Department of Energy & Climate Change

UK Energy Sector Indicators 2014

30 October 2014

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

This document is also available from our website at www.gov.uk/government/collections/uk-energy-sector-indicators

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Introduction

In previous years UK Energy Sector Indicators was published in July (main indicators) and October (background indicators). Following a review of the indicators in 2011 the Department of Energy & Climate Change (DECC) have decided to combine the publications as the majority of the data included within the main indicators is readily available in other DECC statistical publications and releases. A note explaining where the data previously included in the main indicators can be found is available on the DECC section of the gov.uk website at:
www.gov.uk/government/statistics/uk-energy-sector-indicators-main-mapping-to-alternative-data-sources

As a result this release will now simply be known as UK Energy Sector Indicators. The content of this publication has also been reviewed to ensure that all relevant indicators in support of energy and climate change policy not readily available elsewhere are included.

For example, the section on fuel poverty previously included within the background indicators no longer features in this publication as fuel poverty data is readily available in the annual report on fuel poverty statistics and the fuel poverty monitoring indicators available on the DECC section of the gov.uk website at:
www.gov.uk/government/collections/fuel-poverty-statistics

However, also included are details of the input and impact indicators which form a part of DECC's Business Plan. Details of the latest data on the input and impact indicators and other data sets included in DECC's 2012-15 Business Plan (published in May 2012) are provided. The majority of the indicators and other data sets are Official Statistics and data, charts and commentary for those indicators can be accessed in the DECC statistical publications UK Energy in Brief, Quarterly Energy Prices and Energy Trends or on the DECC section of the gov.uk website at:
www.gov.uk/government/organisations/department-of-energy-climate-change/about/statistics

In July DECC published the annual Digest of United Kingdom Energy Statistics and other Government Departments have since published new information on economic performance etc. As a result we are now able to update the indicators included within this publication.

DECC will continue to review the indicators included within this publication to ensure they continue to provide a good overview of data to inform progress in the areas of energy and climate change, and that meet the needs of DECC data users. To help inform this process we would welcome comments from users on the content of the publication, whether there are any additional indicators they would like to see included in future issues, or if there any indicators which are no longer considered to be of use. If you have any comments please send them to DECC Energy Statistics (e-mail: energy.stats@decc.gsi.gov.uk or by post to: DECC, Energy Statistics Team, Kings Buildings – Ground Floor, 16 Smith Square, London SW1P 3HQ).

Indicators

The indicators are grouped under 4 main categories and then further sub-grouped under 11 categories as follows:

- Economic indicators
    - Energy in the economy; investment and productivity

- Reliable supplies of energy
    - Resources
    - Energy diversity
    - Capacity utilisation
    - International comparisons of energy production and use

- Energy prices and competition
    - Fuel prices (industrial and oil & petroleum)
    - Competition in energy markets
    - Fuel prices (domestic)

- Environmental objectives
    - Conversion efficiencies
    - Energy use indicators
    - Energy and the environment

A full list of indicators, charts and tables, is shown in the contents section on pages 1 to 4.

Discontinued indicators

All of the indicators are continually reviewed so as to ensure that they remain relevant, however from time to time it will be necessary to discontinue publishing updates to some of the indicators.

The following indicators included within the 2013 edition of this publication have now been discontinued:

Section 7: Competition in gas sales to electricity generators
Section 10: Average fuel consumption per new car, and Cars registered for the first time.

New indicators included within the publication for the first time are:

Section 10: Median domestic gas consumption (temperature corrected) in England and Wales by property type, and Median domestic electricity consumption in England and Wales by property type.

Numbering of indicators

In previous years some indicators were suffixed a, b or c, however for this edition all indicators have been allocated their own non-suffixed reference number.

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

Designation can be broadly interpreted to mean that the statistics:

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

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

Quality
To ensure the quality of data presented in this publication, the majority of data used are National Statistics mainly produced by DECC, but also by the Office for National Statistics and other Government Departments. This means that they are produced to high professional standards as set out in the UK Statistics Authority's Code of Practice for Official Statistics. Where National Statistics are not produced for a specific series, data have been taken from Ofgem, the independent regulator for electricity and gas markets, National Grid and the International Energy Agency (which is the energy arm of the OECD). These data are also produced to high standards as they are published and used for planning and analytical purposes in their own right.

Revisions
This publication provides a snap shot overview of key elements in relation to energy and climate change and as such is not subject to revision during the year. DECC's revisions protocol is available on the DECC section of the gov.uk website at:
www.gov.uk/government/collections/decc-statistics-governance

Estimated data
Where feasible, charts have been updated to the latest possible year using provisional monthly data. Final energy data for 2013 were published in DECC's Digest of UK Energy Statistics 2014 on 31 July 2014, available on the DECC section of the gov.uk website at:
www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

Time series for charts
In general charts within this publication show data from 1980 through to 2013. However some data, for example emissions are only available on a consistent basis from a later period, e.g. 1990, so some shorter time series are presented.

Data sources
Specific details of the source used for each indicator is provided with further information available from the DECC statistics team. Methodology notes detailing the surveys, data processes and data quality measures used in producing DECC's official statistics are available on the DECC section of the gov.uk website at:
www.gov.uk/government/organisations/department-of-energy-climate-change/about/statistics. A list of sources and website addresses, and a contact list for key DECC staff are provided at the end of this publication on pages 101 and 102.

Department of Energy & Climate Change: Business Plan - Indicators and Other Data Sets

Input indicators	Current	Previous
1: Renewable financial incentive cost per unit of renewable energy generated (£/MWh, current = 2012-13, previous = 2011-12)	66.97	54.26
2: Leverage of UK international climate change finance (ratio, current = Jan 10 – Mar 14, previous = Jan 10 – Sep 13)	9.7	6.7
3: Proportion of Nuclear Decommissioning Authority's budget that is spent on decommissioning and cleaning up nuclear plants (%, current = 2013-14, previous = 2012-13)	35	35
Impact indicators	**Current**	**Previous**
1: The total number of energy efficiency installations (cavity wall and loft insulation) in GB households (million, current = June 2014, previous = March 2014) www.gov.uk/government/collections/green-deal-and-energy-company-obligation-eco-statistics	30.29	30.16
2: The number of households in fuel poverty in England (million, current = 2012, previous = 2011)* www.gov.uk/government/collections/fuel-poverty-statistics	2.28	2.39
3: Percentage of energy consumed in the UK that has been generated from renewable sources (%, current = 2013, previous = 2012) www.gov.uk/government/collections/uk-energy-in-brief	5.2	4.2
4: The spare capacity of the UK's gas network (difference between maximum possible supply and actual peak demand) (% of actual peak demand, current = 2013-14, previous = 2012-13) www.gov.uk/government/collections/uk-energy-in-brief	90	79
5: The spare capacity of the UK's electricity network (difference between maximum possible supply and actual peak demand) (% of actual peak demand, current = 2013-14, previous = 2012-13) www.gov.uk/government/collections/uk-energy-in-brief	43	42
6: The impact of other countries' pledges to decrease their greenhouse gas emissions on predicted global emissions (GtCO2, current = 2013 estimate, previous = 2012 estimate)	8-12	8-13
7: Total emissions of greenhouse gases from the UK (MtCO2, current = 2013 provisional, previous = 2012) www.gov.uk/government/collections/uk-greenhouse-gas-emissions	569.9	581.1
8: Reduction in the Nuclear Provision through decommissioning and clean-up (£billion, current = 2013-14, previous = 2012-13)	2.8	2.4
9: The proportion of all UK energy supply from low carbon sources (%, current = 2013, previous = 2012) www.gov.uk/government/collections/energy-trends	12.9	11.8

Other Data Sets	Current	Previous
1: Average domestic electricity price (including taxes) (UK rank within the EU15, current = 2013, previous = 2012)** www.gov.uk/government/collections/quarterly-energy-prices	11th	11th
2: Average domestic gas price (including taxes) (UK rank within the EU15, current = 2013, previous = 2012)** www.gov.uk/government/collections/quarterly-energy-prices	15th	15th
3: Net UK energy import dependency (%, current = 2013, previous = 2012) www.gov.uk/government/collections/energy-trends	47.1	43.1
4: Final energy consumption (including non-energy use) (Mtoe, current = 2013, previous = 2012) www.gov.uk/government/collections/energy-trends	150.1	148.9
5: Temperature adjusted primary energy use (Mtoe, current = 2013, previous = 2012) www.gov.uk/government/collections/energy-trends	203.2	207.2
6: The size of the Nuclear Provision (£billion, current = 2013-14, previous = 2012-13)	-65.0	-59.0

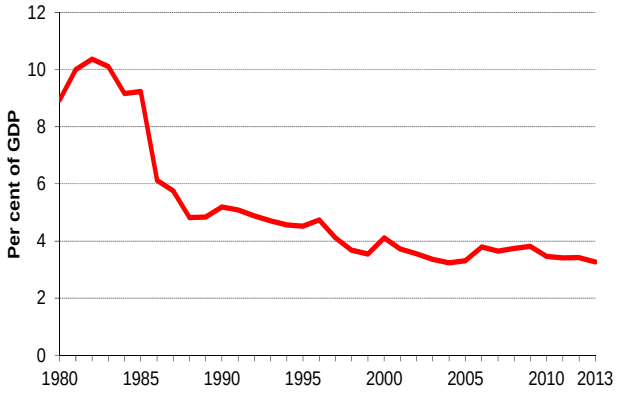
Notes

* Through the Energy Act 2013, the Government has laid the ground for a new legal framework to monitor fuel poverty in England using the Low Income High Costs indicator (LIHC); the data above is based on the LIHC indicator. Under the old 10% indicator (i.e. a household is said to be fuel poor if it needs to spend more than 10% of its income on fuel to maintain a satisfactory heating regime) the data for 2011 and 2012 is 3.20 and 3.05 million households respectively.

** Where 1/15 is the most expensive and 15/15 is the least expensive.

Economic Indicators
1 Energy in the Economy; Investment and Productivity

Chart 1.1:
Contribution to GDP[(1)] by the energy industries, 1980 to 2013



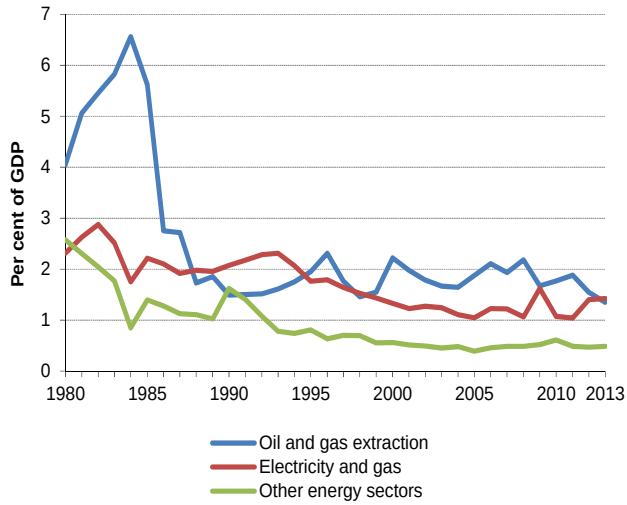
(1) Data from 1997 onwards based on the SIC 2007 classifications

Source: Office for National Statistics

- Following the peak of 10.4% in 1982, the contribution of the energy industries to Gross Domestic Product (GDP) fell sharply until the late 1980s. It has since continued to follow a downward trend but at a much slower rate.

- Latest revised data from ONS show that since 2000, the contribution has remained below 4% and in 2013 the energy industries contributed about 3.3% to GDP (at current prices).

Chart 1.2:
Contribution to GDP by the energy sectors, 1980 to 2013



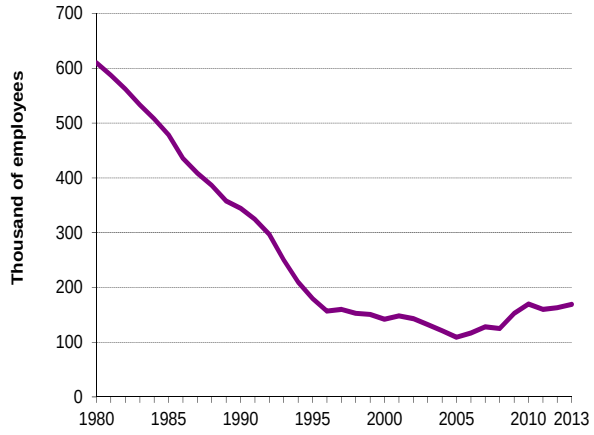
Source: Office for National Statistics

- Apart from the late 1980s to the mid-1990s when oil prices were low, the oil and gas sector has remained a major contributor to GDP. In 1984, the upstream oil and gas sector contributed nearly 7% to GDP. Since the drop in the price of oil in 1986, this reduced and has remained under 3%, as whilst oil prices have risen, production has fallen. In 2013 the contribution to GDP by the oil and gas sector was 1.4%. The average industrial oil prices fell 3% while that for gas rose 10% compared to 2012.

- Between the early 1990s and up to 2005, the contribution to GDP by the electricity and gas sector fell steadily. Apart from the peak in 2009, it has since remained broadly stable. However in the last two years contribution by this sector has been around 1.4%, just under half its level in 1982.

- The contribution to GDP by the other energy sectors (coal extraction and coke, refining and nuclear processing) has also declined over the past two decades, but for the past few years it has remained stable at around 0.5%.

Chart 1.3:
Employment[(1)] in the energy industries, 1980 to 2013

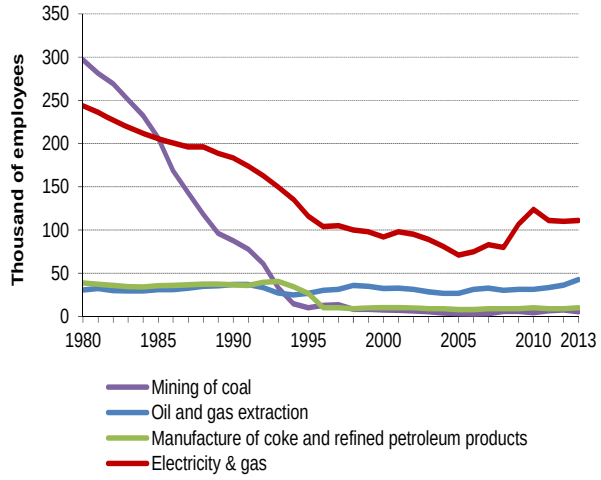


(1) Data exclude contractors and from 1996 onwards are based on the SIC 2007 classifications.

Source: Office for National Statistics

- Employment in the energy industries fell at an average rate of 7.8% per year between 1980 and 1995 with much of the decline in the coal industry. However between 1995 and 2005, the rate of decline in employment was much lower at 4.9% per year.
- Since 2005 there has been growth in employment in the energy industries with an average growth rate of 5.6% per year mainly due to growth in the power and gas sectors.
- In 2013, employment in the energy industries stood at around 169,000, an increase of 3.7% over the previous year.

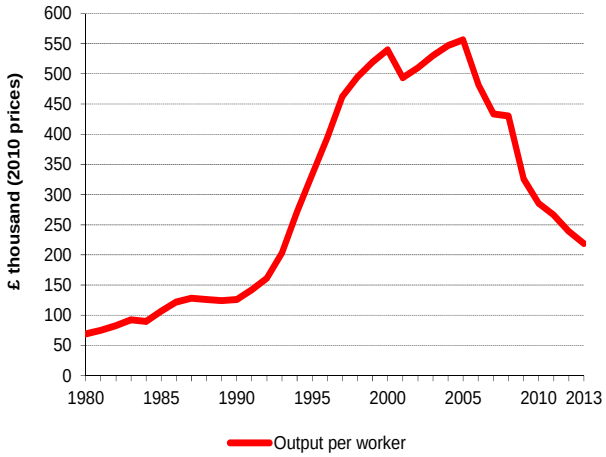
Chart 1.4:
Employment in the energy sectors, 1980 to 2013



Source: Office for National Statistics

- Employment in coal and mining industries has declined since 1980, falling rapidly up to the mid-1990s as a result of a number of mine closures.
- Employment in the oil and gas industries has remained generally stable, however following the slow drop between the late 1990s and 2005, has grown gradually again. In the manufacture of coke and refined petroleum products industries, employment fell in the first half of the 1990s and has since remained fairly low and stable.
- Employment in the electricity and gas sectors declined steadily between 1980 and 2005. It has since improved as a result of growth in the electricity sector, though it has remained relatively stable in the past two years.

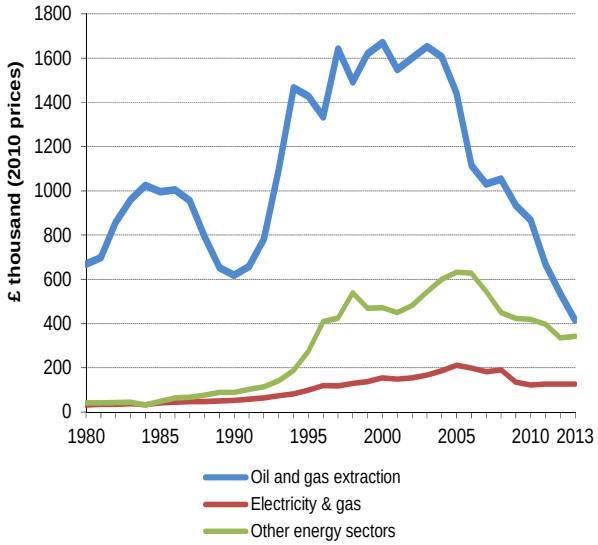
Chart 1.5:
Changes in the productivity of the energy industries, 1980 to 2013



Source: DECC estimates based on Office for National Statistics data

- Since 1980 the productivity of the energy industries has increased overall more than 3-fold.
- Productivity peaked in 2005 at £556,000 per head. It has since fallen mainly as a result of a large decrease in oil and gas production. In 2013, productivity was £219,000 per head.
- Productivity is calculated as gross value added in constant 2010 prices divided by employment.

Chart 1.6:
Changes in the productivity of the energy sectors, 1980 to 2013

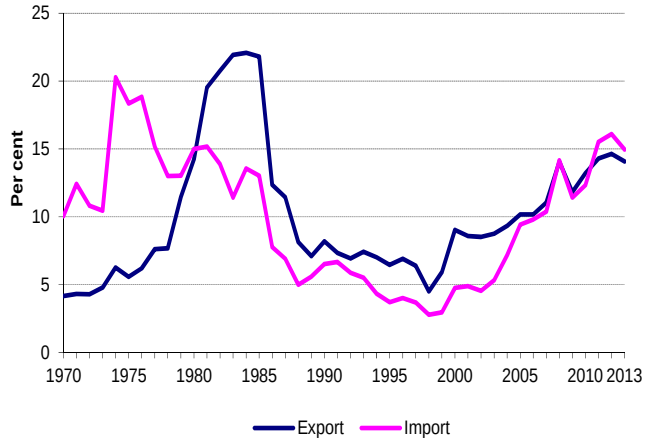


Source: Office for National Statistics
Data from 1996 onwards based on the SIC 2007 classifications

- Labour productivity of the upstream oil and gas industry peaked in 2000 and then again in 2003 after which it has been on a general downward trend. In 2013, it was 75% lower than the peak of 2003 at £416,000 per head at 2010 prices.
- Labour productivity in the electricity and gas industry increased steadily up to 2005 but subsequently fell. In 2013, it was £126,000 per head at 2010 prices, 40% below its 2005 level.
- Since the peak in 2005, labour productivity in the other sectors comprising of coal mining and manufacture of coke and refined petroleum, has been on the decline but remaining broadly similar in the last two years whilst more mines and refineries have closed down.

The output figures used in these productivity measures are derived from changes in the Index of Production, and so reflect changes only in the *volume* of output, i.e. assuming all prices had remained unchanged at 2010 levels.

