6	1,533.9	161.9	486.8	217.6	137.8	4.9	576.4	3,119.2	4,010.4	298.3
2008	498.0	112.2	0.0	1.5	47.7	395.5	1,560.3	174.4	506.8	249.1	189.5	4.2	516.7	3,200.9	4,255.9	310.3
2009	650.4	149.6	0.1	1.7	49.6	401.0	1,624.2	196.1	624.5	222.2	367.3	9.7	533.0	3,576.9	4,829.3	368.6
2010	613.7	261.7	0.2	2.9	42.7	270.6	1,644.5	228.8	659.0	229.0	412.3	30.3	765.0	3,968.8	5,160.5	388.4
2011	891.8	440.7	0.1	21.6	60.0	429.0	1,633.1	247.6	717.3	215.3	620.3	78.5	972.0	4,484.1	6,327.4	422.0

	Active solar heating		Landfill gas	Sewage sludge digestion	Bioenergy					Geo-thermal aquifers	Heat pumps (11)	Total	Wastes (12)		
					Wood combustion - domestic	Wood combustion - industrial	Animal Biomass (8)	Plant Biomass (9)	Anaerobic Digestion (10)					Municipal solid waste combustion	Total bioenergy
Used to generate heat															
1990	6.4	34.2	-	34.6	174.1	-	-	71.7	0.2	31.1	345.8	0.8	-	353.1	41.1
1991	6.8	36.3	-	43.5	174.1	-	-	71.7	0.2	33.5	359.3	0.8	-	366.9	42.9
1992	7.1	31.5	-	43.5	204.2	-	-	71.7	0.3	30.8	381.9	0.8	-	389.9	49.1
1993	7.4	15.0	-	34.0	204.2	236.8	-	71.7	0.3	28.2	590.1	0.8	-	598.3	53.6
1994	7.7	18.9	-	52.1	204.2	455.1	-	71.7	0.3	29.5	831.8	0.8	-	840.3	60.6
1995	8.1	15.1	-	58.5	204.2	498.1	-	71.7	0.3	30.5	878.4	0.8	-	887.3	68.3
1996	8.7	16.6	-	58.5	204.2	505.5	-	71.7	0.3	31.9	888.6	0.8	-	898.1	63.1
1997	8.9	15.5	-	58.2	204.2	506.1	-	71.7	0.3	9.0	864.9	0.8	-	874.6	52.3
1998	9.1	13.6	-	54.1	204.2	436.9	-	71.7	0.3	15.2	796.0	0.8	-	805.9	49.6
1999	9.4	13.6	-	54.2	204.2	367.7	-	71.9	0.3	20.2	732.1	0.8	-	742.3	49.3
2000	11.1	13.6	-	48.3	204.2	254.2	-	71.9	0.3	24.7	617.1	0.8	-	629.0	76.4
2001	13.2	13.6	-	49.4	204.2	225.2	-	71.9	0.3	26.2	590.7	0.8	-	604.8	80.7
2002	16.1	13.6	-	53.4	204.2	225.2	-	71.9	0.3	33.7	602.4	0.8	-	619.3	92.2
2003	19.8	13.6	-	52.4	205.8	225.2	-	71.9	0.3	33.7	602.9	0.8	-	623.5	117.1
2004	24.6	13.6	-	54.8	232.4	225.2	-	71.9	2.0	33.7	633.6	0.8	-	659.0	115.7
2005	29.4	13.6	-	52.9	265.6	93.1	12.4	92.4	2.0	33.7	565.8	0.8	-	596.0	127.5
2006	36.3	13.6	-	44.1	298.8	97.0	22.9	103.0	2.0	33.7	615.1	0.8	-	652.2	111.6
2007	44.9	13.6	-	49.5	332.0	101.2	45.8	112.9	2.0	33.7	690.7	0.8	-	736.4	137.3
2008	55.7	13.6	-	49.8	358.6	220.3	40.4	190.3	2.0	31.5	906.4	0.8	2.7	965.6	153.7
2009	69.5	13.6	-	51.0	375.2	223.4	38.3	223.8	2.0	31.3	958.5	0.8	10.9	1,039.7	140.4
2010	87.0	13.6	-	57.8	391.8	255.7	40.3	266.4	4.8	25.6	1,055.9	0.8	21.2	1,165.0	131.5
2011	109.3	13.6	-	66.1	425.0	280.6	-	249.1	9.8	32.7	1,076.8	0.8	32.5	1,219.5	204.0

	Solar heating and photovoltaics		Wind		Wave and Tidal	Hydro	Bioenergy	Geothermal aquifers	Heat pumps	Transport biofuels (13)	Total	Wastes
	Onshore	Offshore										
Total use of renewable sources												
1990	6.4	0.8	-	-	-	447.7	564.8	0.8	-	-	1,020.5	82.1
1991	6.8	0.7	-	-	-	397.6	606.2	0.8	-	-	1,012.1	84.3
1992	7.1	2.8	-	-	-	467.0	716.6	0.8	-	-	1,194.3	99.6
1993	7.4	18.7	-	-	-	369.9	1,032.1	0.8	-	-	1,428.9	130.0
1994	7.7	29.5	-	-	-	438.0	1,382.6	0.8	-	-	1,858.6	217.0
1995	8.1	33.7	-	-	-	415.9	1,467.1	0.8	-	-	1,925.7	247.0
1996	8.7	41.9	-	-	-	291.7	1,527.7	0.8	-	-	1,870.8	247.9
1997	8.9	57.4	-	-	-	358.4	1,625.7	0.8	-	-	2,051.2	288.3
1998	9.1	75.4	-	-	-	440.0	1,734.0	0.8	-	-	2,259.3	352.4
1999	9.4	73.1	-	-	-	458.8	1,927.1	0.8	-	-	2,469.2	321.8
2000	11.2	81.3	0.1	-	-	437.3	1,998.4	0.8	-	-	2,529.0	329.7
2001	13.4	82.5	0.4	0.0	-	348.7	2,205.1	0.8	-	-	2,651.1	347.0
2002	16.3	107.6	0.4	0.0	-	411.7	2,392.4	0.8	-	2.4	2,931.6	378.3
2003	20.0	109.7	0.8	0.0	-	269.8	2,759.0	0.8	-	15.1	3,175.3	390.9
2004	24.9	149.3	17.1	0.0	-	416.5	3,161.0	0.8	-	16.7	3,786.3	379.6
2005	30.1	215.1	34.6	0.0	-	423.2	3,673.6	0.8	-	74.1	4,451.4	389.5
2006	37.2	307.3	56.0	0.0	-	394.9	3,791.6	0.8	-	187.8	4,775.6	405.3
2007	46.1	386.2	67.3	0.0	-	436.6	3,809.9	0.8	-	361.7	5,108.5	435.6
2008	57.2	498.0	112.2	0.0	-	443.2	4,107.3	0.8	2.7	844.5	6,066.0	464.1
2009	71.2	650.4	149.6	0.1	-	450.6	4,535.4	0.8	10.9	1,038.5	6,907.5	509.0
2010	89.8	613.7	261.7	0.2	-	313.3	5,024.8	0.8	21.2	1,214.4	7,539.9	520.0
2011	131.0	891.8	440.7	0.1	-	489.0	5,561.0	0.8	32.5	1,127.5	8,674.4	626.0