Chart 1.7:
Value of exports and imports of fuels as a percentage of the value of all visible exports and imports[(1)], 1970 to 2013

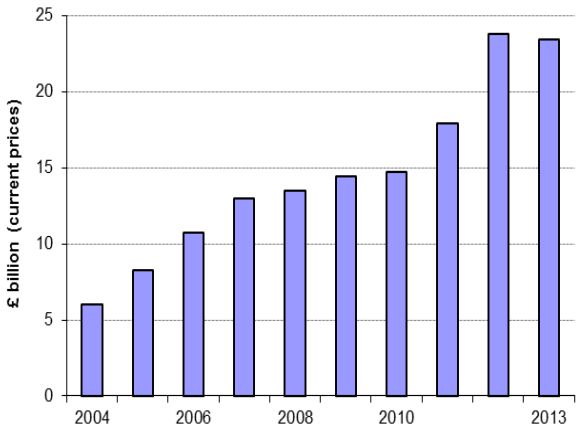


(1) Valued on a 'free on board' basis and at current prices

Source: Office for National Statistics

- Oil, oil products and gas account for most of the overseas trade by the energy industries.
- Before the world oil price crash in 1986 exports of fuels accounted for over 21% of the value of all UK visible exports.
- Energy currently represents 15.0% of all UK imports and 14.1% of all UK exports.
- The UK became a net importer of energy in value terms in 2005 with a deficit of £5.0 billion. In 2013, following a fall in the price of crude oil and reduced levels of imports, the deficit stood at £18.9 billion.
- Between the UK becoming a net exporter in 1981 and a net importer in 2005, the cumulative contribution of energy to the balance of payments was £71 billion.

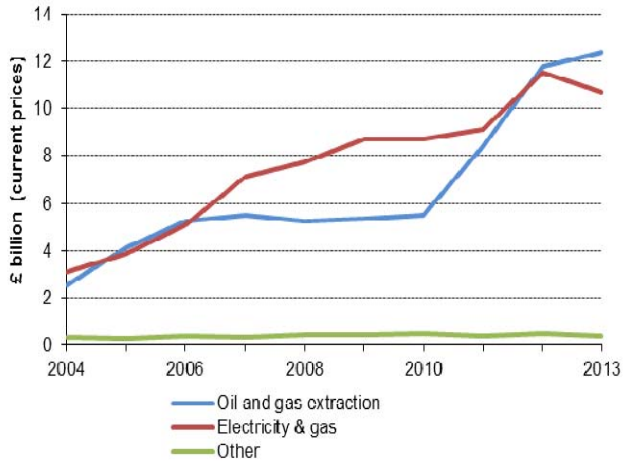
Chart 1.8:
Investment by the energy industries, 2004 to 2013



Source: Office for National Statistics - Capital expenditure investment (total net spend) in the energy industries -

- Investment by the energy industries in 2013 was £23.4 billion (at current prices); £0.4 billion lower than the previous year.
- Since 2004, investment in the energy industries has continued to grow and by 2013 it has increased by 4-fold.

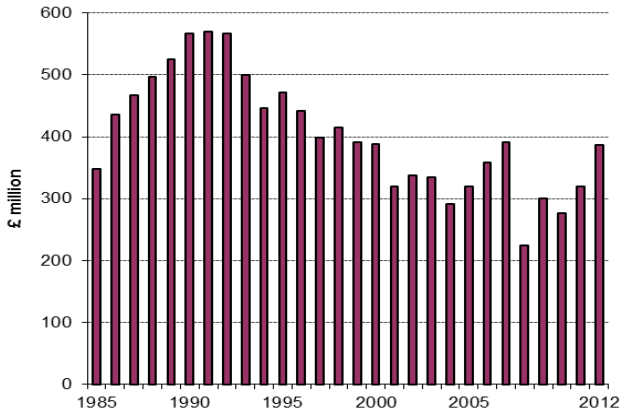
Chart 1.9:
Investment by the energy sectors, 2004 to 2013



Source: Office for National Statistics
Data based on the SIC2007 classifications

- In 2013, investment in the oil and gas extraction sector increased by 4.9% over the previous year to £12.4 billion. This was 53% of the total investment by the energy industries in 2013 and more than twice the amount in 2010.
- Since 2004, there has been a significant increase in investment in the electricity and gas sectors. However in 2013, investment in these sectors fell by 7.4% compared to the recent peak seen in the previous year, to £10.7 billion. In 2013, investment in the electricity sector was 39% and gas 7% of the total investment by the energy industries.
- Investment in the other sectors comprising of the mining of coal and lignite, manufacture of coke and refined petroleum and nuclear processing remained fairly low (under a billion) and broadly constant.

Chart 1.10:
Research and Development by the energy industries [(1)], 1985 to 2012



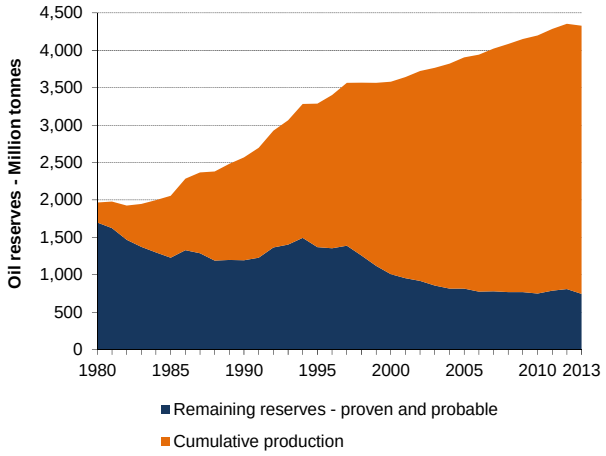
[(1)] Excludes water supply and includes mining.

Source: Office for National Statistics

- Research and development is defined as, 'creative work undertaken on a systemic basis in order to increase the stock of knowledge … and the use of this stock to devise new applications.'
- In 2012, an estimated £387 million, mainly within the extractive industries, was invested in research and development by the energy and water industries in the UK, and accounting for 2.3% of total research and development expenditure in UK businesses.

Reliable Supplies of Energy
2 Resources

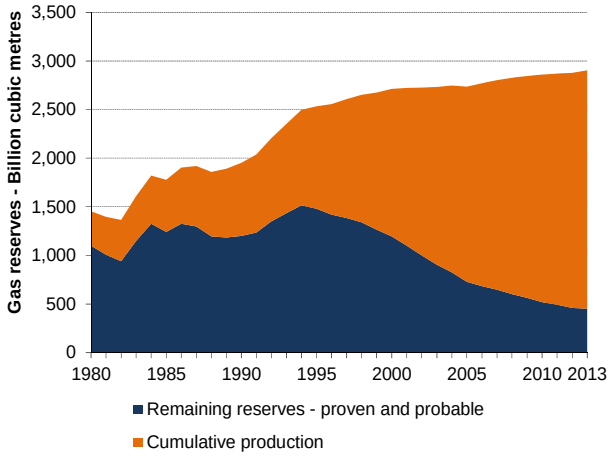
Chart 2.1:
Cumulative oil production plus central estimates of remaining discovered oil reserves, 1980 to 2013



Source: DECC

- Remaining reserves of oil have declined from the mid 1990s, but have remained broadly stable over the last few years.
- The sum of remaining proven and probable reserves and cumulative production (the Estimated Ultimate Recovery, EUR) is a key metric for oil and gas production. The EUR for oil has more than doubled since 1980, reflecting new discoveries and new technologies allowing the exploitation of resources that were previously regarded as uncommercial.
- Proven and probable reserves at the end of 2013 stood at 746 million tonnes, down from 811 million tonnes in 2012.

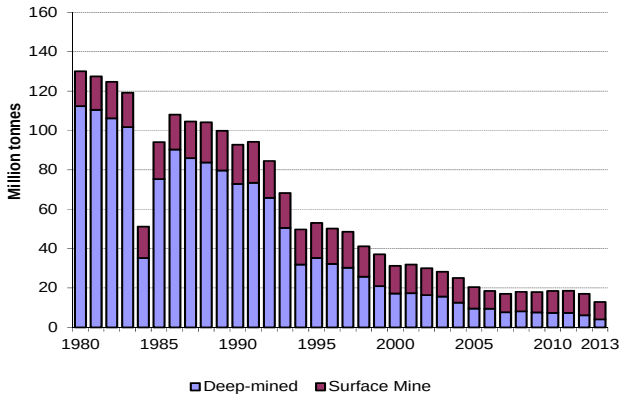
Chart 2.2:
Cumulative gas production plus central estimates of remaining discovered gas reserves, 1980 to 2013



Source: DECC

- Remaining reserves of gas have declined since the early 1990s as the rate of gas production has exceeded additions from existing discoveries and from new finds of gas.
- The sum of remaining proven and probable reserves and cumulative production (the Estimated Ultimate Recovery, EUR) is a key metric for oil and gas production. The EUR for gas has almost doubled since 1980, reflecting new discoveries and new technologies allowing the exploitation of resources that were previously regarded as uncommercial.
- Proven and probable reserves at the end of 2013 stood at 452 Billion Cubic Metres, down from 461 Billion Cubic Metres in 2012.

Chart 2.3:
Coal production, 1980 to 2013



Note:

Surface mine production includes an estimate of slurry recovered from ponds, dumps, rivers etc.

The low level of production in 1984 is because of a miners' strike.

Source: DECC, DUKES table 2.4, The Coal Authority

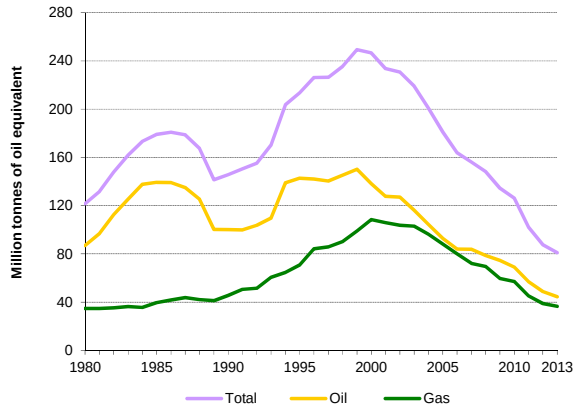
- UK coal production has declined from the 1980s, in response to falling demand caused by switching to cheaper imported coal and to gas for electricity generation. The closure of a number of coal mines in 2013 led to coal production falling further. Deep mine closures owing to exhaustion of recoverable reserves also contributed to the decline. In 2013, deep mined production fell to 4 million tonnes

- Surface mine production has also been declining, but exceeded deep-mined in 2005 for the first time, accounting for 53 per cent of total production. In 2013, surface mine production fell to 9 million tonnes.

- The Coal Authority estimates economically recoverable and minable coal resource in current operations, and those in the planning or pre-planning process, at 230 million tonnes in underground mines and 110 million tonnes in surface mines. In addition there are some 260 million tonnes at closed underground mines still in licence. The tonnage in identified prospects is 3,180 million tonnes suitable for underground mining and 780 million tonnes suitable for surface mining.

- In addition to these conventional mining resources, the Coal Authority has licensed some 3,000 million tonnes of coal in offshore conditional licences for potential underground coal gasification operations.

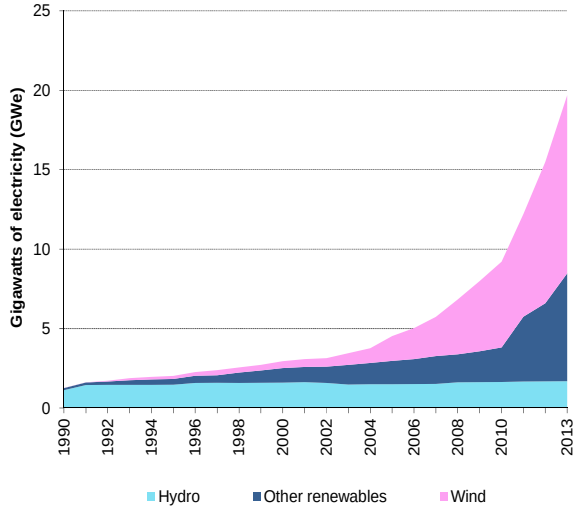
Chart 2.4:
UK Continental Shelf production, 1980 to 2013



Source: DECC, DUKES table 1.1.2

- Oil production in 2013 at 44.5 million tonnes was 70% lower than the record 150.2 million tonnes in 1999, with output down 9% in 2013 compared to 2012, due to slowdowns and maintenance issues.
- As with oil, UK gas production is also declining as UK Continental Shelf reserves deplete. Gas production in 2013 at 36.5 million tonnes was 6% lower than in 2012 and 66% lower than the record 108.4 million tonnes in 2000.
- The long term decline rate in total UKCS production over the last decade is around 9%.

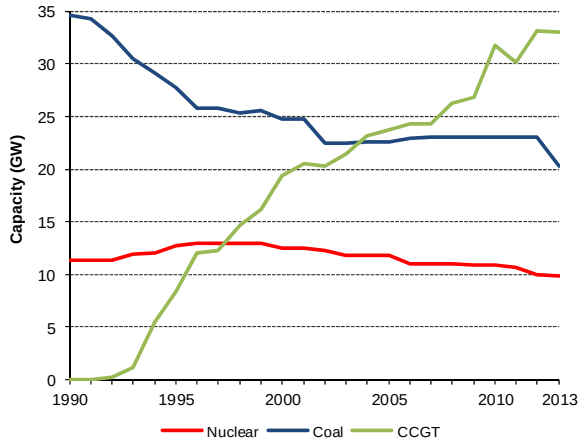
Chart 2.5:
Capacity [(1)] of renewable sources for electricity generation, 1990 to 2013



(1) Installed capacity including wastes burned with biomass
Source: DECC, DUKES table 6.4

- Renewable sources accounted for 22% of all electricity generating capacity in the UK in 2013. Over half of renewables capacity was wind, which first exceeded hydro capacity in 2005.
- The capacity for electricity generation from renewable sources is over fifteen times its level in 1990 and over twice the level of five years ago.
- Over the last three years, capacity of other renewables has increased by 4.6 GW, more than three times that at the end of 2010. Of this, 2.7 GW was due to solar PV, and 1.5 GW due to coal stations converting to biomass.
- Renewable electricity contributed 14.9% of the UK's electricity generation in 2013. All renewable sources provided 5.2% of the UK's gross final energy consumption in 2013, as measured using the Renewable Energy Directive methodology, up from 4.2% in 2012.

Chart 2.6:
Major Power Producers generation capacity, 1990 to 2013



Source: DECC, DUKES table 5.6

- The UK's nuclear plant capacity increased up to 1998 but has declined since with the closure of older stations. Nuclear electricity contributed 7% to the UK's primary energy supply and accounted for 20% of electricity generated and 13% of Major Power Producers (MPPs) generation capacity in 2013.

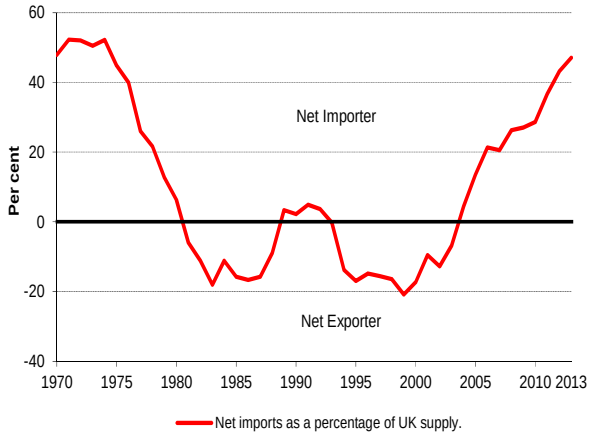
- There was a large fall in coal generation capacity in the 1990s. Between 2002 and 2012 coal capacity was stable, 2013 saw a fall in capacity due to closures under the Large Combustion Plant Directive. Coal accounted for 36% of electricity generation in 2013, down from 40% in 2012, reflecting greater generation from renewables and increased nuclear availability. Coal accounted for 27% of MPPs generation capacity in 2013.

- Since 1992, Combined Cycle Gas Turbine (CCGT) capacity has continually increased. However, in 2013 there was a slight fall to 33 GW, following another brief decrease in 2011. CCGT currently accounts for 43% of MPPs generation capacity and accounted for 25% of electricity generation in 2013.

- Total electricity generation capacity was 85 GW in 2013, compared to 78 GW in 2000 and 75 GW in 1990.

Reliable Supplies of Energy
3 Energy Diversity

Chart 3.1:
Import dependency, 1970 to 2013

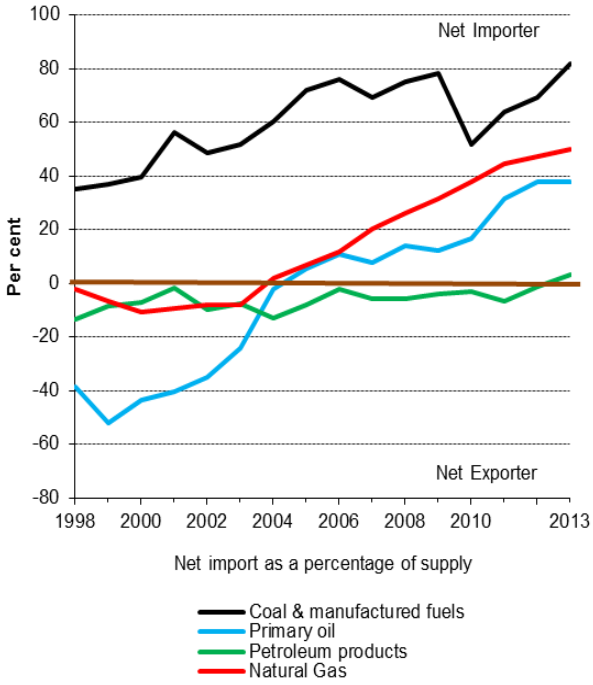


Source: DECC

- In the early 1970s energy imports accounted for over 50% of UK primary energy consumption. However, by 1981 the UK became a net exporter of energy with the rise in the production of oil and gas. Following the Piper Alpha accident in 1988, oil production fell and the UK became a net importer between 1989 and 1992. However, between 1993 and 2003 the UK returned to become a net exporter.

- In 2004 the UK became a net importer again in volume terms with energy imports accounting for 4.5% of the UK primary energy consumption. This figure has continued to increase due to the general decline in oil and gas output and recently the closure of the Coryton refinery. In 2013 the UK import dependency level was 47.1%.

Chart 3.2:
Trade and consumption by fuel type, 1998 to 2013



Source: DECC

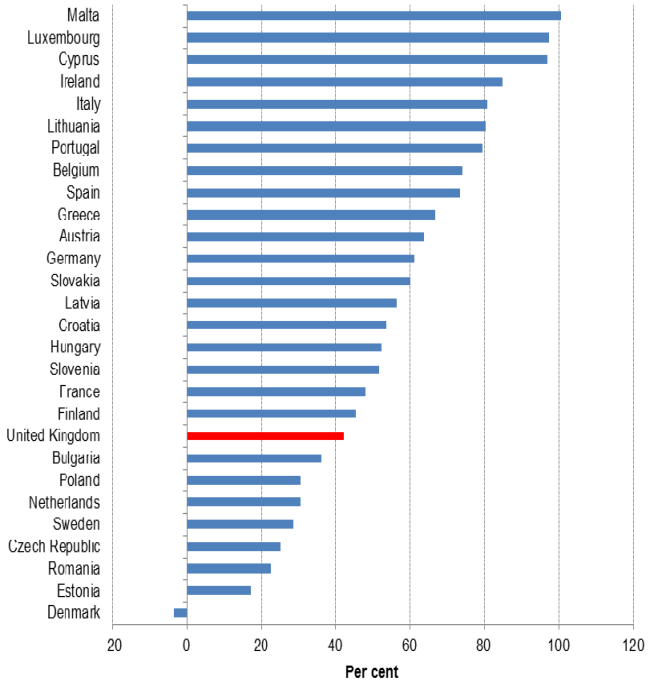
- Coal imports, including manufactured fuels, have been growing steadily to meet demand from generators and the steel industry, and reached nearly 80% of supply in 2009. However coal imports fell sharply in 2010 due to stock use but rose again in recent years, and in 2013 accounted for 82% of the UK primary coal consumption.

- Since 2005, the UK has been a net importer of primary oil and in 2013 imports of primary oil accounted for 38% of the UK primary oil consumption.

- The UK became a net importer of petroleum products in 2013 as imports exceeded exports following the closure of the Coryton refinery.

- Between the late 1990s and early 2000s, the UK was a net exporter of natural gas. With continuing decline in production and depleting reserves, the UK has become increasingly reliant on imports to meet demand, and since 2004 the UK has been a net importer of natural gas. In 2013, natural gas imports accounted for 50% of primary gas consumption.

Chart 3.3:
EU energy dependency, 2012

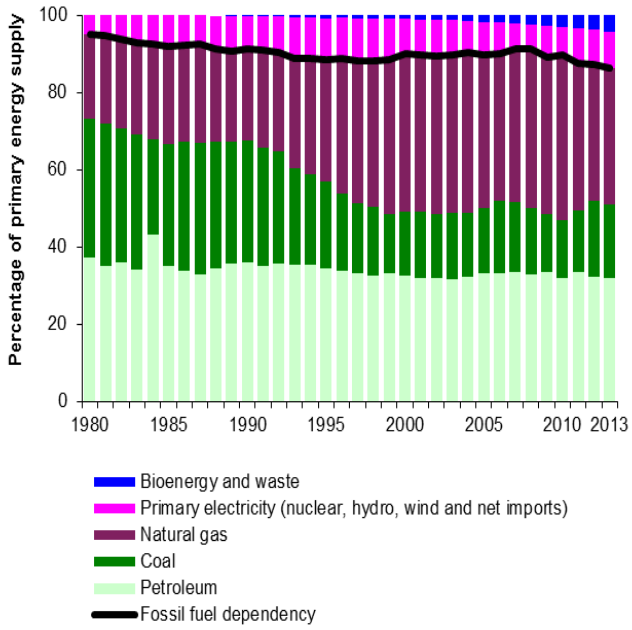


Source: Eurostat

- Since becoming a net importer in 2004, the UK's import dependency has continued to increase.

- Latest comparable data from Eurostat for 2012 shows that the UK had the ninth lowest level of import dependency in the EU behind Denmark which remains a net exporter, Estonia, Romania, Czech Republic, Sweden, Netherlands, Poland and Bulgaria.

Chart 3.4:
Shares of fuels contributing to primary energy supply; fossil fuel dependency, 1980 to 2013



Source: DECC

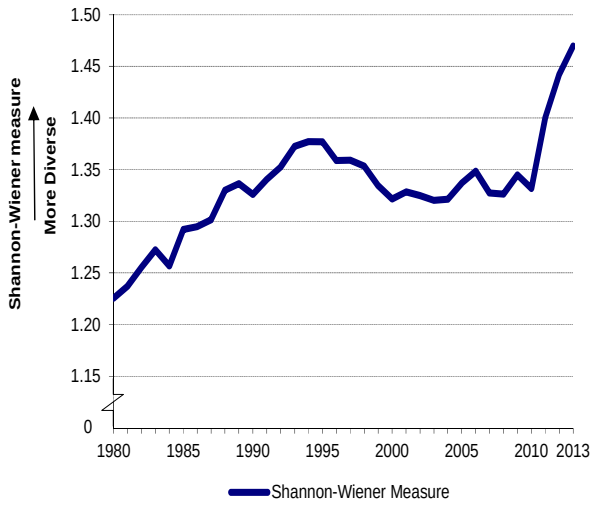
- The mix of primary fuels consumed for energy purposes in the UK has become more diverse.

- In the 1990s coal consumption fell as the amount of natural gas consumed increased. However in recent years, this trend has reversed though in 2013 both coal and gas consumption fell slightly.

- Fossil fuel dependency is measured as the proportion of primary energy supply met by coal, oil and gas. The overall trend in fossil fuel dependency has been gradually downward since 1980. Dependency increased slightly in the late 1990's, largely as a result of less nuclear electricity generation, before stabilising and then falling in 2009 reflecting full operation of nuclear plants and growth in renewables.

- In 2013, coal, petroleum and gas consumption fell slightly and an increase in output from nuclear, wind and other renewables saw fossil fuel dependency reduced by 1.2 percentage points to 86.2%.

Chart 3.5:
Diversity of supply of primary fuels(1), 1980 to 2013

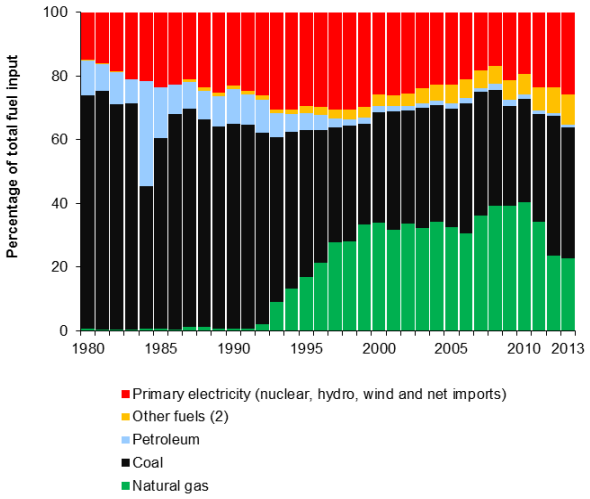


(1) Includes coal, oil, natural gas, nuclear electricity, hydro electricity, net electricity imports and renewables, but excludes non-energy use.

Source: DECC

- There was a steady increase in the diversity of primary fuels in the early 1990s as gas replaced coal for generation and nuclear electricity use increased.
- In the late 1990s as gas became the dominant non-transport fuel, there was a steady decline in diversity, which then remained broadly stable for the next few years.
- In 2005 and 2006 there was a small increase in diversity due to an increase in the use of coal and renewables. However over the past few years, diversity has risen sharply. The increase in 2013 was the result of more output from nuclear and wind and more consumption of bioenergy but less consumption of coal, petroleum and natural gas.
- The Shannon-Wiener measure shows how diversity of a particular market is changing over time. An increase in the Shannon-Wiener measure implies an increase in diversity and vice-versa - more details in the technical notes.

Chart 3.6:
Shares of electricity generated from different fuels [(1)], 1980 to 2013



(1) On fuel input basis. Data for some of the earliest years shown are estimated.
(2) Mainly coke and breeze, coke oven gas, blast furnace gas and renewable sources other than hydro and wind.

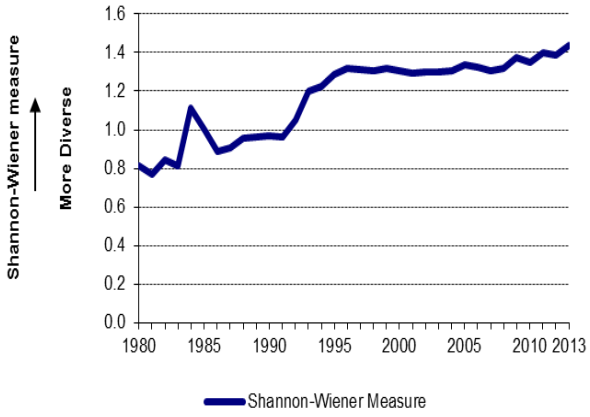
Source: DECC, DUKES table 5.3

- Fuel use for electricity generation became more diverse through the late 1960s and early 1970s, as the share of electricity generated from petroleum grew at the expense of coal, peaking at 29% in 1972. This trend was reversed in the late 1970s, continuing through the 1980s, with the exception of 1984 where generation from coal fell due to the miners' strike.

- The 1990s saw more rapid increases in diversity, with the gas share of fuel used for electricity generation rising to 34% in 2000 after the introduction of gas fired Combined Cycle Gas Turbines (CCGT) stations. This was coupled with the decreasing share of coal, down to 35% in 2000.

- After 2000, gas's share fell back in some years but rose in others depending on the relative prices of coal and gas. In 2010, gas attained a new record share of 40%, but fell back to 23% in 2013, its lowest percentage for seventeen years due to high prices. Correspondingly coal's share has also varied, rising to 41% in 2006, falling to a record low of 31% in 2009, before rising to 41% in 2013. In 2000, nuclear's share fell below 25% for the first time since the early 1990s with increased outages at nuclear stations for repairs, maintenance and safety case work. Since then nuclear's share has fallen back in some years due to closures and further maintenance outages and risen in other years. Nuclear's share increased to 20% in 2013.

Chart 3.7:
Diversity of electricity generated from different fuels [(1)],1980 to 2013



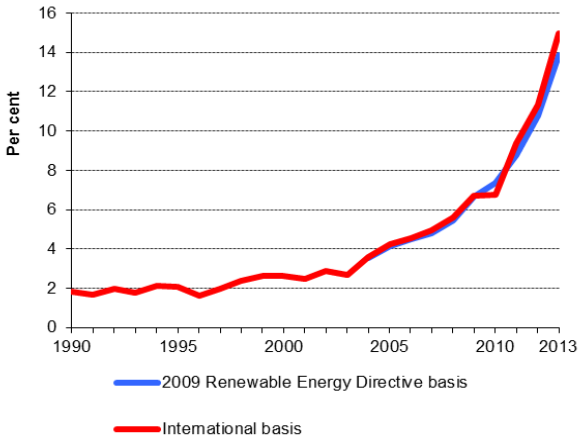
(1) Includes coal, oil, natural gas, nuclear, hydro and other (net imports, coke breeze, coke oven gas, blast furnace gas and renewable sources including wind).

Source: DECC

- Under the Shannon-Wiener measure, diversity increased in the 1970s as the use of oil in generation grew, but then fell back in the 1980s. It increased temporarily in 1984 during the miners' strike as more oil and less coal was used. Diversity increased once more in the early 1990s with the use of gas for generation.

- After 1996, the diversity measure declined gradually because coal, gas and nuclear have reduced other fuels (particularly oil) from 10% of the total down to below 2%. More recently gas and coal generation has declined, with nuclear increasing. The result of this and the recent increase in renewable generation has further increased diversity in 2013 to the highest level recorded.

Chart 3.8:
Proportion of electricity generated by renewables, 1990 to 2013



Source: DECC, DUKES chapter 6

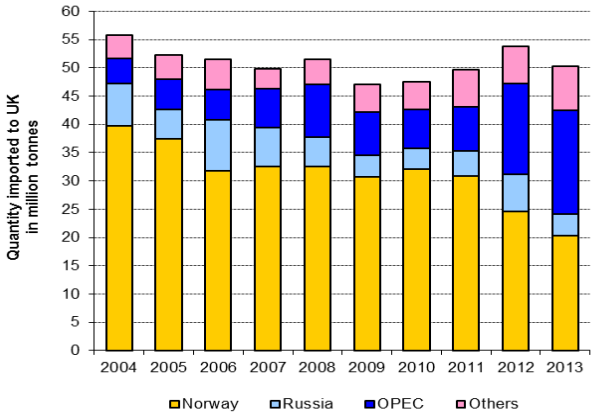
- Renewables provided a record 14.9% of the electricity generated (International basis, i.e. electricity generated from all renewables except non-biodegradable wastes as a percentage of all electricity generated in the UK) in the UK in 2013, an increase from 2.6% in 2000.

- Aside from some variation due to particularly low (in 2010) or high (in 2011) rainfall, over the last two decades, generation from hydro has remained broadly constant (around 4-5 TWh), with little new capacity being built.

- Since the early 2000s, generation from wind has grown rapidly due to increased capacity; in 2007, it overtook hydro to become the leading renewables technology in output terms. Over the same time period, generation from bioenergy has also increased, largely from landfill gas, co-firing, and, more recently, biomass (particularly from converted coal capacity).

- Under the EU Renewable Energy Directive the UK has a target of 15% of total energy from renewables by 2020. This measure “normalises” electricity generation from hydro and wind to account for variation in generation as a result of variable wind speeds and rainfall. The electricity component of this measures renewable electricity generation (including “normalised” wind and hydro) as a proportion of gross electricity consumption. In 2013, this measure was 13.9%.

Chart 3.9:
Sources of oil imports, 2004 to 2013



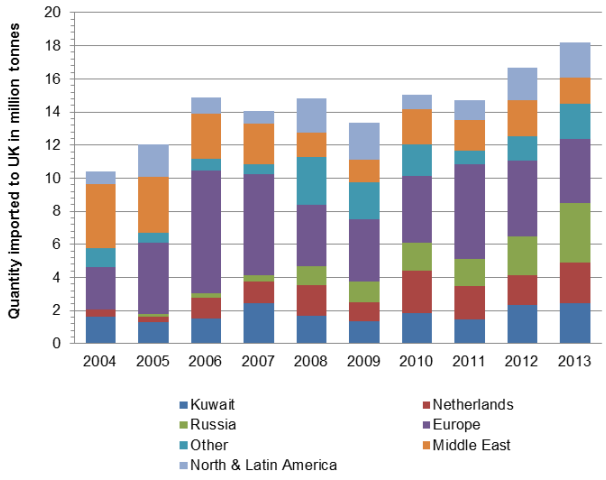
Source: International Energy Agency, DECC

- Even when UK oil production exceeded UK oil demand, the UK imported crude oil primarily because refiners consider the type of crude oil rather than its origin. Most UK refineries use North Sea 'type' crude oil and do not differentiate between UK and Norwegian oil. The close proximity of UK and Norwegian oil fields mean that they may use the same pipeline infrastructure.

- Some crude oils, notably from some OPEC countries, are specifically imported for the heavier hydrocarbons required for bitumen or lubricant production.

- The total volumes of crude oil imports in 2013 decreased from 2012 due to lower refinery demand. Norwegian imports decreased to around 40 per cent of all imports, offset by an increase in imports from OPEC countries such as Algeria (12 per cent) and Saudi Arabia (4 per cent).

Chart 3.10:
Sources of diesel and aviation fuel imports, 2004 to 2013



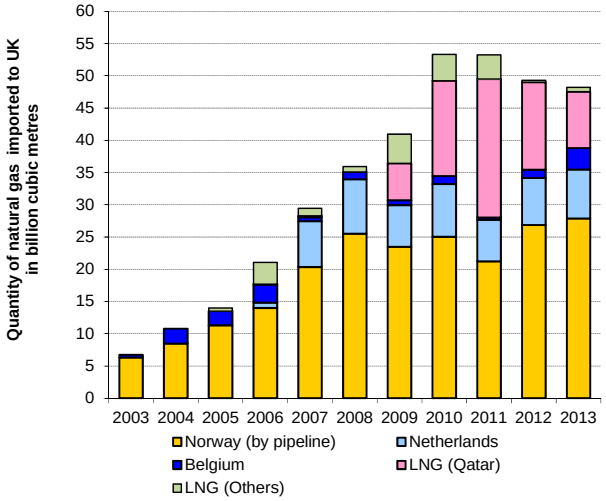
Source: DECC

- The UK is heavily dependent on imports for road diesel and aviation fuel. Net imports met nearly two thirds of the UK's demand for aviation fuel, and around a third of the demand for road diesel.

- The main source of imports of aviation fuel is Kuwait, which provided nearly a third of the UK's aviation fuel imports in 2013. Diesel is predominantly supplied through Sweden, Russia and the Netherlands. Together, these accounted for two thirds of diesel imports in 2013.

- Due to its proximity, Europe has always been a major source of diesel and aviation fuel to the UK. For aviation fuel, however, newer refineries in the Asia and the Middle East are an increasingly important source.

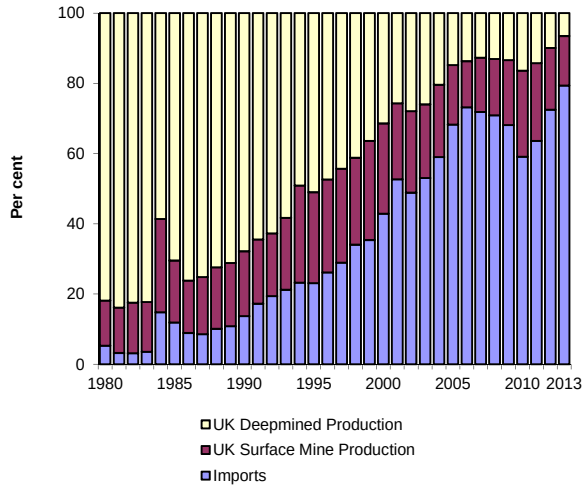
Chart 3.11:
Sources of gross natural gas imports, 2003 to 2013



Source: DECC, National Grid

- UK gas production peaked in 2000 and has been in decline since. With declining indigenous production UK demand has increasingly been met through imports. Norway is the key supplier to the UK with nearly 60% of 2013 imports.
- In 2013 net imports of gas accounted for half of the gas output from the UK transmission system. Between 1997 and 2003, the UK was a net exporter of gas.
- A key development in gas imports has been the increase in LNG imports following the opening of new facilities. LNG imports accounted for 47% of imports in 2011, but this fell to 20% in 2013 as LNG imports were in demand elsewhere in the world, particularly Asia.

Chart 3.12:
Shares of UK coal supply, 1980 to 2013

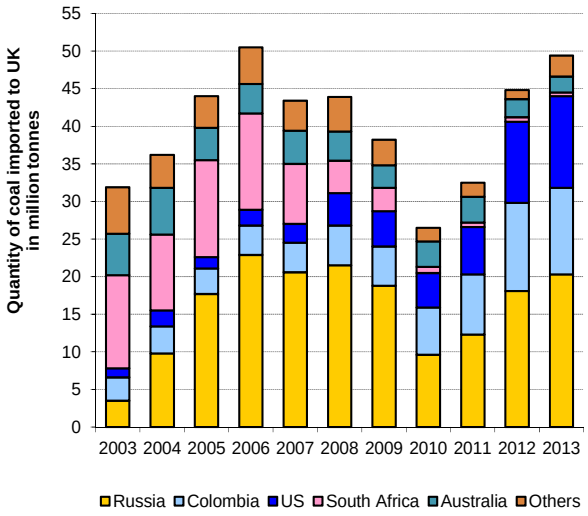


Source: DECC, *DUKES table 2.4*

- UK coal production has declined since 1952 when it peaked at 228 million tonnes. This decline has meant that over the years the UK has become dependent on coal imports and in 2001 imports exceeded UK production.
- Coal imports in 2006 reached a record high at 50 million tonnes but declined to 27 million tonnes in 2010. Coal imports have risen since and were 49 million tonnes in 2013 (82% cent of UK coal supply)[1]. This reflects the declining contribution of domestic production in meeting demand from electricity generators.
- In 2013, steam coal, which is used for electricity generation, accounted for 87% of the total imports, 13% was coking coal. Imports of anthracite were negligible.

1. Import dependency is calculated as net imports divided by the sum of production (including a small estimate of slurry), net imports and stock change.

Chart 3.13:
Sources of coal imports, 2003 to 2013



Source: HM Revenue & Customs and DECC. Energy Trends table 2.4

- Imported coal into the UK has predominantly been from five countries, Russia, Colombia, the US, South Africa and Australia. In 2013, 41% of the UK's coal imports were from Russia, of which 95% was steam coal.