6.1.1 Renewable sources used to generate electricity and heat⁽¹⁾; electricity generated from renewable sources (continued)

														GWh		
	Wind (1)		Wave and Tidal (1)	Solar photo-voltaics	Hydro (1)		Bioenergy						Total	Wastes (7)		
	Onshore	Offshore			Small scale	Large scale (2)	Landfill gas	Sewage sludge digestion	Municipal solid waste combustion (3)	Animal Biomass (4)	Plant Biomass (5)	Anaerobic Digestion with fossil bioenergy (6)			Co-firing fuels	
Electricity generated																
1990	9	-	-	-	127	5,080	139	316	141	-	-	0	-	596	5,812	83
1991	9	-	-	-	142	4,482	208	328	150	-	1	0	-	688	5,320	88
1992	33	-	-	-	149	5,282	377	328	177	-	52	1	-	934	6,398	104
1993	217	-	-	-	159	4,143	447	378	252	-	121	1	-	1,198	5,717	165
1994	344	-	-	-	159	4,935	517	361	449	-	192	0	-	1,518	6,956	352
1995	392	-	-	0	166	4,672	562	410	471	-	198	0	-	1,642	6,872	412
1996	488	-	-	0	118	3,275	708	410	489	-	197	0	-	1,805	5,685	417
1997	667	-	-	0	164	4,005	918	408	585	-	199	0	0	2,110	6,946	483
1998	877	-	-	0	206	4,911	1,185	386	849	-	234	-	0	2,654	8,649	583
1999	850	-	-	1	207	5,128	1,703	410	856	-	459	-	1	3,429	9,616	559
2000	945	1	-	1	214	4,871	2,188	367	840	-	456	-	31	3,882	9,914	519
2001	960	5	0	2	210	3,845	2,507	363	880	-	542	-	234	4,526	9,549	528
2002	1,251	5	0	3	204	4,584	2,679	368	907	286	568	-	272	5,080	11,127	545
2003	1,276	10	0	3	150	2,987	3,276	394	965	602	525	9	402	6,174	10,600	579
2004	1,736	199	0	4	283	4,561	4,004	440	971	1,022	556	9	362	7,364	14,147	583
2005	2,501	403	0	8	444	4,478	4,290	466	964	2,533	460	8	382	9,102	16,936	578
2006	3,574	651	0	11	478	4,115	4,424	445	1,083	2,528	423	12	363	9,277	18,106	651
2007	4,491	783	0	14	523	4,554	4,677	494	1,189	1,757	585	15	607	9,325	19,690	714
2008	5,792	1,305	0	17	555	4,600	4,757	532	1,239	1,575	620	13	912	9,649	21,918	744
2009	7,564	1,740	1	20	577	4,664	4,952	598	1,509	1,625	637	30	1,343	10,694	25,259	873
2010	7,137	3,044	2	33	497	3,147	5,014	698	1,597	2,332	627	92	1,624	11,986	25,845	924
2011	10,372	5,126	1	252	697	4,989	4,979	755	1,739	2,964	614	239	1,683	12,973	34,410	1,005