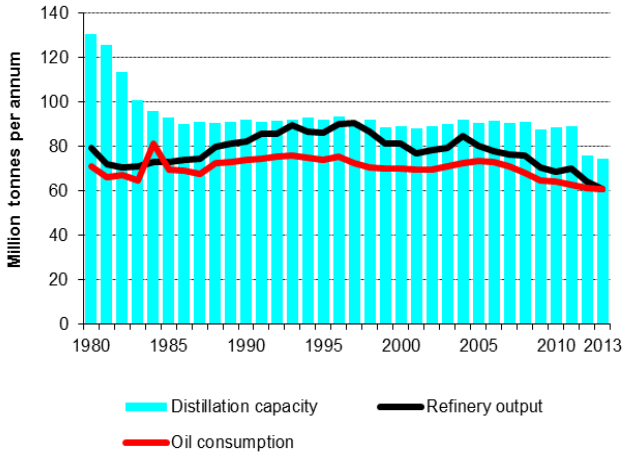
- Coal imports grew by 10% between 2012 and 2013, as a result of lower UK production and generation demand with growth in imports from the USA and Russia, up 13% and 12% respectively.

- In 2003 South Africa provided 39% of imported coal, but this has gradually fallen, to just 1% in 2013. Over the same period, Colombia's share of imports has risen, from 10% to 23%.

- The last two years have seen a large increase in the USA's share of UK coal imports, as it is increasingly using shale gas, rather than coal, as a source of electricity generation, meaning more coal is available to export.

Reliable Supplies of Energy
4 Capacity Utilisation

Chart 4.1:
Oil refinery utilisation, 1980 to 2013

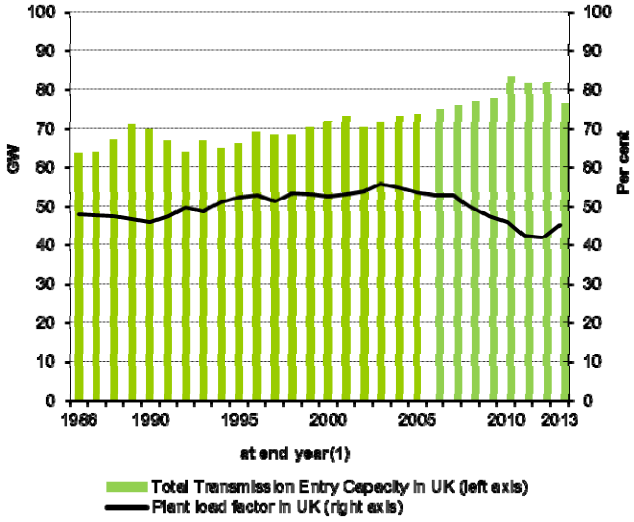


Source: DECC

- Improved refinery efficiency following modernisation in the 1990s has meant that the refinery output of all UK refineries was 82 per cent of total distillation capacity in 2013, compared to 61 per cent in 1980.

- Distillation capacity has been broadly flat since 1985. However, the closure of Coryton refinery in summer 2012 saw a 15 per cent decrease on 2011's levels. More recently, some rationalisation of the existing refinery capacity contributed to a small decrease between 2012 and 2013.

Chart 4.2:
Electricity generating capacity and average load factor for Major Power Producers (MPPs), 1986 to 2013



(1) Before 1997 capacities are as at the end of March of the following year. Capacity figures prior to 2006 relate to declared net capacity.

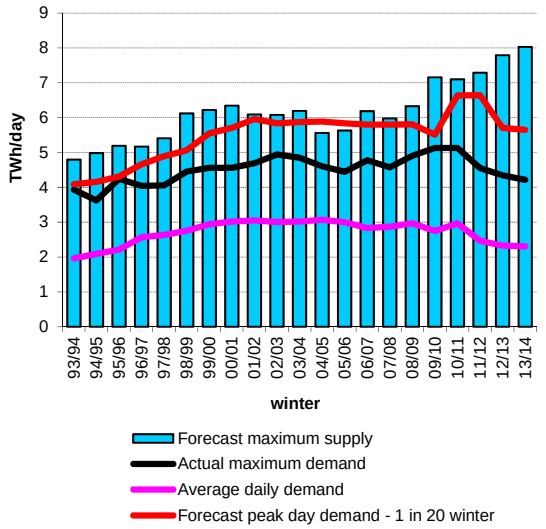
Source: DECC

- Total electricity generating capacity remained within the 60 to 70 GW band between 1986 and 1999, but after that started rising and exceeded 73 GW at the end of 2004. From 2006 to 2009, capacity rose by around 1% per year. In 2010, it rose by 7% to 83 GW due to the opening of five new CCGT stations. In 2011, capacity fell by 2% on the previous year, due to the closure/mothballing of several CCGT stations, partially offset by an increase in wind capacity, before falling marginally again in 2012. In 2013, capacity fell by 7%, due to the closure of several coal stations only partially offset by new renewables.

- Since 1986, the capacity utilised (i.e. the average load factor) has risen from around 48% to a peak of 56% in 2003. Plant load factors have declined since then due to generally increasing capacity and falling demand. In 2013 the plant load factor of MPPs was 45%, an increase on 2012's 42%.

- Maximum demand in 2012/13 was 53.4 GW, a decrease on the maximum demand in 2011/12.

Chart 4.3:
Gas capacity – maximum supply, maximum demand and peak (1 in 20 winter) estimated demand, 1993/94 to 2013/14



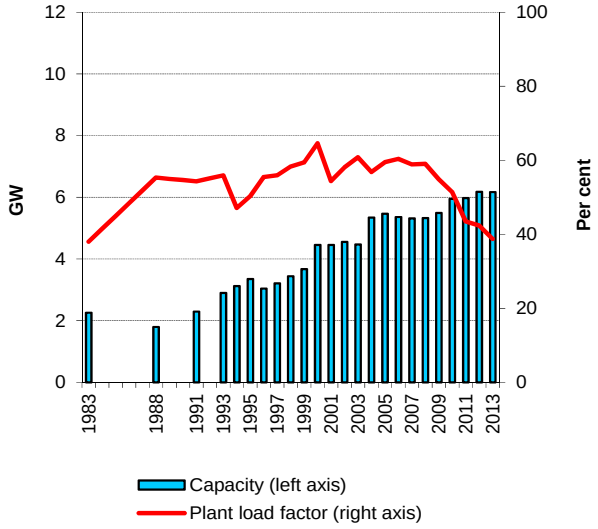
Source: National Grid and DECC

- The maximum supply of gas has increased in recent years whilst demand for gas has dropped, reflecting both warmer weather and lower demand for gas for power generation. The gap between forecast maximum supply and actual demand now stands at 47 per cent of total supply, up from 44 per cent last year.

- The estimated maximum amount of gas that could be supplied to the UK from offshore and onshore production, storage and imports has increased significantly, from 5.98 TWh/day in 2007/08 to 8.03 TWh/day in 2013/14, as new LNG import facilities opened.

- The peak demand in 2013/14 was 3.0 per cent lower than 2012/2013 and 17.9 per cent lower than in 2010/11, which saw peaks in demand due to cold weather.

Chart 4.4:
CHP capacity for electricity generation and average load factor, 1983 to 2013



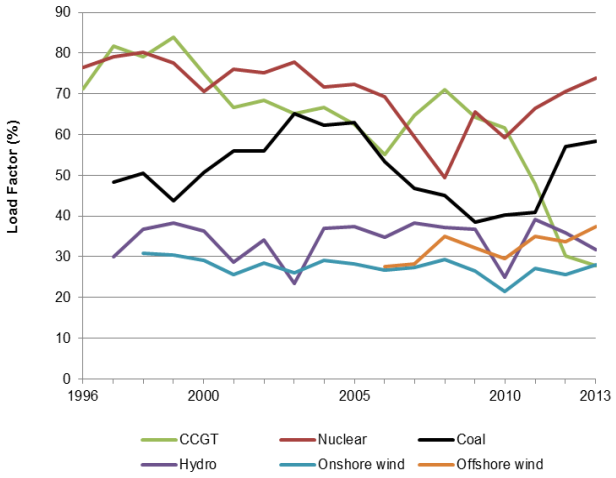
Source: DECC and Ricardo-AEA, DUKES table 7.1

- Between 2012 and 2013, 'Good Quality' electricity generation capacity of Combined Heat and Power (CHP) plants remained constant at around 6.2GW.

- CHP plants generated around 5.8% of the total electricity generated in the UK in 2013.

- The plant load factor measures how intensively the CHP plants were used. The average load factor peaked in 2000 at 64% then fell sharply in 2001 with high gas prices playing a role in the reduction. Since 2008, load factors have fallen from 59% to 39%, mainly due to average operating hours reducing.

Chart 4.5:
Load factors by technology type, 1996 to 2013

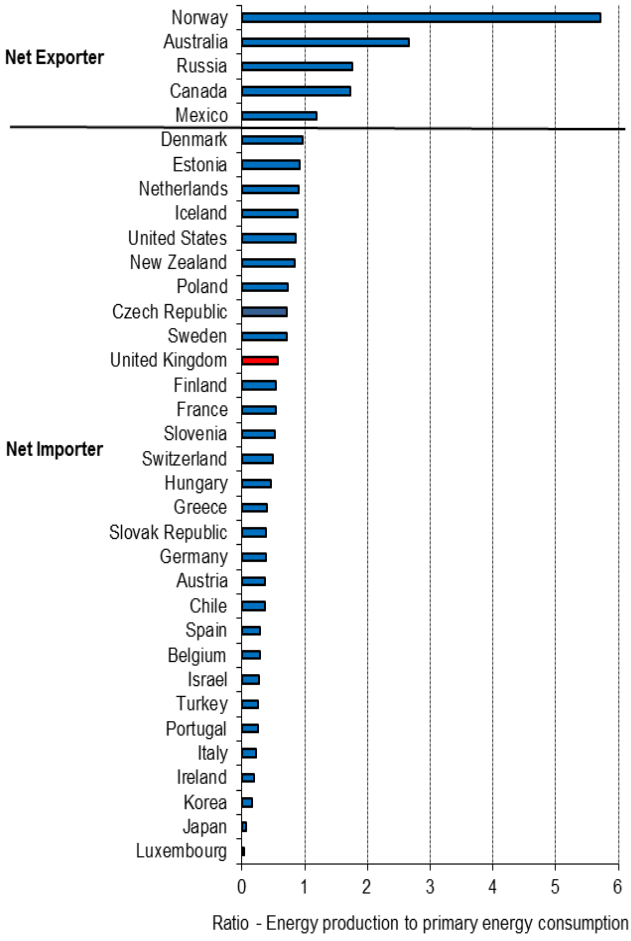


Source: DECC, DUKES table 5.9 and 6.5 for renewable technologies.

- Load factors measure how intensively each type of plant has been used across the year.
- The load factor of Combined Cycle Gas Turbine (CCGT) stations' generally fell, from over 80% in 1999, throughout the mid-2000s, while coal's increased, as gas prices relative to coal increased, so that in 2005 they both stood at 63%. After increasing in 2007 and 2008, as gas prices and nuclear availability fell, the CCGT load factor has fallen in every year since due to a decrease in electricity demand, an increase in CCGT capacity and high gas prices. In 2013, the load factor was 28%, its lowest level for at least seventeen years, whilst coal saw an opposite trend to stand at 58%.
- Nuclear load factors declined in 2007 and 2008 as a result of maintenance outages to several stations. After an increase in 2009 to 66% as stations returned, further outages in 2010 saw the load factor fall again to 59%. In 2013, availability increased, with the load factor reaching an eight year high of 74%.
- Hydro and wind load factors are highly dependent on the weather. Low rainfall in 2003 resulted in a decline in the hydro load factor to 23%. After higher subsequent load factors, low rainfall and wind speeds resulted in much lower load factors for hydro and wind in 2010. In 2011, high wind speeds led to increases in the load factors for both onshore and offshore wind to 27% and 35%. Meanwhile, the highest rainfall levels for at least a decade led to hydro's load factor increasing to 39% in 2011, the highest level for at least fourteen years. Reduced wind speeds and rainfall in 2012 compared to 2011 saw the load factors for both onshore and offshore wind decrease to 26% and 34%, with hydro down to 36%. In 2013, reduced rainfall compared to 2012 saw the load factor for hydro decrease again to 32%. However, the load factors for onshore and offshore wind increased to 28% and 37% due to an increase in wind speed compared to 2012.

Reliable Supplies of Energy
5 International Comparisons of Energy Production and Use

Chart 5.1:
Ratio of energy production to primary energy consumption in OECD countries and Russia(1), 2013

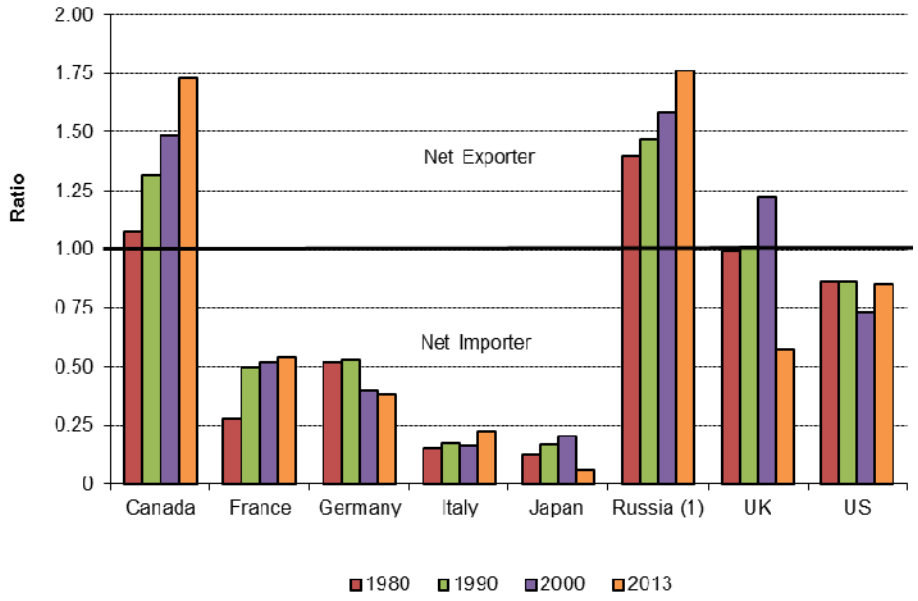


(1) Data for Russia is for 2012, the latest year for which the data are available.

Source: International Energy Agency (IEA)

- Latest comparable data from IEA show that there were four OECD countries, which produced more energy than they consumed in 2013. Russia, which is included here as a G8 member was also a net exporter.
- Norway produced nearly 6 times more energy than it consumes in 2013; with Australia next at 2.7 times. The UK ratio however was just below 0.6 as a result of production falling due to mine closures and the closure of an oil refinery as well as long-term decline in North Sea fields.
- Amongst the G8 countries Canada, Russia and to a lesser extent France have seen marked increases in this ratio since 1980. Italy has also seen a slight increase despite its ratio remaining below 0.3 (see Chart 5.2). However, the ratio for the UK has fallen since 2000 as oil and gas production has fallen and although it is below the 1980 level, it remains above all of the European G8 countries. In Canada the production of all fuels has increased whilst in Japan production has fallen sharply as a result of the Fukushima incident.
- Primary energy consumption for the OECD countries and Russia are sourced from the IEA which produces estimates using net calorific values and excludes consumption for international marine and aviation bunkers.

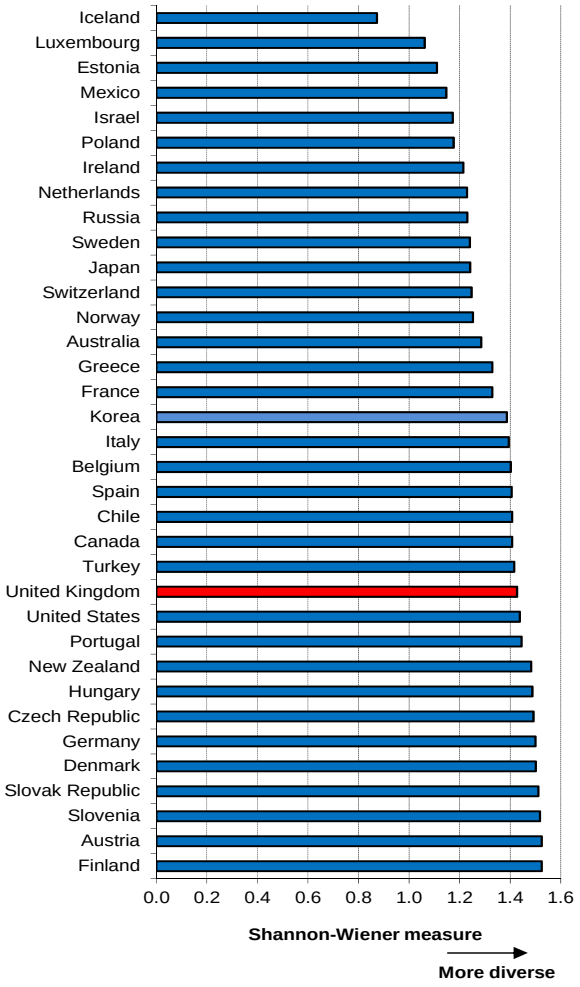
Chart 5.2:
Ratio of energy production to primary energy consumption for G8 Countries, 1980 to 2013



(1) Russia data for 1980 and 1990 estimated from former USSR data. The latest year for which data is available for Russia is 2012.

Source: International Energy Agency

Chart 5.3:
Diversity of primary energy supply [(1)] in OECD countries and Russia[(2)], 2013

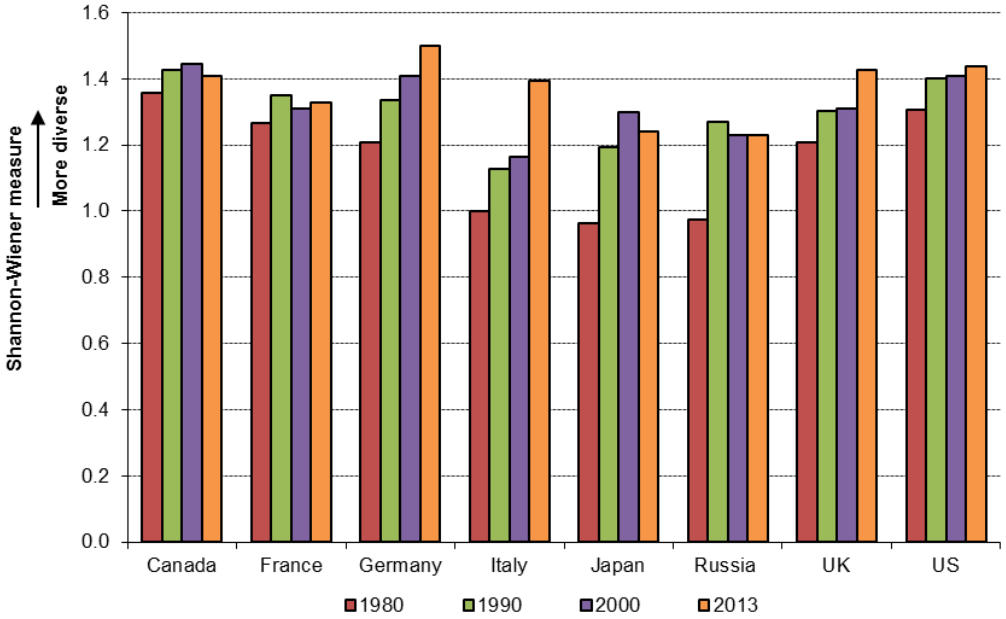


(1) Measured as Shannon-Weiner measure of diversity based on the shares of 5 groups of fuels: coal, oil, gas, primary electricity and biofuels & waste.
(2) Data for Russia is for 2012, the latest year for which data are available.

Source: International Energy Agency

- All G8 countries have seen increases in the diversity of their energy supplies since 1980 (see Chart 5.4). In France the dominance of nuclear power has resulted in a reversal of this trend since 1990.
- In the UK there is a diverse fuel mix comprising of coal, oil, gas, nuclear and renewables.
- In Japan, the diversity measure has fallen as a result of a sharp fall in nuclear energy due to the Fukushima incident and hence more reliance instead on fossil fuels.

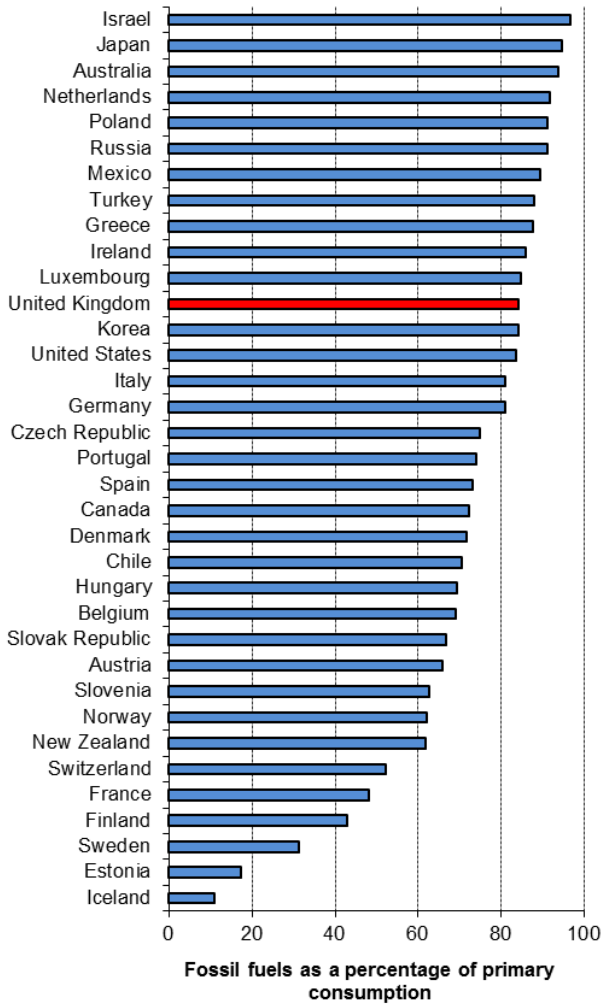
Chart 5.4:
Diversity of primary energy supply(1) for G8 Countries, 1980 to 2013



(1) Based on the shares of five groups of fuels: coal, oil, gas, primary electricity and biofuels & waste.
(2) Russia data for 1980 and 1990 estimated from former USSR data. The latest year for which data is available for Russia is 2012.

Source: International Energy Agency

Chart 5.5:
Fossil fuel dependency in OECD countries and Russia[(1)], 2013

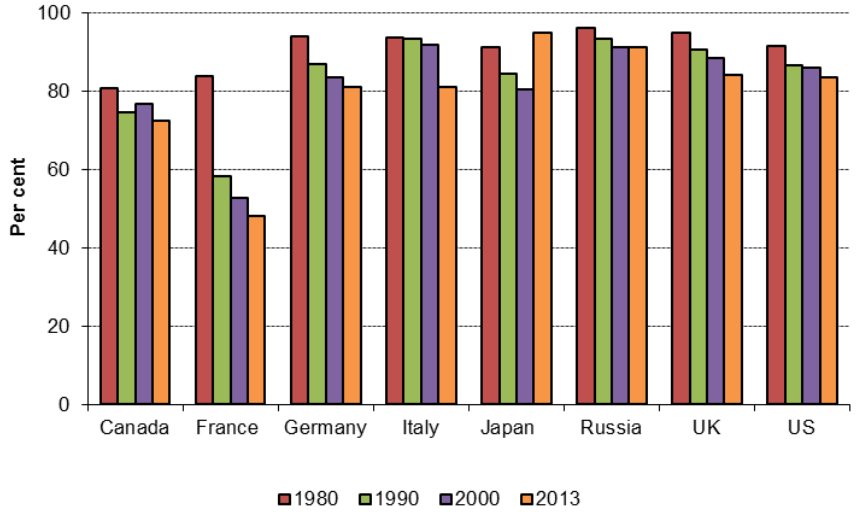


(1) Data for Russia is for 2012, the latest year for which data are available.

Source: International Energy Agency

- The proportion of primary energy supply met by coal, oil and gas provides a measure of a country's dependence on fossil fuels. The OECD countries that are least dependent on fossil fuels, such as, Iceland, Sweden, France and Norway, have well developed alternative sources such as nuclear or hydroelectricity, or geothermal heat.
- All G8 countries, except Japan, have reduced their dependence on fossil fuels since 1980 (see Chart 5.6) by developing and using alternative sources. In France, the growth of nuclear electricity has led to a sharp decline in fossil fuel dependency. Italy has no nuclear electricity and the ratio has remained fairly steady since 1980 before falling in the last decade, due to increased renewables. In Japan, the increase on fossil fuel dependency in recent years was due to the impact of the nuclear disaster in March 2011.
- On the IEA basis of net calorific values, the UK's growth in nuclear and renewable sources of electricity has reduced dependence on fossil fuels from 95% of primary energy supply in 1980 to 84% in 2013.

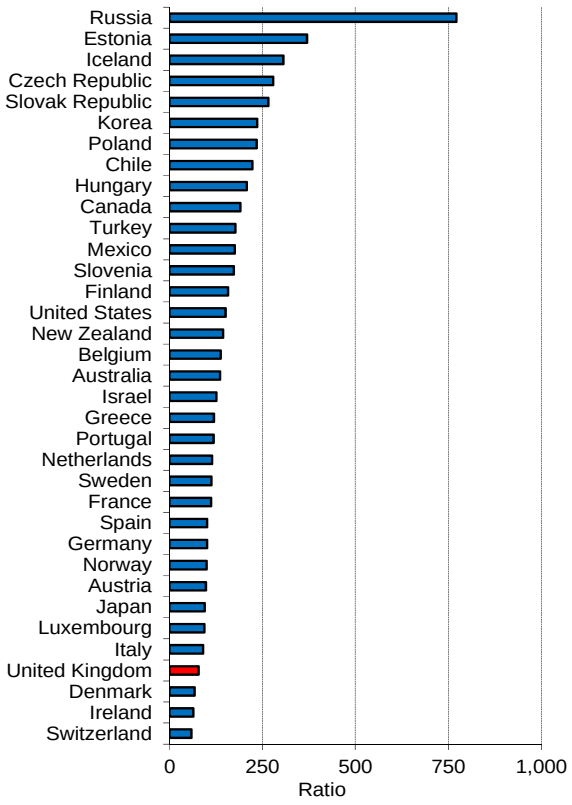
Chart 5.6:
Fossil fuel dependency(1) for G8 Countries, 1980 to 2013



(1) Percentage of primary consumption provided by fossil fuels.
(2) Russia data for 1980 and 1990 estimated from former USSR data. The latest year for which data is available for Russia is 2012.

Source: International Energy Agency

Chart 5.7:
The energy ratio[(1)] in OECD countries and Russia[(2)], 2013

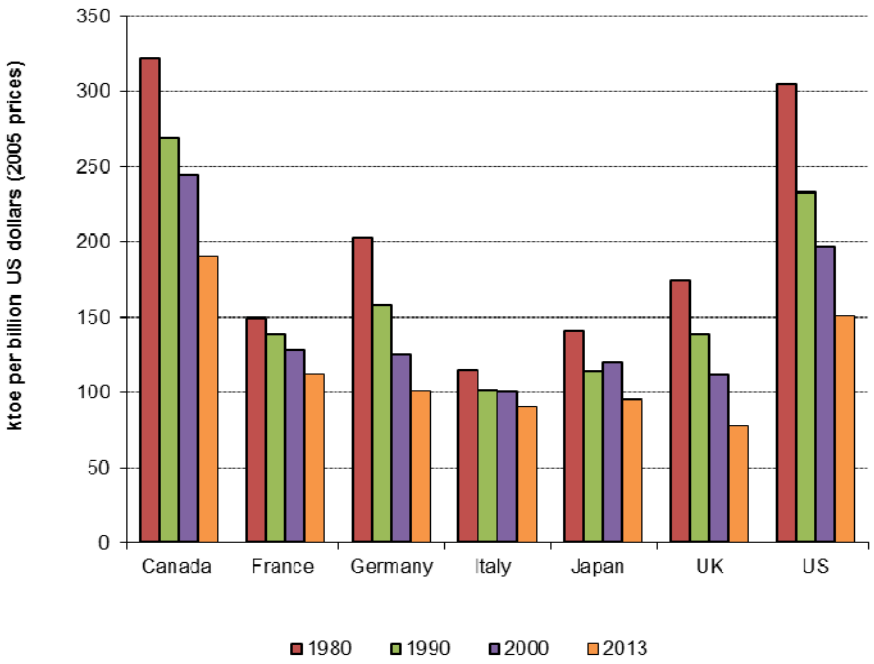


(1) Energy consumption (thousand tonnes of oil equivalent) per billion US dollars (2005 prices)
(2) Data for Russia is for 2012, the latest year for which data are available.

Source: International Energy Agency

- The energy ratio is the ratio of overall primary energy consumption to GDP at constant prices. Differences between countries reflect many factors including climatic differences, the prevalence of energy intensive industries, the relative importance of transport, and the efficiency of energy use in all sectors of the economy.
- All G8 countries, have seen improvements in their energy ratio since 1980 (see Chart 5.8) with growth in GDP outstripping that of primary energy consumption. The latest data for Russia showed that its ratio has improved sharply since 2000 but it is still over four times higher than Canada, the next highest ratio in the G8 economy (Canada).
- Among the remaining G8 countries, Italy saw the smallest improvement, in percentage terms, in the ratio since 1980, indicating that its GDP has grown only slightly faster than its energy use. The UK, by contrast had the largest improvement in the energy ratio since 1980, with a much faster growth in GDP than its energy use, reflecting many factors including the move to a more service based economy.
- The UK in 2013 had the lowest energy ratio of all G7 countries.

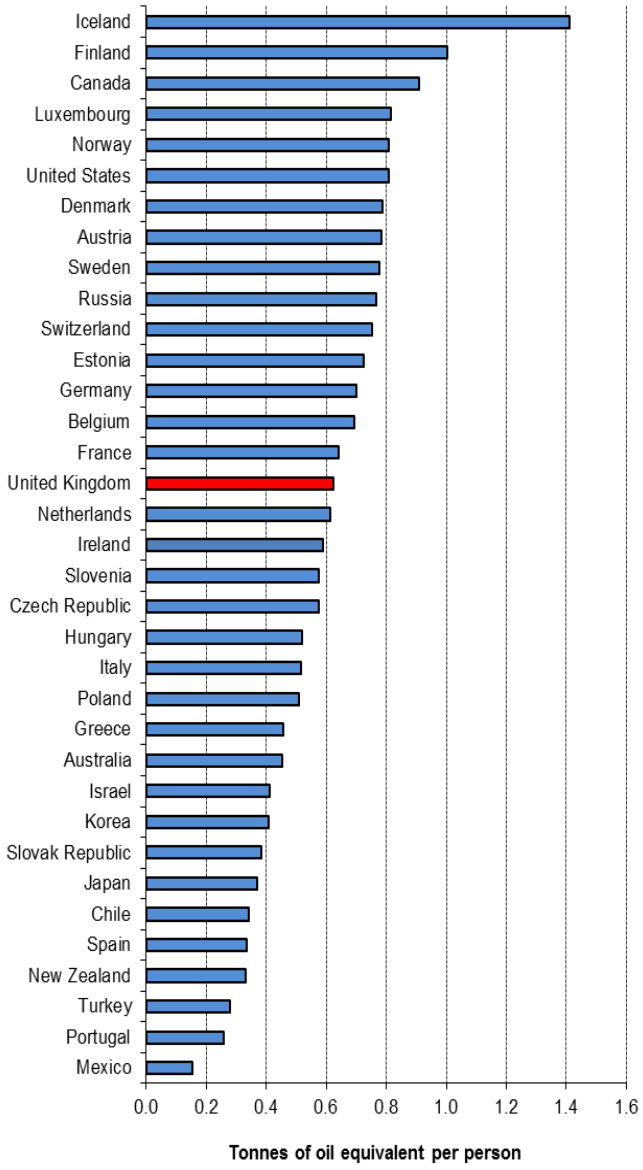
Chart 5.8:
The energy ratio[1,2], for G8 countries 1980 to 2013



(1) Energy consumption (thousand tonnes of oil equivalent) per billion US dollars (2005 prices).
(2) Data for Russia are very high and to avoid distortion of the scale are not shown in the chart. Russia data are available and for 1980 and 1990 have been estimated from the former USSR data. The latest year for which data is available for Russia is 2012.

Source: International Energy Agency

Chart 5.9:
Household[(1)] energy use per person in OECD countries and Russia, 2012

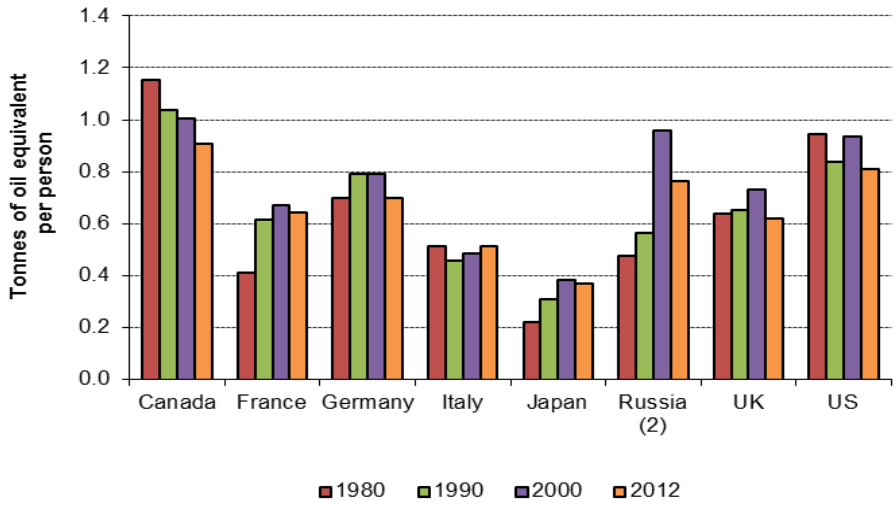


- The OECD countries vary considerably in the amount of energy each person uses at home. This variation can be a combination of many factors, such as climate, house size, household size, comfort levels, energy efficiency and energy prices.
- In 2012, amongst the G8 group, countries such as France, Japan and Russia saw increases in their energy use per person from the 1980 levels (see Chart 5.10). In contrast Canada and the US saw a decline in their average energy use per person as energy efficiency measures took effect. For Germany and Italy, household usages were broadly similar to the 1980 levels.
- In the UK, between 1980 and 2004 there was a relatively modest rise in the household energy use per person, but in the subsequent years this trend reversed reflecting improvements in energy efficiency measures.

(1) excludes fuels used for transport

Source: International Energy Agency

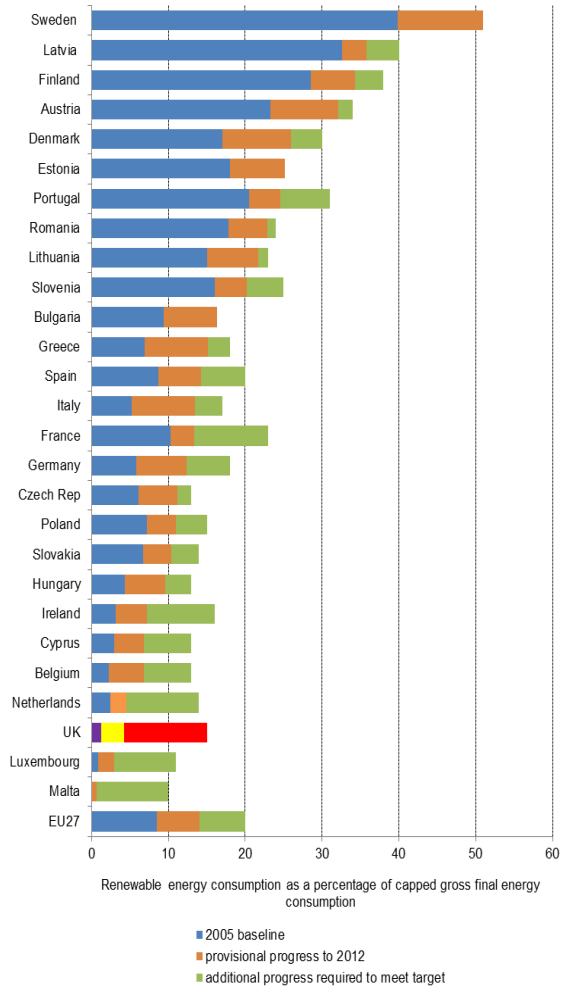
Chart 5.10:
Household(1) energy use per person for G8 Countries, 1980 to 2012



(1) excludes fuels used for transport
(2) Russia data for 1980 and 1990 estimated from Former USSR data.

Source: International Energy Agency

Chart 5.11:
Progress against 2009 EU Renewable Energy Directive, 2012[1]



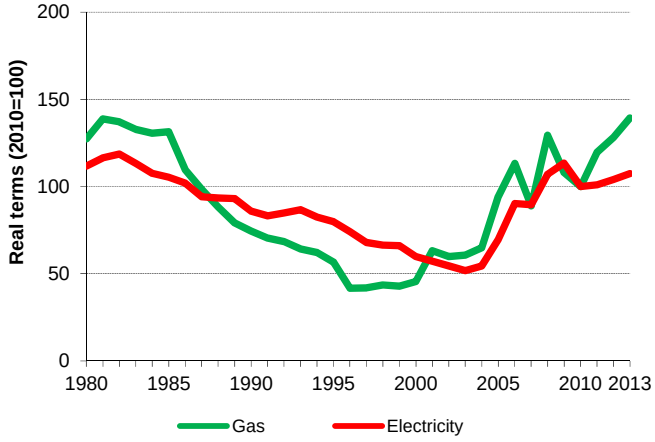
- The 2009 Renewable Energy Directive introduced targets for all EU member states to obtain a certain proportion of energy consumed from renewable sources.
- Individual country targets for 2020 vary from 10 per cent in Malta, to 49 per cent in Sweden. The average for all member states is 20 per cent; the UK target is 15 per cent.
- The chart shows the progress that has been made by all member states since 2005. Provisional data for 2012 indicates Bulgaria, Estonia and Sweden have all achieved their targets, and that that five further member states (Romania, Lithuania, the Czech Republic, Austria and Greece) are within 3 percentage point of achieving their targets. The UK in 2012 ranked third lowest in the ratio of renewable energy to final consumption, with Malta and Luxembourg having lower percentages. The scale of challenge in 2012, as measured by the additional progress required to meet countries target, is greatest for the UK, followed by France, the Netherlands, Malta, and Ireland.
- The UK have published provisional progress data for 2013; this shows further progress was made during the year, with the renewables contribution rising from 4.2 to 5.2 per cent.

[1] Data for Malta, Hungary, Greece and Latvia have been estimated by Eurostat.