	Wind		Wave and Tidal	Solar photo-voltaics	Hydro		Bioenergy and wastes						Total	
	Onshore	Offshore			Small scale	Large scale (3)	Landfill gas	Sewage sludge digestion	Municipal solid waste (14)	Animal Biomass (15)	Plant Biomass (16)	Anaerobic Digestion and bioenergy wastes		
	Declared net capacity													
1990	4.3	-	-	-	26.3	1,084.0	16.5	72.7	30.9	-	-	0.1	120.3	1,234.8
1991	6.3	-	-	-	37.9	1,377.1	28.7	91.4	30.9	0.2	-	0.1	151.3	1,572.7
1992	21.3	-	-	-	40.3	1,383.0	51.1	91.4	44.6	12.8	-	0.1	200.0	1,644.5
1993	55.2	-	-	-	42.2	1,383.0	78.7	88.4	69.8	25.5	-	0.1	262.5	1,743.0
1994	65.7	-	-	-	42.2	1,383.0	84.9	87.1	106.8	25.5	-	0.1	304.4	1,795.3
1995	85.1	-	-	0.2	48.6	1,383.0	94.7	87.2	106.8	25.4	-	0.1	314.2	1,831.1
1996	113.0	-	-	0.3	49.1	1,405.8	145.7	87.2	135.0	25.4	-	0.1	393.4	1,961.6
1997	135.4	-	-	0.5	58.5	1,428.8	169.4	86.8	135.0	25.4	0.1	0.1	416.8	2,039.9
1998	139.4	-	-	0.6	61.6	1,413.0	220.6	89.8	182.1	63.9	0.3	-	556.7	2,171.3
1999	150.5	-	-	1.2	63.6	1,413.0	309.0	91.3	180.6	63.9	0.3	-	645.1	2,273.4
2000	175.0	1.6	0.2	2.0	66.1	1,419.0	382.6	85.3	204.0	73.7	39.3	-	784.9	2,448.7
2001	181.7	1.6	0.2	2.8	67.9	1,440.0	418.3	85.0	208.9	73.7	39.3	-	825.2	2,519.5
2002	223.4	1.6	0.2	0.7	70.3	1,388.8	439.2	96.0	217.8	76.7	58.5	-	888.1	2,573.0
2003	285.6	26.6	0.2	1.0	47.1	1,354.5	575.1	123.7	237.2	76.7	64.5	1.4	1,078.6	2,793.7
2004	340.8	51.6	0.2	1.4	51.7	1,355.9	670.9	131.9	238.5	70.3	64.8	1.5	1,178.0	2,979.6
2005	569.0	89.2	0.2	1.9	57.2	1,343.2	759.7	137.8	248.7	70.3	74.5	1.6	1,292.7	3,353.2
2006	695.0	126.7	0.2	2.4	55.5	1,361.4	795.4	143.8	257.3	70.3	107.3	3.9	1,377.9	3,619.2
2007	877.2	164.2	0.2	3.1	59.0	1,358.7	836.7	150.2	257.3	94.3	211.3	3.9	1,553.6	4,015.9
2008	1,187.6	244.4	0.2	3.8	61.4	1,456.5	843.8	147.6	293.3	94.3	219.5	3.9	1,602.3	4,556.2
2009	1,466.7	392.5	1.0	4.5	64.7	1,458.5	914.9	156.9	305.0	94.3	299.8	8.8	1,779.7	5,167.5
2010	1,699.9	559.3	1.0	13.1	68.0	1,452.9	951.9	185.7	336.5	94.3	330.2	28.1	1,926.5	5,720.6
2011	1,959.0	766.4	1.2	165.9	74.1	1,470.9	991.0	197.5	421.1	94.3	1,159.5	55.2	2,918.5	7,356.1

- (1) For wind, wave, tidal and hydro, the figures represent the energy content of the electricity supplied, but for biofuels the figures represent the energy content of the fuel used.
- (2) Excluding pumped storage stations.
- (3) Biodegradable part only.
- (4) Includes electricity from poultry litter combustion, and meat & bone combustion.
- (5) Includes electricity from straw and energy crops.
- (6) Includes electricity from farm waste digestion and other AD.
- (7) Non-biodegradable part of municipal solid waste plus waste tyres, hospital waste, and general industrial waste.
- (8) Includes heat from meat & bone combustion and sewage sludge combustion.
- (9) Includes heat from straw, energy crops and paper & packaging.
- (10) Includes heat from farm waste digestion and other non-farm AD.
- (11) Data on heat pumps were included in this table for the first time in 2011. It is understood that there was a negligible contribution prior to 2008.
- (12) Includes heat from waste tyre combustion, hospital waste combustion, and general industrial waste combustion.
- (13) Liquid biofuels are generally blended for use in transport.
- (14) Includes the use of waste tyres and hospital waste.
- (15) Includes the use of poultry litter and meat & bone.
- (16) Includes the use of straw combustion and short rotation coppice.

6.1.2 Renewable orders and operational capacity

Technology band	Contracted projects		1998 Live projects operational at 31 December 1998 (1)		1999 Live projects operational at 31 December 1999 (1)		2000 Live projects operational at 31 December 2000 (1)		
	Number	Capacity MW	Number	Capacity MW	Number	Capacity MW	Number	Capacity MW	
England and Wales									
NFFO - 1 (1990)	Hydro	26	11.85	21	10.00	21	10.00	19	8.75
	Landfill gas	25	35.50	19	30.78	19	30.78	19	30.78
	Municipal and industrial waste	4	40.63	4	40.63	4	40.63	3	37.08
	Other	4	45.48	4	45.48	4	45.48	4	45.48
	Sewage gas	7	6.45	6	5.98	6	5.98	6	5.98
	Wind	9	12.21	7	11.66	7	11.66	7	11.66
	Total (2)	75	152.12	61	144.53	61	144.53	58	139.73
NFFO - 2 (late 1991)	Hydro	12	10.86	10	10.46	10	10.46	10	10.46
	Landfill gas	28	48.45	26	46.39	26	46.39	26	46.39
	Municipal and industrial waste	10	271.48	2	31.50	2	31.50	2	31.50
	Other	4	30.15	1	12.50	1	12.50	1	12.50
	Sewage gas	19	26.86	18	19.06	18	19.06	18	19.06
	Wind	49	84.43	25	53.83	25	53.83	24	52.53
	Total (2)	122	472.23	82	173.74	82	173.74	81	172.44
NFFO - 3 (1995)	Energy crops and agricultural and forestry waste - gasification	3	19.06	-	-	-	-	1	8.00
	Energy crops and agricultural and forestry waste - other	6	103.81	1	38.50	1	38.50	2	69.50
	Hydro	15	14.48	6	9.72	7	10.08	8	11.74
	Landfill gas	42	82.07	40	78.96	42	82.07	42	82.07
	Municipal and industrial waste	20	241.87	5	75.32	6	77.42	6	77.42
	Wind - large	31	145.92	7	32.46	8	34.76	9	36.81
	Wind - small	24	19.71	7	5.38	9	7.93	9	7.93
	Total	141	626.92	66	240.34	73	250.76	77	293.47
NFFO - 4 (1997)	Hydro	31	13.22	3	0.70	5	1.42	5	1.42
	Landfill gas	70	173.68	21	45.93	43	103.30	51	135.71
	Municipal and industrial waste - CHP	10	115.29	-	-	-	-	2	14.98
	Municipal and industrial waste - fluidised bed combustion	6	125.93	-	-	-	-	-	-
	Wind - large	48	330.36	-	-	-	-	1	2.53
	Wind - small	17	10.33	-	-	1	0.63	3	2.03
	Anaerobic digestion of agricultural waste	6	6.58	-	-	-	-	-	-
	Energy crops and forestry waste gasification	7	67.34	-	-	-	-	-	-
	Total	195	842.73	24	46.63	49	105.35	62	156.67
NFFO - 5 (1998)	Hydro	22	8.87	-	-	-	-	-	-
	Landfill gas	141	313.73	1	1.78	11	16.58	23	53.88
	Municipal and industrial waste	22	415.75	-	-	-	-	-	-
	Municipal and industrial waste - CHP	7	69.97	-	-	-	-	-	-
	Wind - large	33	340.16	-	-	-	-	-	-
	Wind - small	36	28.67	-	-	2	1.69	2	1.69
	Total	261	1,177.15	1	1.78	13	18.27	25	55.57
NFFO Total		794	3,271.15	234	607.02	278	692.64	303	817.88
Scotland									
SRO - 1 (1994)	Biomass	1	9.8	-	-	-	-	1	9.80
	Hydro	15	17.25	3	2.27	4	3.22	6	4.04
	Waste to Energy	2	3.78	2	3.78	2	3.78	2	3.78
	Wind	12	45.6	6	21.76	7	25.13	7	25.13
	Total	30	76.43	11	27.81	13	32.13	16	42.75
SRO - 2 (1997)	Biomass	1	2	-	-	-	-	-	-
	Hydro	9	12.36	-	-	-	-	-	-
	Waste to Energy	9	56.05	-	-	3	6.7	4	15.00
	Wind	7	43.36	-	-	-	-	-	-
	Total	26	114.04	-	-	3	6.7	4	15.00
SRO - 3 (1999)	Biomass	1	12.9	-	-	-	-	-	-
	Hydro	5	3.9	-	-	-	-	-	-
	Waste to Energy	16	49.11	-	-	-	-	1	3.94
	Wave	3	2	-	-	-	-	-	-
	Wind - large	11	63.43	-	-	-	-	1	8.29
	Wind - small	17	14.06	-	-	-	-	2	1.62
	Total	53	145.40	-	-	-	-	4	13.85
SRO Total		109	335.87	11	14.55	16	38.83	24	71.60
Northern Ireland									
NI NFFO - 1 (1994)	Hydro	9	2.37	7	1.89	7	1.89	7	1.89
	Sewage gas	5	0.56	-	-	-	-	-	-
	Wind	6	12.66	6	12.66	6	12.66	6	12.66
	Total	20	15.59	13	14.55	13	14.55	13	14.55
NI NFFO - 2 (1996)	Biogas	1	0.25	-	-	-	-	-	-
	Biomass	2	0.3	2	0.30	2	0.30	2	0.30
	Hydro	2	0.25	1	0.08	1	0.08	1	0.08
	Landfill gas	2	6.25	-	-	-	-	-	-
	Municipal and industrial waste	1	6.65	-	-	-	-	-	-
	Wind	2	2.57	-	-	1	0.43	2	2.57
	Total	10	16.27	3	0.38	4	0.81	5	2.95
NI NFFO Total		30	31.86	16	14.93	17	15.36	18	17.50
All NFFO and equivalents (2)		933	3,638.88	261	649.76	311	746.83	345	907.00

(1) Sites that have closed, sites that are not currently using renewables as fuel and those that are no longer under contract have been excluded.

(2) The NFFO database has reported that at the end of December 2011 487 sites totalling 1,275.56 MW had gone live under NFFO, but this includes a number of sites which have closed or are not currently using renewables as fuels.

The following table compares the totals for live projects, above, with the overall NFFO total:

	Number	MW
All live NFFO and equivalents	380	1020.56
NFFO-1 no longer classed as live and operational	17	12.85
NFFO-2 no longer classed as live and operational	8	12.76
NFFO-3 no longer classed as live and operational	25	104.65
NFFO-4 no longer classed as live and operational	10	29.01
NFFO-5 no longer classed as live and operational	15	19.42
SRO-1 no longer classed as live and operational	8	28.84
SRO-2 no longer classed as live and operational	4	16.70
SRO-3 no longer classed as live and operational	5	15.74
NI-NFFO-1 no longer classed as live and operational	15	15.04
NI-NFFO-2 no longer classed as live and operational	0	0.00
All NFFO and equivalents	487	1275.56