Source: Eurostat

Energy Prices and Competition
6 Fuel Prices (Industrial and oil & petroleum)

Chart 6.1:
Fuel price indices[(1)] for the industrial sector, 1980 to 2013 including the Climate Change Levy

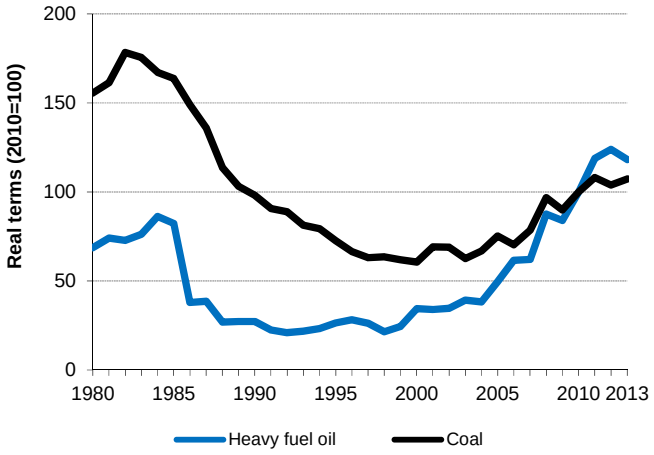


(1) Prices deflated using the GDP (market prices) deflator (2010=100)

Source: DECC

- In 2013, annual average real term industrial electricity prices, including the Climate Change Levy (CCL), rose by 3 per cent compared to 2012. Average gas prices, including CCL, rose by 9 per cent.
- However between 2003 and 2013 prices have more than doubled, increasing each year except for a slight fall in 2007, before falling by 12 per cent in 2010 then rising again in the last 3 years - by 1 per cent in 2011 and 3 per cent in 2012.
- Gas prices fell steadily between 1981 and 1996 before rising to reach a then real-term peak in 2008. Since 2003, prices have increased by 130 per cent, reaching a new real term peak in 2013, 8 per cent above the 2008 peak.

Chart 6.2:
Fuel price indices[(1)] for the industrial sector, 1980 to 2013 including the Climate Change Levy

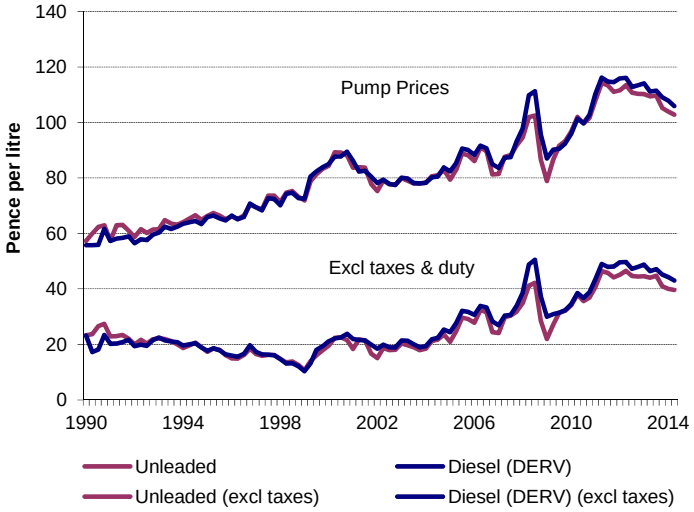


(1) Prices deflated using the GDP (market prices) deflator (2010=100)

Source: DECC

- In 2013, annual average real term industrial heavy fuel oil prices fell by 5 per cent compared to 2012. Coal prices, including CCL, rose by 3 per cent.
- Heavy fuel oil prices, which generally move in line with changes in the price of crude oil, rose in the 1970's and the first half of the 1980's before falling sharply in 1986. Prices stayed at a lower level throughout the 1990's, before increasing steadily from 2000 until 2008, when crude oil hit a new high of almost $150 per barrel. Prices fell in 2009, but rose again in 2010 and 2011 to reach a new real-term peak in 2012, 41 per cent above that of 2008, as oil prices remained above $100 per barrel.
- Coal prices peaked in real terms in 1982 before falling steadily for around 20 years. Since 2003, coal prices have generally increased, as high international demand caused spot prices to peak.

Chart 6.3:
Petrol and diesel prices indices[(1)], 1990 to Q2 2014

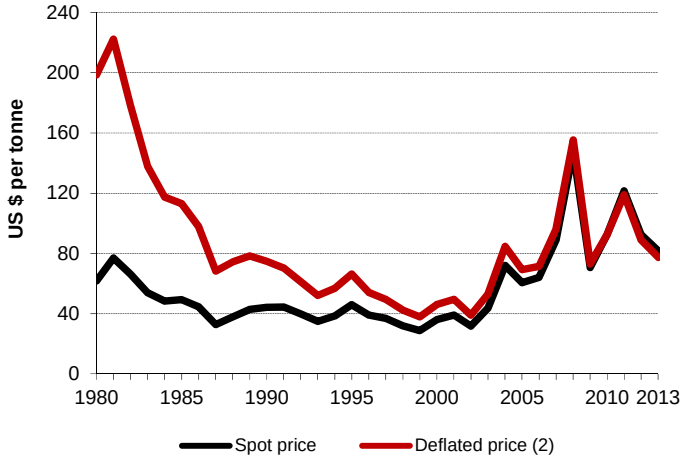


(1) Prices deflated using the GDP (market prices) deflator (2010=100)

Source: DECC

- The real term pump price of unleaded petrol in Q2 2014 was 28 per cent higher than in Q2 2004. Over the same period the price excluding duty and taxes has increased by 86 per cent. However, prices are down 10 per cent on the real terms peak of 3 years ago.
- The real term pump price of diesel in Q2 2014 was 32 per cent higher than in Q2 2004. Over the same period the price excluding duty and taxes has almost doubled, but prices are down 9 per cent on the real terms peak of 3 years ago.
- In Q2 2014 diesel was 3.1 pence per litre (2.9%) higher than petrol.
- Petrol and diesel retail prices reached a new peak in Q2 2012.
- In the late 1990's, tax and duty on petrol and diesel comprised more than 80 per cent of the pump price, compared to around 60 per cent of the pump price in both 1990 and 2013.

Chart 6.4:
Trends in the NW European marker price of coal[(1)], 1980 to 2013

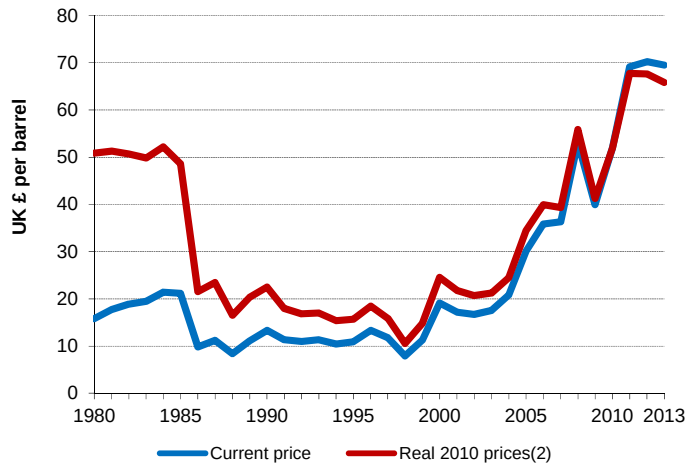


(1) Imported steam coal mostly for power stations, adjusted to a common energy content of 26 GJ/tonne.
(2) Prices deflated using the GDP (market prices) deflator (2010=100)

Source: BP Statistical Review of World Energy, DECC

- In 2013, the average spot price for a single delivery to North West Europe of imported coal was US$81.69 (£52.20) per tonne.
- After following a broad downwards trend between 1983 and 2002, prices increased in 2003 and 2004, fell in 2005, then rose again from 2006. After large increases in 2008 due to supply problems and high demand, prices fell sharply in 2009 as the global recession hit. Prices increased once more in 2010 and 2011 then fell back in 2012 and 2013. In real terms, the price in 2013 was almost 50 per cent higher than in 2003, but was 13 per cent lower than in 2012.
- The lower price over the past 2 years has increased the demand for coal as a UK generation fuel, especially as gas prices have been relatively high.

Chart 6.5:
Trends in the price of Brent crude oil(1), 1980 to 2013

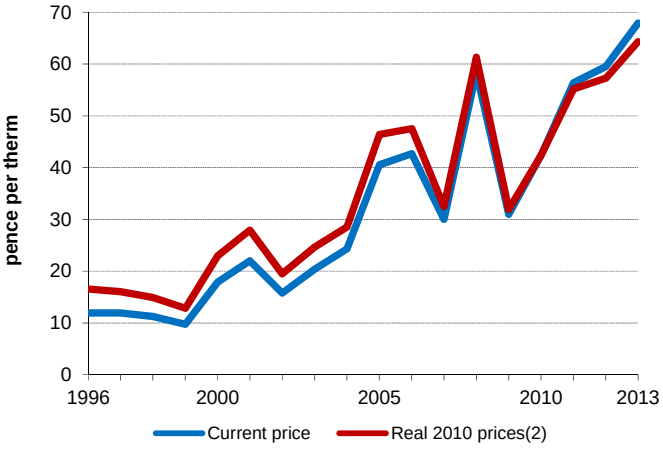


(1) One month forward price.
(2) Calculated using the GDP (market prices) deflator

Source: Platts; DECC

- In the 1990's, crude oil prices were at relatively low levels. Prices started to increase in 2003, following the Iraq war, and increased further over the period 2005 to 2008, with prices in 2008 increasing by 42 per cent in real terms. Prices in 2009 fell as the global recession hit, but prices then rose sharply once more - by 26 per cent in real terms in 2010 and by a further 30 per cent in real terms in 2011. In the last 2 years, real terms prices have been broadly flat, but at record high levels.
- Between 2003 and 2013, Brent crude oil's one month forward price increased by 210% in real terms.
- In $ terms, crude oil prices have stayed above $100 per barrel in most between February 2011 and the end of 2013.

Chart 6.6:
Trends in the wholesale price of gas(1), 1996 to 2013

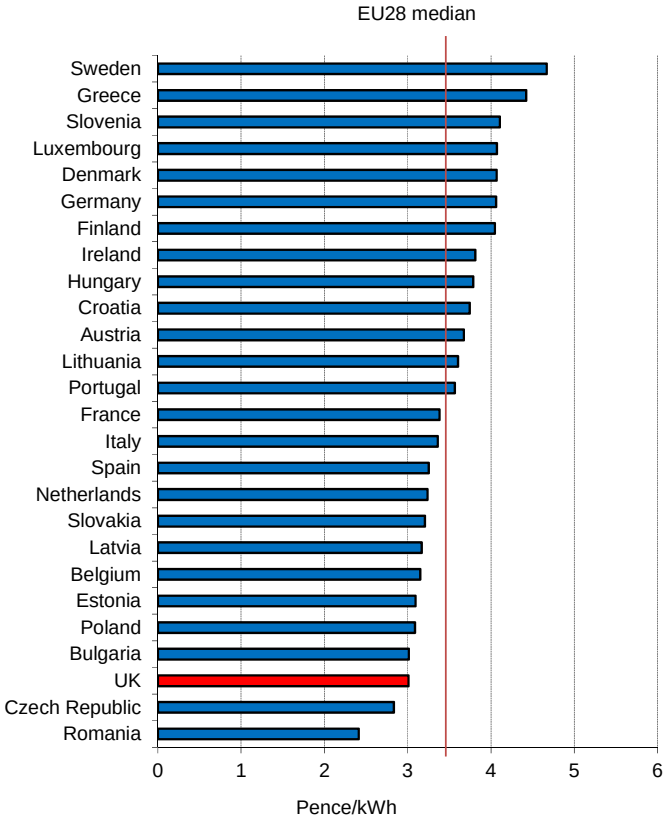


(1) NBP (National Balancing Point) price.
(2) Calculated using the GDP (market prices) deflator

Source: BP Statistical Review of World Energy, DECC

- Gas prices have followed a broadly upwards trend from 2000, due to upward pressure on prices in Europe and the decline of UK Continental Shelf gas production.
- The wholesale price peaked in real terms in 2013, 5 per cent higher than the previous peak in 2008.
- In 2013, the wholesale price of gas rose by 14 per cent (12 per cent in real terms) compared to 2012.
- Higher prices since 2011 have in part been driven by global demand changes following the Fukushima nuclear incident in Japan.

Chart 6.7:
Industrial gas prices for medium consumers within the EU28 in 2013: converted to UK pence per kWh[(1)(2)(3)]



- In 2013, UK industrial gas prices for medium consumers, including tax, were the third lowest within the EU28 on a common pounds sterling currency basis, and were 13 per cent (0.46 pence/kWh) below the EU28 median.

- Prices for small consumers including tax were the fourth lowest in the EU28 and were around 20 per cent lower than the EU28 median. Prices for large consumers including tax were fourth lowest in the EU28 and around 12 per cent lower than the EU28 median.

- Generally, prices for medium gas consumers in the UK have been below the EU median since 1998, when the series began, although in 2006 UK prices did spike above EU median levels.

- In 2013, average UK industrial gas prices, including taxes where not refunded, were the third lowest in the G7, with prices in the US and Canada estimated to be lower than the UK (from IEA data).

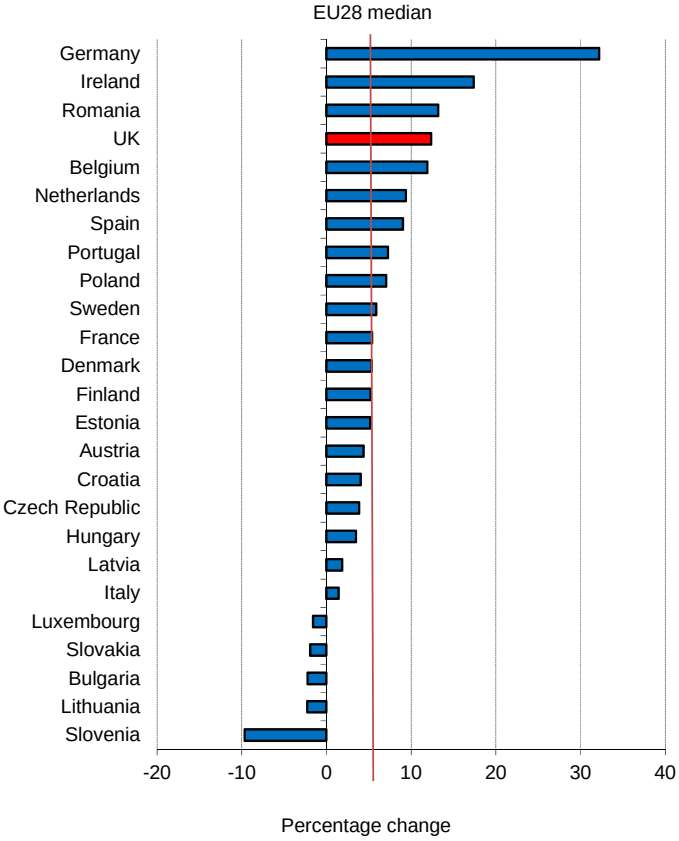
Notes: Price include taxes where not refunded

(1) Converted using average 2013 exchange rates.
(2) Data not available for Cyprus and Malta.
(3) The prices for 2013 are averages of prices for the periods January - June 2013 and July - December 2013.

Size bands.
Small consumers consuming 278 - 2,777 MWh per annum
Medium consumers consuming 2,778 - 27,777 MWh per annum.
Large consumers consuming 27,778 - 277,777 MWh per annum.

Source: Derived from Eurostat data.

Chart 6.8:
Percentage change in industrial gas prices for medium consumers within the EU 28: 2012 to 2013[(1)(2)(3)]



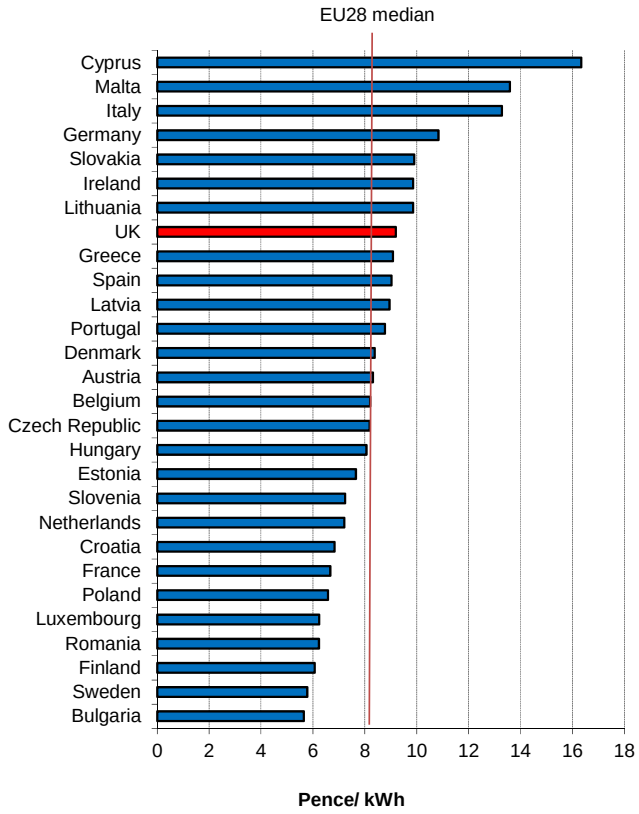
- Between 2012 and 2013, average UK industrial gas prices for medium consumers, including tax, rose by 12 per cent, compared to an EU median increase of 5 per cent.
- The greatest decrease was in Slovenia, where prices fell by 10 per cent.
- The greatest increase was in Germany, where prices rose by 32 per cent.
- Since 2008, the first full year with data under the new methodology, the UK price has increased by 28 per cent, compared to a median increase of 20 per cent in the EU28.
- However, despite the relatively large rise, UK prices remain amongst the lowest in the EU, as shown in Chart 6.7.

Notes: Percentage change in prices including all taxes where not refunded.

(1) There is only limited gas supply in Sweden and Portugal.
(2) Data is not available for Cyprus, Greece or Malta.
(3) The prices for 2012 and 2013 are averages of prices for the periods January - June and July – December within each year and are based on prices converted to UK pence per kWh.

Source: Derived from Eurostat data.

Chart 6.9:
Industrial electricity prices for medium consumers within the EU28 in 2013: converted to UK pence per kWh[(1)(2)]



- In 2013, UK average industrial electricity prices for medium consumers, including tax, were 11 per cent (0.93 pence/kWh) above the EU28 median on a common pounds sterling currency basis.
- Since 1998, when the series began, the UK price for medium electricity consumers has generally been above the EU median, although prices dipped below the EU median in 2011.
- In 2013, the average UK industrial electricity price including taxes was the fourth highest in the G7 (from IEA data).

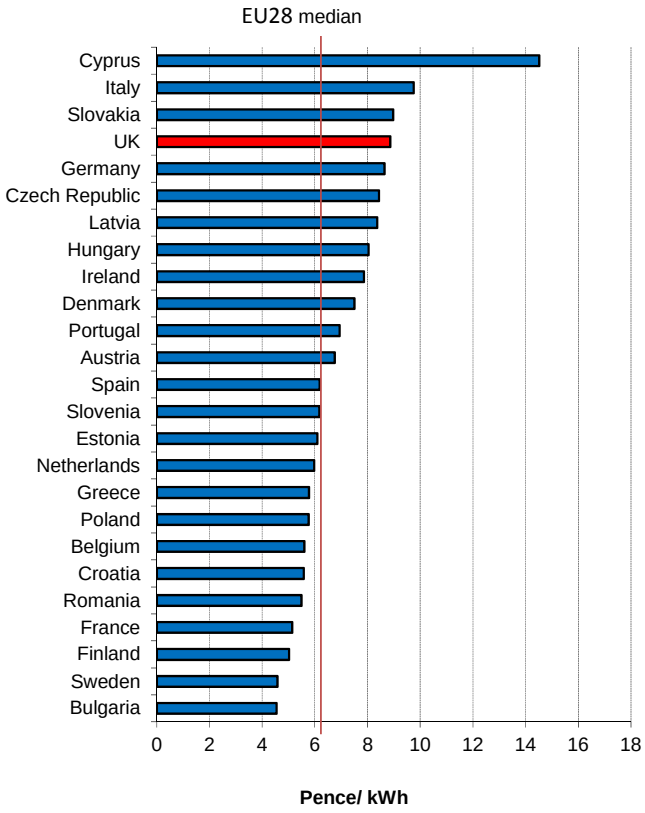
Note: Prices include taxes where not refunded.

(1) Converted using average 2013 exchange rates.
(2) The prices for 2013 are averages of prices for the periods January - June 2013 and July - December 2013.

Size band.
Medium consumers consuming 2,000 - 19,999 MWh per annum.