6.1.2 Renewable orders and operational capacity (continued)

2001		2002		2003		2004		2005		2006	
Live projects operational at 31 December 2001 (1)		Live projects operational at 31 December 2002 (1)		Live projects operational at 31 December 2003 (1)		Live projects operational at 31 December 2004 (1)		Live projects operational at 31 December 2005 (1)		Live projects operational at 31 December 2006 (1)	
Number	Capacity MW	Number	Capacity MW	Number	Capacity MW	Number	Capacity MW	Number	Capacity MW	Number	Capacity MW
21	10.00	9	2.95	9	7.63	13	8.19	13	4.83	13	4.83
19	30.78	8	16.56	17	29.32	13	25.09	13	25.09	13	25.09
4	40.63	4	44.62	4	40.63	4	40.63	4	40.63	4	40.63
4	45.48	2	25.38	2	25.38	3	45.38	3	45.38	3	45.38
6	5.98	2	8.67	6	5.98	4	1.55	4	4.08	4	4.08
5	8.14	1	2.06	2	5.81	3	7.53	5	8.14	5	8.14
59	141.01	26	100.24	40	114.74	40	128.37	42	128.16	42	128.16
10	10.46	1	0.07	2	2.78	8	10.16	9	10.43	9	10.43
26	46.39	13	22.33	26	46.39	22	35.67	21	34.64	21	34.64
2	31.50	2	31.50	2	31.50	2	31.50	2	31.50	2	31.50
1	12.50	1	12.50	-	-	1	12.50	1	12.50	1	12.50
18	19.06	16	14.22	17	18.39	17	25.69	17	18.56	17	18.56
23	52.45	23	52.45	21	52.20	23	52.45	22	51.97	22	51.97
80	172.36	56	133.07	68	151.26	73	167.97	72	159.60	72	159.60
1	8.00	-	-	-	-	-	-	-	-	-	-
2	69.50	2	69.50	2	69.50	2	69.50	2	69.50	2	69.50
8	11.74	8	11.74	8	11.74	8	11.74	8	11.74	8	11.74
42	82.07	42	82.07	42	82.07	42	82.07	41	80.55	40	79.03
6	77.42	6	77.42	7	89.12	8	102.92	9	114.62	9	126.32
10	41.02	10	41.02	10	41.02	10	41.02	12	50.50	12	50.50
10	9.47	11	10.84	13	11.86	13	11.86	15	13.52	15	13.52
79	299.22	79	292.58	82	305.31	83	319.11	87	340.43	86	350.61
7	2.10	8	2.30	9	2.49	9	2.49	9	2.49	9	2.49
51	135.71	55	141.73	57	146.00	60	148.36	62	161.46	62	160.51
2	14.98	4	33.48	4	33.48	4	33.48	4	33.48	4	33.48
-	-	-	-	-	-	-	-	-	-	-	-
1	2.53	4	12.97	4	12.97	4	12.97	6	38.67	6	38.67
4	2.76	5	3.27	5	3.27	5	3.27	6	4.03	6	4.03
-	-	1	1.43	1	1.43	1	1.43	1	1.43	1	1.43
-	-	-	-	-	-	-	-	-	-	-	-
65	158.08	77	195.18	80	199.64	83	202.00	88	241.57	88	240.62
3	0.64	3	0.64	3	0.64	-	-	-	-	-	-
45	89.60	58	114.50	67	137.26	77	164.32	80	170.41	84	180.49
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
4	3.65	4	3.65	6	4.85	9	7.45	9	7.45	9	7.45
52	93.89	65	118.79	76	142.75	86	171.77	89	177.86	93	187.94
335	864.55	303	839.86	346	913.70	365	989.21	378	1,047.61	381	1,066.92
1	9.80	1	9.80	1	9.80	1	9.80	1	9.80	-	-
6	4.04	8	7.82	9	8.81	9	8.81	10	10.75	10	10.75
2	3.78	2	3.78	2	3.78	2	3.78	2	3.78	2	3.78
7	25.13	7	25.13	7	25.13	7	25.13	7	25.13	7	25.13
16	42.75	18	46.53	19	47.52	19	47.52	20	49.46	19	39.66
-	-	-	-	-	-	-	-	-	-	-	-
2	1.46	2	1.46	2	1.46	2	1.46	2	1.46	2	1.46
4	15.00	4	15.00	6	17.65	6	17.65	6	17.65	6	17.65
3	18.95	5	31.29	5	31.29	5	31.29	5	31.29	5	31.29
9	35.41	11	47.75	13	50.40	13	50.40	13	50.40	13	50.40
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
2	6.12	4	10.30	7	16.04	10	22.36	10	22.36	10	22.36
1	0.20	1	0.20	1	0.20	1	0.20	1	0.20	1	0.20
1	8.29	1	8.29	1	8.29	1	8.29	1	8.29	1	8.29
3	2.47	3	2.47	5	4.28	5	4.28	5	4.28	4	3.43
7	17.08	9	21.26	14	28.81	17	35.13	17	35.13	16	34.28
32	95.24	38	115.54	46	126.73	49	133.05	50	134.99	48	124.34
7	1.89	8	2.33	8	2.33	8	2.33	9	2.37	9	2.37
-	-	-	-	-	-	-	-	-	-	-	-
6	12.66	6	12.66	6	12.66	6	12.66	6	12.66	6	12.66
13	14.55	14	14.99	14	14.99	14	14.99	15	15.03	15	15.03
-	-	-	-	-	-	-	-	-	-	-	-
2	0.30	2	0.30	2	0.30	2	0.30	2	0.30	2	0.30
1	0.08	1	0.08	1	0.08	1	0.08	1	0.08	1	0.08
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
2	2.57	2	2.57	2	2.57	2	2.57	2	2.57	2	2.57
5	2.95	5	2.95	5	2.95	5	2.95	5	2.95	5	2.95
18	17.5	19	17.94	19	17.94	19	17.94	20	17.98	20	17.98
385	977.29	360	973.34	411	1,058.37	433	1,140.20	448	1,200.59	449	1,209.24

6.1.2 Renewable orders and operational capacity (continued)

Technology band	2007		2008		2009		2010		
	Live projects operational at 31 December 2007 (1)		Live projects operational at 31 December 2008 (1)		Live projects operational at 31 December 2009 (1)		Live projects operational at 31 December 2010 (1)		
	Number	Capacity MW	Number	Capacity MW	Number	Capacity MW	Number	Capacity MW	
England and Wales									
NFFO - 1 (1990)	Hydro	13	4.83	13	4.83	13	4.83	13	4.83
	Landfill gas	13	25.09	13	25.09	13	25.09	13	25.09
	Municipal and industrial waste	4	40.63	4	40.63	4	40.63	4	40.63
	Other	3	45.38	3	45.38	3	45.38	3	45.38
	Sewage gas	4	4.08	4	4.08	4	4.08	4	4.08
	Wind	5	8.14	5	8.14	5	8.14	5	8.14
	Total (2)	42	128.16	42	128.16	42	128.16	42	128.16
NFFO - 2 (late 1991)	Hydro	9	10.43	9	10.43	9	10.43	9	10.43
	Landfill gas	21	34.64	21	34.64	21	34.64	21	34.64
	Municipal and industrial waste	2	31.50	2	31.50	2	31.50	2	31.50
	Other	1	12.50	1	12.50	1	12.50	1	12.50
	Sewage gas	17	18.56	17	18.56	17	18.56	17	18.56
	Wind	22	51.97	22	51.97	22	51.97	22	51.97
	Total (2)	72	159.60	72	159.60	72	159.60	72	159.60
NFFO - 3 (1995)	Energy crops and agricultural and forestry waste - gasification	-	-	-	-	-	-	-	-
	Energy crops and agricultural and forestry waste - other	1	31.00	1	31.00	1	31.00	1	31.00
	Hydro	8	11.74	8	11.74	8	11.74	8	11.74
	Landfill gas	35	71.08	35	71.08	35	71.08	30	60.27
	Municipal and industrial waste	9	126.32	9	126.32	9	126.32	10	169.32
	Wind - large	12	50.50	12	50.50	12	50.50	12	50.50
	Wind - small	15	13.52	15	13.52	15	13.52	15	13.52
	Total	80	304.16	80	304.16	80	304.16	76	336.35
NFFO - 4 (1997)	Hydro	9	2.49	9	2.49	9	2.49	7	1.94
	Landfill gas	60	158.95	60	158.95	58	156.04	50	130.69
	Municipal and industrial waste - CHP	4	33.48	4	33.48	4	33.48	4	33.48
	Municipal and industrial waste - fluidised bed combustion	-	-	-	-	-	-	-	-
	Wind - large	7	42.72	7	42.72	7	42.72	7	42.72
	Wind - small	6	4.03	6	4.03	6	4.03	6	4.03
	Anaerobic digestion of agricultural waste	-	-	-	-	-	-	-	-
	Energy crops and forestry waste gasification	-	-	-	-	-	-	-	-
	Total	86	241.67	86	241.67	84	238.76	74	212.85
NFFO - 5 (1998)	Hydro	-	-	-	-	2	1.00	2	1.00
	Landfill gas	79	168.04	79	168.04	75	163.35	63	130.38
	Municipal and industrial waste	-	-	-	-	1	9.90	1	9.90
	Municipal and industrial waste - CHP	-	-	-	-	-	-	-	-
	Wind - large	-	-	-	-	-	-	-	-
	Wind - small	9	7.45	9	7.45	9	7.45	9	7.45
	Total	88	175.49	88	175.49	87	181.69	75	148.73
NFFO Total		368	1,009.07	368	1,009.07	365	1,012.37	339	985.69
Scotland									
SRO - 1 (1994)	Biomass	-	-	-	-	-	-	-	-
	Hydro	9	10.09	9	10.09	9	10.09	9	10.09
	Waste to Energy	2	3.78	2	3.78	2	3.78	2	3.78
	Wind	7	25.13	7	25.13	7	25.13	7	25.13
	Total	18	39.00	18	39.00	18	39.00	18	39.00
SRO - 2 (1997)	Biomass	-	-	-	-	-	-	-	-
	Hydro	2	1.46	2	1.46	2	1.46	2	1.46
	Waste to Energy	6	17.65	6	17.65	6	17.65	6	17.65
	Wind	5	31.29	5	31.29	5	31.29	3	18.51
	Total	13	50.40	13	50.40	13	50.40	11	37.62
SRO - 3 (1999)	Biomass	-	-	-	-	-	-	-	-
	Hydro	-	-	-	-	-	-	-	-
	Waste to Energy	10	22.36	10	22.36	10	22.36	10	22.36
	Wave	1	0.20	1	0.20	1	0.20	1	0.20
	Wind - large	-	-	-	-	-	-	-	-
	Wind - small	4	3.43	4	3.43	4	3.43	4	3.43
	Total	15	25.99	15	25.99	15	25.99	15	25.99
SRO Total		46	115.39	46	115.39	46	115.39	44	102.61
Northern Ireland									
NI NFFO - 1 (1994)	Hydro	9	2.37	9	2.37	9	2.37	-	-
	Sewage gas	-	-	-	-	-	-	-	-
	Wind	6	12.66	6	12.66	6	12.66	-	-
	Total	15	15.04	15	15.04	15	15.04	-	-
NI NFFO - 2 (1996)	Biogas	-	-	-	-	-	-	-	-
	Biomass	2	0.30	2	0.30	2	0.30	2	0.30
	Hydro	1	0.08	1	0.08	1	0.08	1	0.08
	Landfill gas	-	-	-	-	-	-	-	-
	Municipal and industrial waste	-	-	-	-	-	-	-	-
	Wind	2	2.57	2	2.57	2	2.57	2	2.57
	Total	5	2.95	5	2.95	5	2.95	5	2.95
NI NFFO Total		20	17.98	20	17.98	20	17.98	5	2.95
All NFFO and equivalents (2)		434	1,142.44	434	1,142.44	431	1,145.74	388	1,091.24

6.1.2 Renewable orders and operational capacity (continued)

		2011	
		Live projects operational at 31 December 2011 (1)	
Technology band		Number	Capacity MW
England and Wales			
NFFO - 1 (1990)	Hydro	13	4.83
	Landfill gas	13	25.09
	Municipal and industrial waste	4	40.63
	Other	3	45.38
	Sewage gas	4	4.08
	Wind	5	8.14
	Total (2)	42	128.16
NFFO - 2 (late 1991)	Hydro	9	10.43
	Landfill gas	21	34.64
	Municipal and industrial waste	2	31.50
	Other	1	12.50
	Sewage gas	17	18.56
	Wind	22	51.97
	Total (2)	72	159.60
NFFO - 3 (1995)	Energy crops and agricultural and forestry waste - gasification	1	31.00
	Energy crops and agricultural and forestry waste - other		
	Hydro	8	11.74
	Landfill gas	26	52.76
	Municipal and industrial waste	8	98.12
	Wind - large	11	48.14
	Wind - small	15	13.52
	Total	69	255.27
NFFO - 4 (1997)	Hydro	9	2.49
	Landfill gas	55	149.63
	Municipal and industrial waste - CHP	4	33.48
	Municipal and industrial waste - fluidised bed combustion		
	Wind - large	7	42.72
	Wind - small	6	4.03
	Anaerobic digestion of agricultural waste		
	Energy crops and forestry waste gasification		
	Total	81	232.35
NFFO - 5 (1998)	Hydro	2	1.00
	Landfill gas	66	150.17
	Municipal and industrial waste	1	9.90
	Municipal and industrial waste - CHP		
	Wind - large		
	Wind - small	9	7.45
	Total	78	168.52
NFFO Total		342	943.90
Scotland			
SRO - 1 (1994)	Biomass		
	Hydro	9	10.09
	Waste to Energy		
	Wind	3	10.53
	Total	12	20.62
SRO - 2 (1997)	Biomass		
	Hydro	2	1.46
	Waste to Energy	4	13.73
	Wind	3	18.51
	Total	9	33.70
SRO - 3 (1999)	Biomass		
	Hydro		
	Waste to Energy	7	15.76
	Wave	1	0.20
	Wind - large		
	Wind - small	4	3.43
	Total	12	19.39
SRO Total		33	73.71
Northern Ireland			
NI NFFO - 1 (1994)	Hydro		
	Sewage gas		
	Wind		
	Total	-	-
NI NFFO - 2 (1996)	Biogas		
	Biomass	2	0.30
	Hydro	1	0.08
	Landfill gas		
	Municipal and industrial waste		
	Wind	2	2.57
	Total	5	2.95
NI NFFO Total		5	2.95
All NFFO and equivalents (2)		380	1,020.56