Source: Derived from Eurostat data.

Chart 6.10:
Industrial electricity prices for extra-large consumers within the EU28 in 2013: converted to UK pence per kWh[(1)(2)(3)]



- In 2013, UK average industrial electricity prices for extra-large consumers, including tax, were the fourth highest on a common pounds sterling currency basis, and were 44 per cent above the EU28 median.
- For small consumers, the UK price including tax was 4 per cent above the EU median.

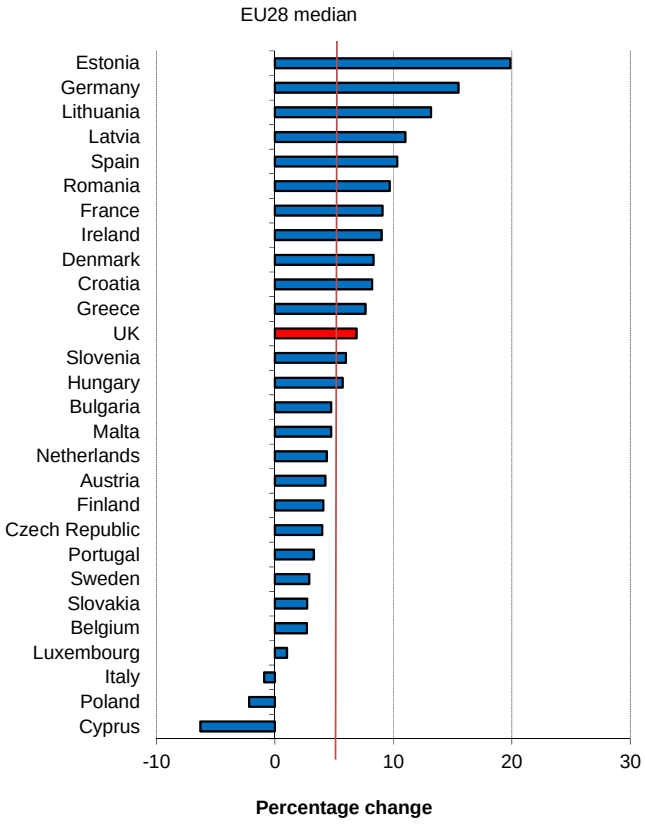
Notes: Percentage change in prices including all taxes where not refunded.

(1) Converted using average 2013 exchange rates.
(2) Data not available for Malta, Luxembourg and Lithuania.
(3) The prices for 2013 are averages of prices for the periods January - June 2013 and July - December 2013.

Size bands.
Small consumers consuming 20 - 499 MWh per annum.
Extra-large consumers consuming 70,000 – 150,000 MWh per annum.

Source: Derived from Eurostat data

Chart 6.11:
Percentage change in industrial electricity prices for medium consumers within the EU28, 2012 to 2013[(1)]



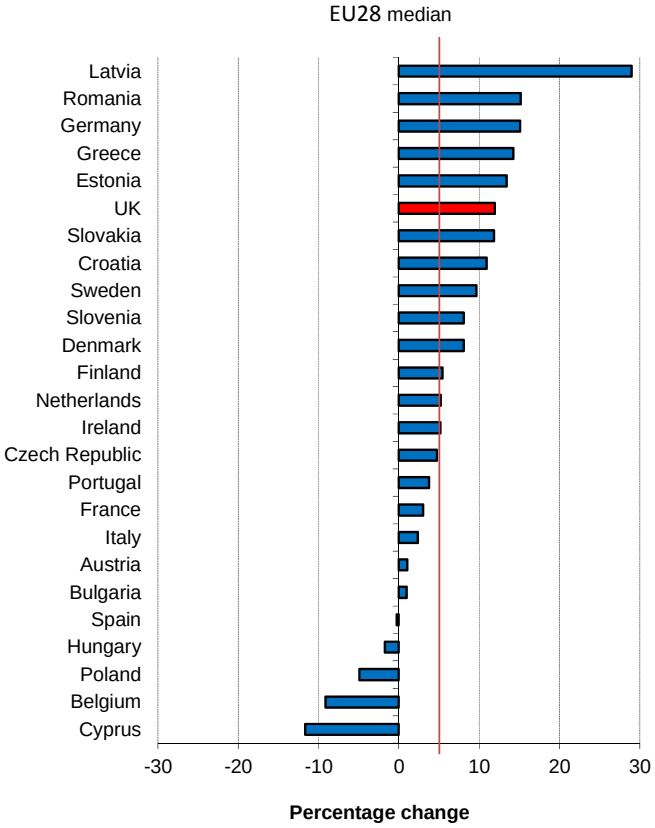
- Between 2012 and 2013, average UK industrial electricity prices for medium consumers, including taxes, rose by 7 per cent compared to an EU median increase of 5 per cent.
- The largest fall was in Cyprus, where prices fell by 6 per cent.
- The largest increase was in Estonia, where prices rose by 20 per cent.
- Since 2008, the first full year with data under the new methodology, the UK price has increased by 22 per cent, in line with the median increase in the EU28.

Notes: Tax component represents all taxes levied where not refunded.

(1) The prices for 2012 and 2013 are averages of prices for the periods January - June and July - December within each year and are based on prices converted to UK pence per kWh.

Source: Derived from Eurostat data

Chart 6.12:
Percentage change in industrial electricity prices for extra-large consumers within the EU28, 2012 to 2013 (1)(2)



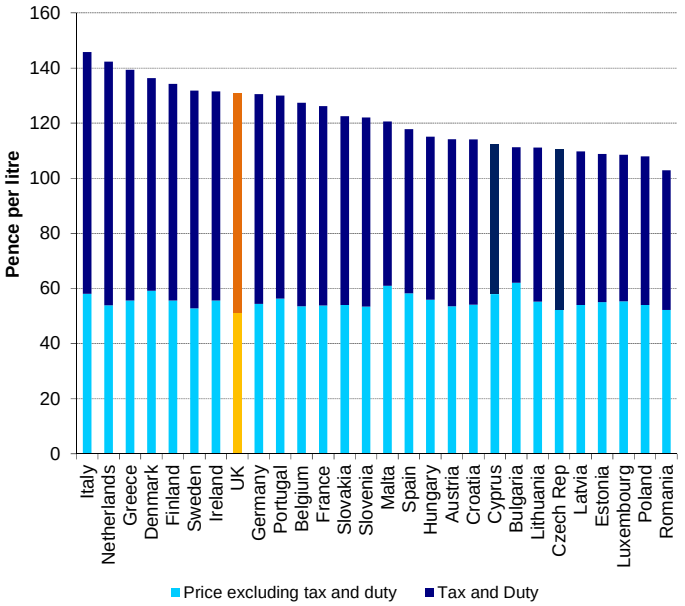
Notes: Percentage changes in prices include all taxes where not refunded.

(1) Data not available for Lithuania, Luxemburg or Malta.
(2) The prices for 2012 and 2013 are averages of prices for the periods January - June and July - December within each year and are based on prices converted to UK pence per kWh.

Source: Derived from Eurostat data.

- Between 2012 and 2013, average UK industrial electricity prices for extra-large consumers, including taxes, rose by 12 per cent compared to an EU median increase of 5 per cent.
- The largest decrease was in Cyprus, where prices fell by 12 per cent.
- The largest increase was in Latvia, where prices rose by 29 per cent.
- Since 2008, the first full year with data under the new methodology, the UK price has increased by 19 per cent, similar to the median increase of 17 per cent in the EU.
- Prices for small industrial electricity consumers in the UK, including tax, rose by 5 per cent between 2012 and 2013, compared to a median EU increase of 7 per cent.
- Between 2008 and 2013, UK prices to small industrial electricity consumers including tax rose by 24 per cent, broadly in line with the EU median increase of 26 per cent.

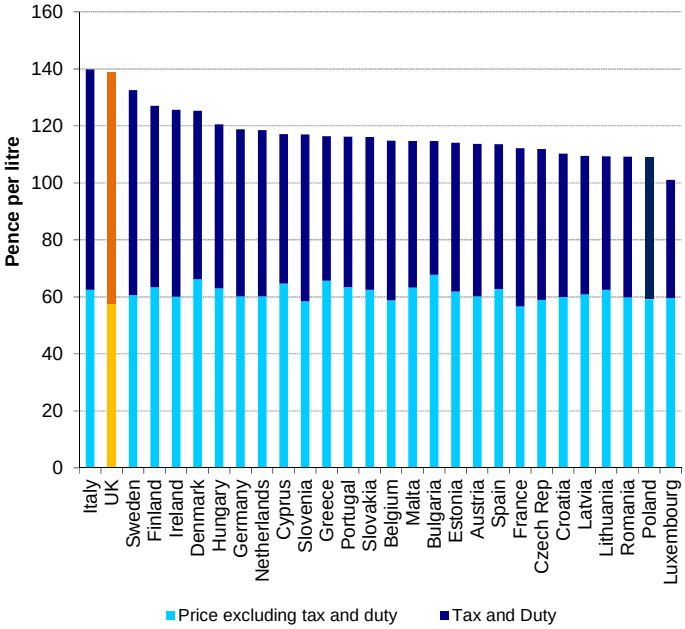
Chart 6.13:
European unleaded petrol/ULSP prices in pence/litre at December 2013



Source: European Commission Oil Bulletin.

- In December 2013, unleaded petrol prices in the EU, excluding tax and duty, were on average 55.3 pence per litre. This compares to an average price in the UK for Ultra Low Sulphur Petrol (ULSP) of 51.0 pence per litre.
- Tax and duty on unleaded petrol, in December 2013, was the lowest in Bulgaria, at 49.2 pence per litre. The highest was in the Netherlands, at 88.4 pence per litre. In the UK, tax and duty was 79.7 pence per litre. The EU average was 64.6 pence per litre.
- In December 2013, UK unleaded petrol prices, including tax and duty, were the eighth highest in the EU, at 130.8 pence per litre. The highest price was in Italy, at 145.8 pence per litre. The lowest price was in Romania, at 102.9 pence per litre.

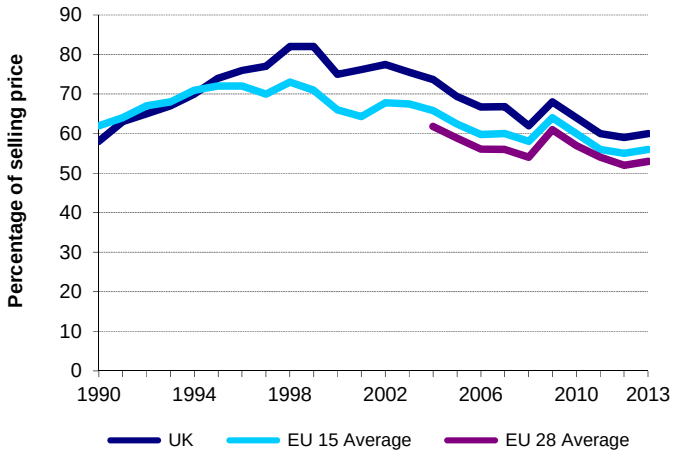
Chart 6.14:
European diesel prices in pence/litre at December 2013



Source: European Commission Oil Bulletin.

- In December 2013, diesel prices in the EU, excluding tax and duty, were lowest in France, at 56.7 pence per litre, whereas Bulgaria's price was the highest at 67.8 pence per litre.
- In December 2013, tax and duty on diesel within the EU was lowest in Luxembourg at 41.5 pence per litre. The UK had the highest level of tax and duty at 81.1 pence per litre, compared to an average level of 56.0 pence per litre in the EU27.
- In December 2013, UK diesel prices were the second-highest in the EU at 138.8 pence per litre. The highest price was in Italy, at 139.7 pence per litre, whilst the lowest price was in Luxembourg, at 101.1 pence per litre.

Chart 6.15:
Taxes and duties as a percentage of selling price for unleaded petrol, 1990 to 2013



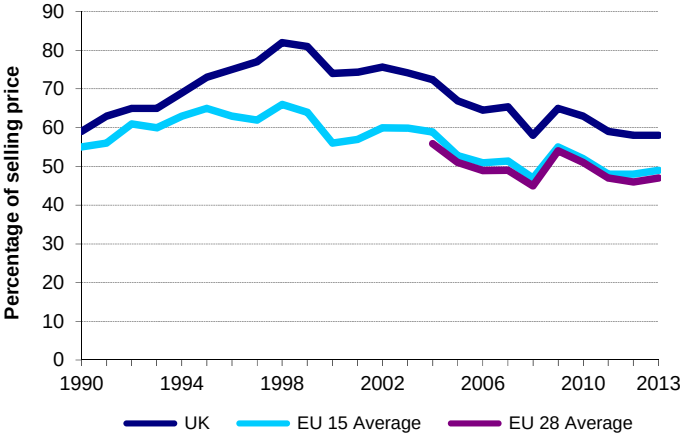
Note: Croatia joined the EU in July 2013 forming the EU 28, but has not provided data for previous years.

Source: European Commission Oil Bulletin, International Energy Agency Energy Prices and Taxes.

- Unleaded petrol taxes and duties in the UK have shown a clear correlation with the EU average, although between 1995 and 1997 they diverged following the Government's policy of increasing duty ahead of inflation. The duty rate has not changed since it was cut by 1 pence per litre on 23 March 2011.

- Tax and duties on unleaded fuel in the UK in 2013 accounted for 60 per cent of the selling price on average. The highest amount of tax in the EU was in the Netherlands, at 61 per cent, compared to 44 per cent in Bulgaria, the lowest in the EU.

Chart 6.16:
Taxes and duties as a percentage of selling price for diesel, 1990 to 2013



Note: Croatia joined the EU in July 2013 forming the EU 28, but has not provided data for previous years.

Source: European Commission Oil Bulletin, International Energy Agency Energy Prices and Taxes.

- Taxes and duties on diesel in the UK have shown a correlation with the EU average, however since the mid nineties the gap has widened due to UK fiscal policy, with taxes make up a larger proportion of the cost of diesel in the UK.

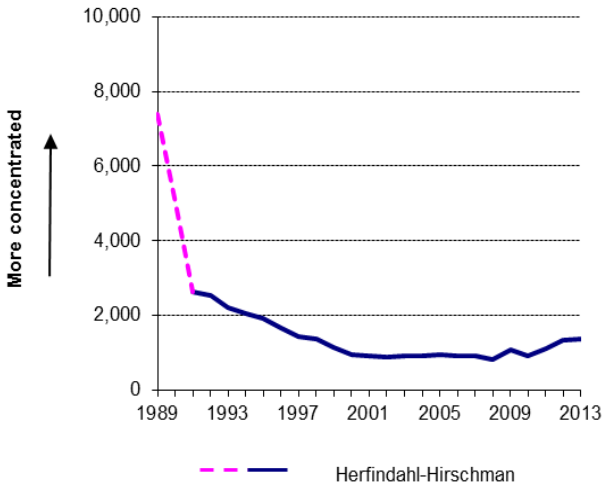
- In 2013, tax and duties on diesel as a percentage of the selling price varied from 58 per cent in the UK, which was the highest in the EU, to 41 per cent in Luxembourg, the lowest in the EU.

Energy Prices and Competition

7 Competition in Energy Markets

One way of measuring the extent of competition in electricity generation is by considering the market shares of each company in the electricity generation market. Table 7.1 shows how the number of companies has increased since privatisation and Chart 7.1 shows that whilst market shares are not evenly distributed between the 44 companies generating electricity in 2013, the overall market became considerably less concentrated, particularly between 1992 and 2000. The Herfindahl-Hirschman measure of diversity places more emphasis on larger companies that are already established rather than smaller generators.

Chart 7.1:
Competition in electricity generation, 1989 to 2013



Source: DECC

- The number of companies counted as major power producers (MPPs, whose major business is the generation of electricity) increased from six before privatisation to eleven in 1991. There was a peak of 36 in 2001, which fell in the years to 2006, to 29. By 2013, the number of companies had increased to 44, due to the reclassification of several renewable generators as MPPs (starting with four wind generators in 2007), as well as the addition of new generators.

- The break up of the nationalised power suppliers into smaller privatised companies produced an immediate impact on the Herfindahl-Hirschman measure of concentration. A further decrease occurred once new companies began to build their own Combined Cycle Gas Turbine (CCGT) stations after 1992, but between 2000 and 2008, there was a levelling off of the concentration measure. Although new power producers appeared, others were taken over or bought power stations to add to their portfolio.

- The share of the top three companies in generation terms remained at around 40% between 2004 and 2007. As shown in Table 7.2, this rose to 44% in 2009 due to the take-over of British Energy by EDF. The fall in nuclear generation in 2010 saw the share fall to 40%, before increasing to 51% in 2013. The share of the next three largest in generation terms had been on a falling trend to 2008, but increased in 2009 and 2010 before falling to around 24% for the last three years. The share of those outside the top nine has fluctuated between 18 and 21 per cent since 2008. However, this fell to 13% in 2012, a level maintained in 2013.

Table 7.1: Number of Major Power Producers

Year	Number	Year	Number	Number producing at least 5% of total generation
1989	6[1]	2000	34	7
1990	6	2001	36	6
1991	11[2]	2002	36	7
1992	14	2003	34	6
1993	20	2004	32	7
1994	23	2005	30	7
1995	25	2006	29	7
1996	26	2007	34[3]	8
1997	27	2008	34[4]	9
1999	30	2009	34[5]	8
		2010	39[6]	8
		2011	41[7]	7
		2012	44[8]	7
		2013	44	7

(1) In 1989, CEGB, NSHEB, SSEB, NIE, UKAEA, BNFL.
(2) In 1991, National Power, PowerGen, Scottish Hydro-Electric, Scottish Power, Nuclear Electric, Scottish Nuclear, National Grid, NIE, MEB, UKAEA, BNFL.
(3) By 2007 the following 30 producers had been added since 1991:
AES Electric Ltd, Baglan Generation Ltd, Barking Power Ltd, British Nuclear Group, British Energy plc, Centrica plc, Coolkeeragh Power Ltd, Corby Power Ltd, Coryton Energy Co Ltd, Derwent Cogeneration Ltd, Drax Power Ltd, EDF Energy plc, EDF Renewables Ltd, Fellside Heat and Power Ltd, Fibrowatt Ltd, First Hydro Company, Fred Olsen, H G Capital, Immingham CHP LLP, International Power Ltd, Premier Power Ltd, RES, RGS Energy Ltd, Rocksavage Power Company Ltd, Seabank Power Ltd, South East London Combined Heat & Power Ltd, Spalding Energy Company, Teesside Power Ltd, Uskmouth Power Company Ltd and Vattenfall Wind Power.
Four of these companies are wind generation companies which were re-classified as Major Power Producers in 2007, while the following seven producers had ceased to produce or ceased to exist as separate entities:
Nuclear Electric, Scottish Nuclear, National Grid, NIE, UKAEA, BNFL, MEB.
Of the other four 1991 companies, three have been renamed: National Power is now known as RWE npower; PowerGen is now known as E.On UK plc; and Scottish and Southern Energy was formed by the merger of Southern Electric and Scottish Hydro-Electric.
(4) From 2008, Sembcorp was added, while Edison First Hydro was taken over by International Power Ltd.
(5) From 2009, Statkraft Energy was added, while British Energy was taken over by EDF.
(6) From 2010, the following producers were added: Scotia Wind, Dong Energy, Ardrossan, Marchwood Power and Energy Power Resources.
(7) From 2011, the following producers were added: Peel Energy and CEP Wind 2.
(8) From 2012 the following producers were added: Scirca, Flack, Londonwaste and Riverside Recovery.