Chapter 7: Long term trends

Combined Heat and Power

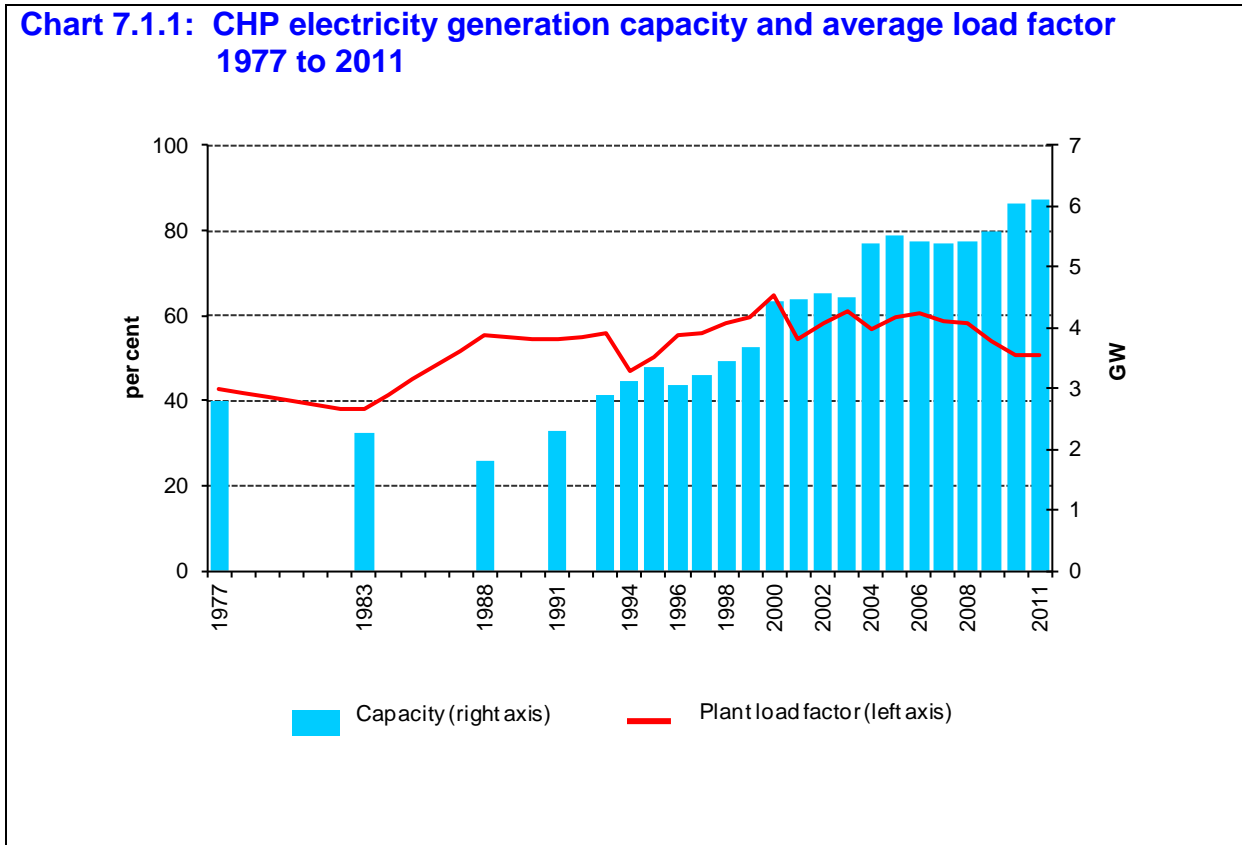
Combined Heat and Power: capacity, generation and fuel use (Table 7.1.1)

7.1.1 This table extends the summary series shown in Table 7A of Chapter 7 of the main Digest back to 1977, the earliest year for which data on Combined Heat and Power (CHP) are available. CHP data have been collected on an annual basis since 1993, but before that the data were collected on an occasional basis.

7.1.2 As Chart 7.1.1 shows, between 1993 and 2005 the electricity generating capacity of CHP increased by over 90 per cent, at an average rate of around 5½ per cent a year. Between 2005 and 2009 capacity levelled off before increasing again in 2010 due to increases within the oil refinery sector.

7.1.3 The plant load factor measures how intensively the CHP plants are used. The average load factor peaked in 2000 at around 65 per cent but fell sharply in 2001 to around 54 per cent following a fall in the electricity price. Between 2002 and 2008 the load factor fluctuated between 56 and 61 per cent, before falling in 2009 and again in 2010, remaining at around 50 per cent in 2011.

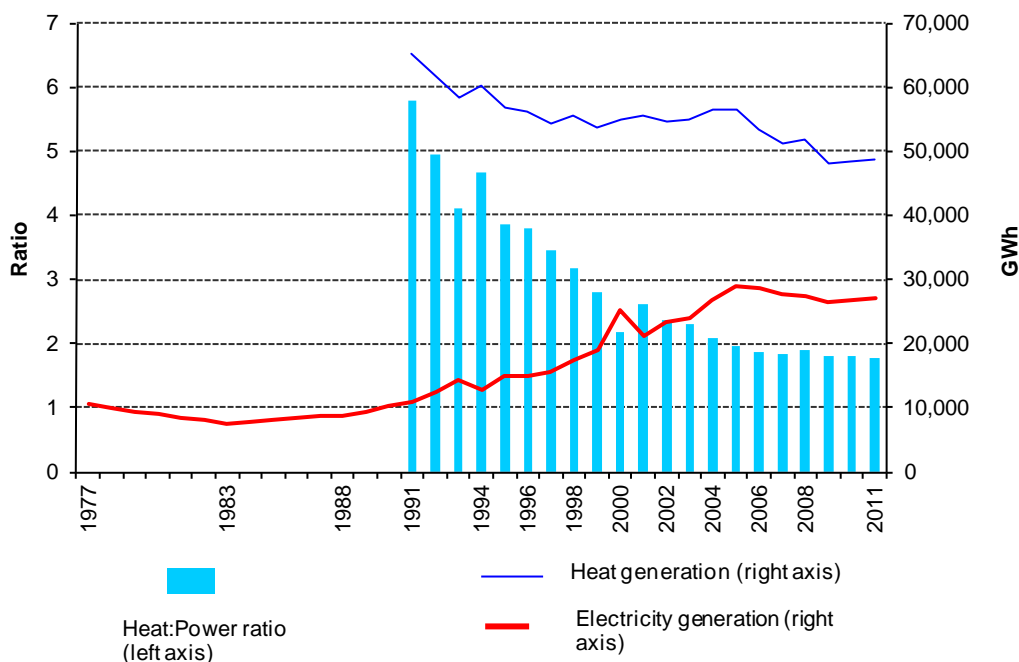
Chart 7.1.1: CHP electricity generation capacity and average load factor 1977 to 2011



7.1.4 Between 1995 and 2006 heat generation at CHP plants showed a fairly stable pattern remaining within the 53,000 to 57,000 GWh band, before falling in 2007 and again in 2009 such that the heat generated in 2011 was around 48,500 GWh.

7.15 Over the same period (1995-2006), electricity generation from CHP almost doubled, equivalent to a growth rate of around 5½ per cent a year. The rise in generation up to 2000 reflected the liberalisation of the electricity markets which gave a strong incentive to design schemes to maximise the electricity generation for a given heat load since the electricity could be sold on to suppliers. Newer CHP schemes thus tended to have lower heat to power ratios as Chart 7.1.2 shows. One of the effects of the introduction of the New Electricity Trading Arrangements (NETA) in March 2001 was a fall in the price of electricity, including the price of electricity exported from CHP plants. This led to a decline in investment in new plants and also a decline in the electrical output of existing CHP plants between 2000 and 2001. Following the sharp decline in 2001, electricity generation at CHP plants rose again to its peak in 2005, exceeding the 2000 level by 14 per cent. However, between 2006 and 2009, electricity generation decreased before levelling out between 2009 and 2011.

Chart 7.1.2: CHP electricity and heat generation and heat: power ratio 1977 to 2011



Heat to power ratios and heat generation data are not available before 1991

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7.1.1 Combined Heat and Power: capacity, generation and fuel use

	Number of schemes	Electricity capacity (1) MWe	Heat capacity MWth	Heat to power ratio (2)	Fuel input GWh	Electricity generation (3) GWh	Heat generation (4) GWh	Overall efficiency (3) Per cent	Load factor Per cent
1977	..	2,793	..	..	..	10,450	..	..	43
1983	..	2,254	..	..	..	7,500	..	..	38
1988	..	1,793	..	..	..	8,700	..	..	55
1991	266	2,293	13,361	5.80	113,537	10,917	65,174	67	54
1993	996	2,893	14,442	4.12	101,650	14,171	58,418	71.4	55.9
1994	1,139	3,117	15,704	4.67	97,468	12,853	60,079	74.8	47.1
1995	1,220	3,355	15,698	3.85	106,504	14,778	56,833	67.2	50.3
1996	1,299	3,041	15,382	3.81	97,994	14,782	56,285	72.5	55.5
1997	1,319	3,204	15,025	3.46	97,881	15,699	54,329	71.5	55.9
1998	1,329	3,439	15,111	3.16	100,878	17,569	55,579	72.5	58.3
1999	1,353	3,669	14,644	2.81	100,551	19,104	53,755	72.5	59.4
2000	1,340	4,451	11,606	2.17	106,230	25,246	54,877	75.4	64.7
2001	1,369	4,454	11,616	2.61	109,349	21,232	55,411	70.1	54.4
2002	1,348	4,565	11,271	2.35	112,669	23,222	54,565	69.0	58.1
2003	1,348	4,494	10,933	2.30	113,086	23,933	54,978	69.8	60.8
2004	1,335	5,396	11,772	2.10	120,181	26,853	56,520	69.4	56.8
2005	1,364	5,533	11,499	1.96	124,605	28,828	56,442	68.4	59.5
2006	1,362r	5,431	11,207r	1.86	122,342r	28,729r	53,407r	67.1	60.4
2007	1,407r	5,398r	11,065r	1.84	118,601r	27,833r	51,298r	66.7	58.9r
2008	1,427r	5,410r	10,880r	1.89	118,689r	27,529r	51,913r	66.9	58.1r
2009	1,485r	5,573r	10,738r	1.82	111,298r	26,428r	48,096r	67.0r	54.1r
2010	1,577r	6,053r	10,496r	1.80r	112,570r	26,772r	48,273r	66.7r	50.5r
2011	1,880	6,111	10,405	1.79	112,858	27,191	48,627	67.2	50.8

(1) (CHP_{QPO}) basis from 1995 onwards

(2) Heat to power ratios are calculated from the qualifying heat output (QHO) and the qualifying power output (QPO) (and their equivalents in the years before the CHPQA scheme was used for CHP statistics).

(3) These are calculated using gross calorific values; overall net efficiencies are some 5 percentage points higher.

(4) (CHP_{QHO}) basis from 1995 onwards