Source: DECC

Table 7.2: Percentage of total generation and total capacity by Major Power Producers

Generating companies	Share in generation (%)					Share in capacity (%) [1]				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Aggregated share of top 3 companies	43.5	39.7	45.6	51.7	51.1	43.4	43.7	43.7	46.8	43.0
Aggregated share of next 3 companies	22.8	25.4	24.4	23.8	24.0	26.5	24.4	25.4	22.4	23.6
Aggregated share of next 3 companies	14.0	13.6	11.1	11.1	11.8	12.1	12.3	12.6	13.1	13.8
Aggregated share of top 9 companies	**80.3**	**78.7**	**81.1**	**86.6**	**87.0**	**81.9**	**80.4**	**81.7**	**82.3**	**80.4**
Other major power producers	19.7	21.3	18.9	13.4	13.0	18.1	19.6	18.3	17.7	19.6

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

Source: DECC

The following charts and tables cover electricity sales in the industrial, commercial and domestic sectors. Competition has been introduced to the different electricity markets in three phases.

- About 30% of the market (customers with a maximum demand over 1 MW) was opened up to competition in March 1990.
- A further 15% of the market (100 kW to 1 MW) was opened up to competition in April 1994.
- Full competition for the remaining 55% of the market covering the smaller consumers (i.e. below 100 kW peak load) was introduced in stages between September 1998 and June 1999.
- This final phase covered domestic consumers who account for almost a third of all electricity consumed in the UK.

An analysis has been carried out separately for the industrial and commercial sectors, where buyers have been free to choose their supplier for a number of years. Table 7.3 shows the number of companies in each of these two sectors and also for the domestic sector where before competition the customer base of their home region determined their market share. Charts 7.2, 7.3 and 7.4 show the Herfindahl-Hirschman measure of concentration for each of the sectors.

- The merger of PowerGen and TXU in 2002 took the market share of the top three above 60%. It fell back to around 50% as Table 7.4 shows, increased again to 55.7% in 2009, before falling again to 47.7% in 2013. The market share of the top nine suppliers peaked in 2009 and 2010 and fell to 89.7% in 2013, whereas the share of those outside of the top nine rose from 4.4% in 2007 to 10.3% in 2013, in part due to the addition of new suppliers.
- The total number of companies in the UK counted as sellers of electricity in 2013 is 33 (up from 26 in 2005). Before privatisation (1989) there were 16, but they were not in competition with each other.

Table 7.3: Number of companies supplying electricity

	1996	1998	2000	2002	2004	2006	2008	2010	2011	2012	2013
Domestic sector	1	1	11	7	11	10	10	10	15	16	20
Commercial sector	17	16	14	14	18	17	14	14	21	22	23
Industrial sector	18	22	20	18	27	22	18	20	25	26	27

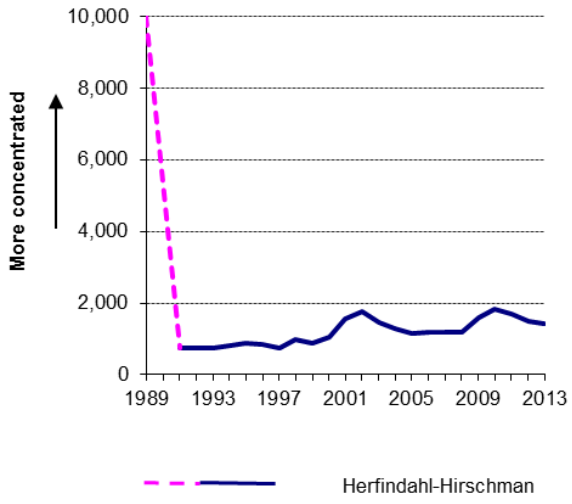
Source: DECC

Table 7.4: Percentage of total electricity supplied to all consumers

	Market share (%)				
Electricity suppliers	2009	2010	2011	2012	2013
Aggregated share of top 3 suppliers	55.4	55.4	51.3	49.1	47.7
Aggregated share of next 3 suppliers	36.0	35.6	36.0	36.7	35.4
Aggregated share of next 3 suppliers	6.0	6.3	6.6	6.2	6.6
Aggregated share of top 9 suppliers	**97.3**	**97.3**	**93.9**	**92.0**	**89.7**
Other suppliers	2.7	2.7	6.1	8.0	10.3

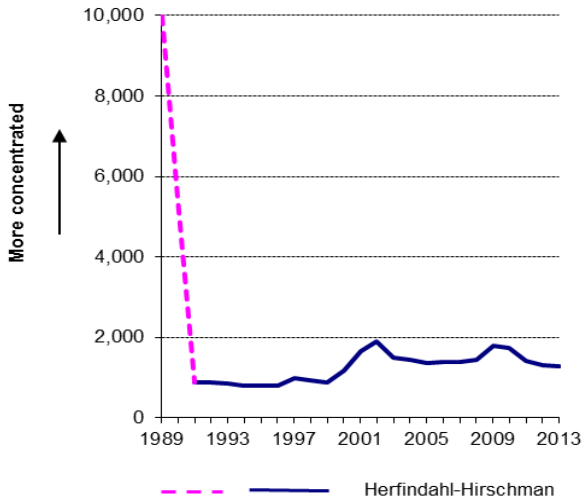
Source: DECC

Chart 7.2:
Competition in electricity sales to the industrial sector, 1989 to 2013



Source: DECC

Chart 7.3:
Competition in electricity sales to the commercial sector, 1989 to 2013



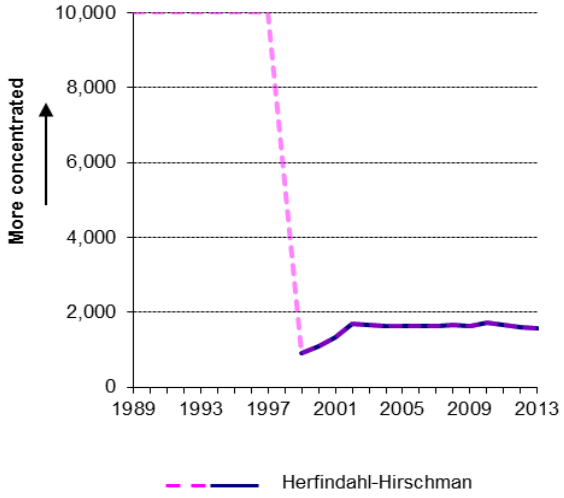
Source: DECC

- The number of companies supplying the industrial and commercial sectors was on a declining trend up to 2002, mainly because of mergers. This produced a general upward movement in the Herfindahl-Hirschman indicator of concentration.

- Since 2002 the number of industrial suppliers has increased from 18 to 30 in 2004, but closure of smaller companies reduced this to 20 in 2010. The number increased by six in 2012 and again by one in 2013. The number supplying commercial customers reached 18 during 2004/05 but fell to 14 in 2010, resulting in an upward movement in the Herfindahl-Hirschman measure indicating more concentration. In 2011, the number of industrial and commercial suppliers increased on 2010 levels, resulting in slight decreases in the Herfindahl-Hirschman indicator.

- There is usually a large turnover of customers switching supplier at the end of their contract. The implication is that supply companies losing customers tend to replace them from elsewhere leaving the customer base for each company broadly unchanged except for the increases brought about by mergers.

Chart 7.4:
Competition in electricity sales to the domestic sector, 1989 to 2013



Source: DECC

- Competition in electricity sales to the domestic sector did not begin until September 1998, with the market opened up in stages between then and May 1999. Before 1998 each Regional Electricity Company (REC) had a regional monopoly for domestic supply.

- From 1999 to 2002, electricity sales to the domestic sector, as with industry and commercial sales, became more concentrated with some generators who were also suppliers merging their supply businesses with those of former RECs and some former REC supply businesses merging together. Since 2002 there has been less merger activity and the concentration measure has been fairly constant.

- In 2013 there were five entrants to the market, though the low level of customers acquired has had little impact on the index.

- Data from Energy UK shows that 2 million domestic customers were supplied from smaller (non big 6) companies in July 2014.

Competition in gas supply was introduced in stages:

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

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

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

Table 7.5 shows the number of companies supplying gas to final consumption in the remaining three sectors. The data indicate the number of companies supplying gas has increased in all three of these sectors in 2013, with the industrial sector showing a marked increase. Although data are restricted to companies supplying greater than ¼ per cent within each sector, from 2013 sectoral data were also collected for small suppliers, which shows the number of companies (in total) selling to domestic, commercial and industrial sector were and 21, 23 and 20 respectively.

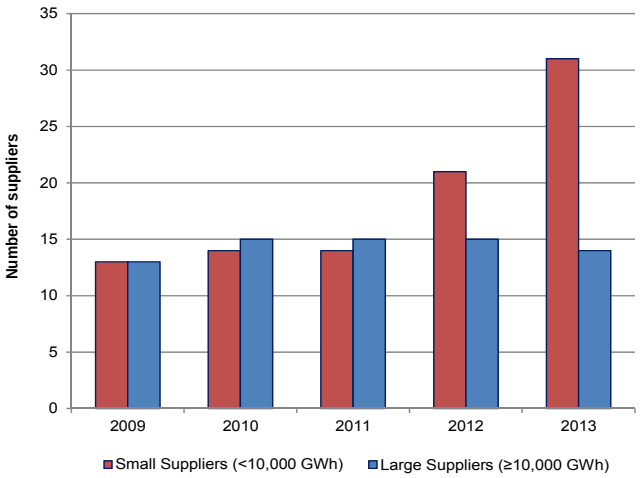
Table 7.5:
Number of companies supplying gas(1)

	1996	1998	2000	2002	2004	2006	2008	2010	2011	2012	2013
Domestic sector	1	12	16	13	7	7	7	8	8	8	10
Commercial sector	21	21	20	18	14	8	8	10	11	11	15
Industrial sector	17	18	20	18	12	11	11	12	10	10	17

(1) Companies with less than ¼ per cent share of the total market are excluded. In October 2013, 57 suppliers were licensed to supply gas to domestic customers but some suppliers have more than one supply licence and own or part own more than one supply company.

Source: DECC

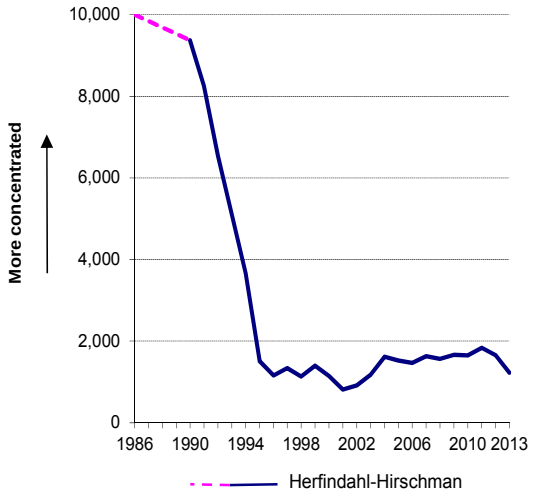
Chart 7.5:
Total number of companies supplying gas, 2009 to 2013



Source: DECC

- Chart 7.5 shows the number of large suppliers versus small suppliers over the past five years. The cut-off of 10,000 GWh was used to define these two groups based on a clear break in the gas supply data at this level.
- Chart 7.5 indicates that the number of large gas suppliers has remained relatively constant over the past five years.
- Beyond 2011, there has been a marked increase in the number of small suppliers meeting gas demand. In 2013, there were 31 small gas suppliers, more than twice that two years' previously.

Chart 7.6:
Competition in gas sales to the industrial sector, 1986 to 2013

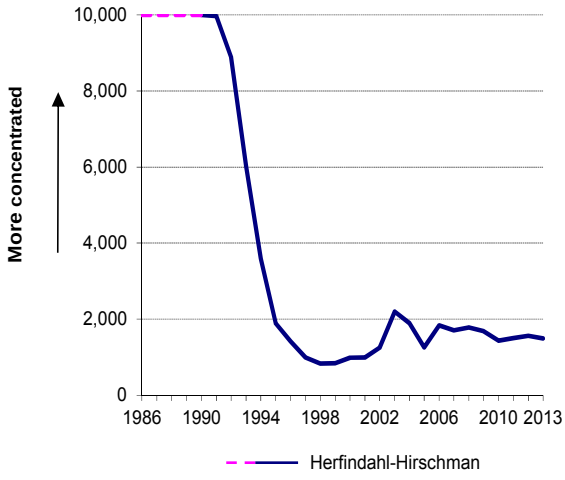


Source: DECC

- The number of companies supplying gas to industry increased from 7 in 1990 to 20 in 2000. The number fell back to 10 in 2012 due to mergers between existing suppliers; in 2013, with the emergence of new suppliers, this number has increased again to 17, although these new suppliers have a small overall market share.

- Substantial changes to market shares occurred between 1991 and 1995 with British Gas losing market share to competitors. The situation has since stabilised, with an overall trend of increasing concentration since 2001.

Chart 7.7:
Competition in gas sales to the commercial sector, 1986 to 2013

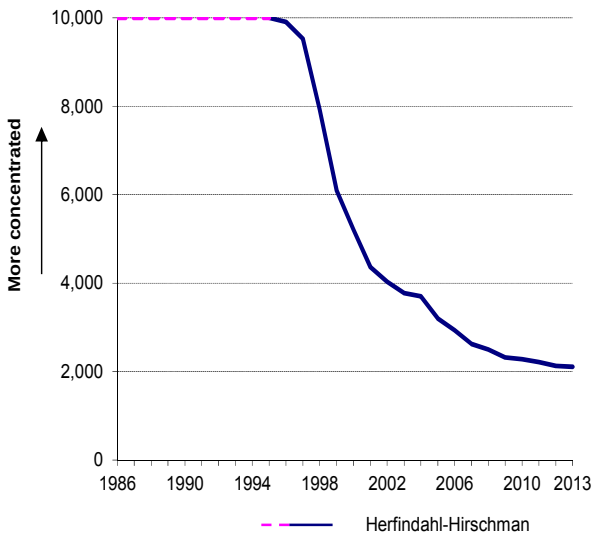


Source: DECC

- The number of gas companies supplying the commercial sector increased from 4 in 1991 to 21 in 1998. The number fell to 8 in 2006, but has since increased to 15 in 2013.

- The opening of all consumption bands in this sector to competition in 1998 attracted some further new entrants, but mergers between existing suppliers has increased concentration slightly from 1999 to 2006. From 2006 onwards concentration has been more stable.

Chart 7.8:
Competition in gas sales to the domestic sector, 1986 to 2013



Source: DECC

- The market power of British Gas in the domestic sector has been in decline since the opening up of the domestic sector from 1996 onwards.
- Since 1996, the market concentration in the domestic sector has continued to decrease. The number of companies supplying gas to the domestic sector (greater than ¼% supply) was stable between seven and eight companies between 2004 and 2012. The market has continued to become less concentrated, however, as these few companies continue to take market share from British Gas.
- In 2013, the number of companies supplying gas to the domestic sector, with a ¼ per cent market share or more, increased to ten. This trend is set to continue as smaller companies compete for market share with the larger established gas suppliers.

Table 7.6: Percentage of total gas supplied to all consumers

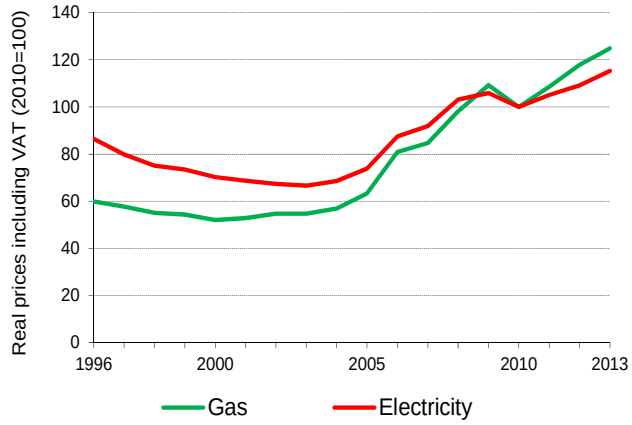
	Market share (%)				
Gas suppliers	2009	2010	2011	2012	2013
Aggregated share of top 3 suppliers	51.5	50.9	47.7	47.1	46.2
Aggregated share of next 3 suppliers	19.7	20.9	21.2	20.3	21.4
Aggregated share of next 3 suppliers	13.8	12.8	13.9	14.3	14.9
Aggregated share of top 9 suppliers	**85.0**	**84.7**	**82.8**	**81.8**	**82.5**
Other suppliers	15.0	15.3	17.2	18.2	17.5

Source: DECC

Table 7.6 shows how the market shares of the largest companies have changed over the last 5 years with the largest tending to lose market share to the medium sized and smaller companies.

Energy Prices and Competition
8 Fuel Prices (Domestic)

Chart 8.1:
Fuel price indices[1] for the domestic sector, 1996 to 2013

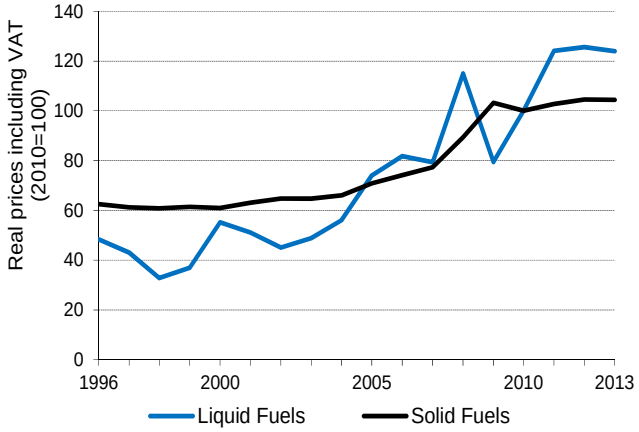


- Between 2012 and 2013, domestic electricity prices increased by 5.6 per cent in real terms, while gas increased by 5.9 per cent.
- Prices for both gas and electricity generally fell between 1996 and 2000. However, gas prices have more than doubled since 2003 and electricity prices are up by 73 per cent over the same ten year period.

Notes:
(1) Consume price indices deflated using the GDP (market prices) deflator (2010=100)

Source: Office for National Statistics.

Chart 8.2:
Fuel price indices[1] for the domestic sector, 1996 to 2013

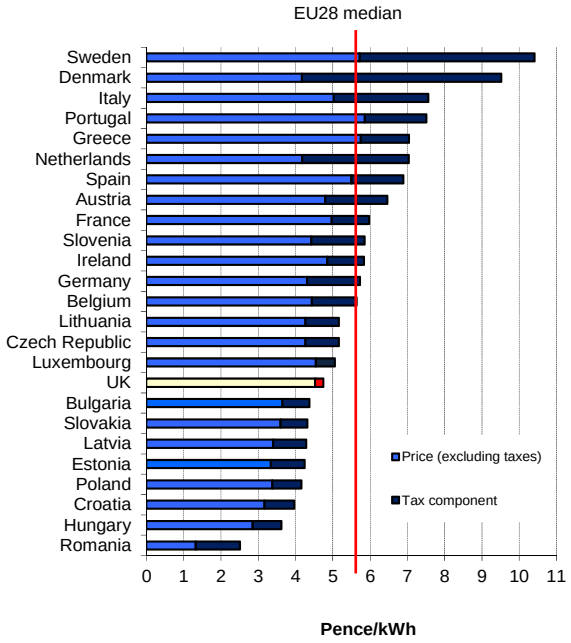


- Between 2012 and 2013, prices for domestic solid fuels remained broadly unchanged in real terms, and the price of liquid oils decreased by 1.3 per cent.
- Prices for solid fuels remained broadly unchanged in the 1990s before climbing slowly between 2000 and 2007. Prices then rose by 33 per cent between 2007 and 2009, and have remained around that level since then.
- Liquid fuel prices follow those of crude oil and are therefore more volatile. Following a peak in 2008, prices fell by 31 per cent in 2009, but in 2012 and 2013 are around 8 per cent above the 2008 level.

Notes:
(1) Consumer price indices deflated using the GDP (market prices) deflator (2010=100)

Source: Office for National Statistics.

Chart 8.3:
Domestic gas prices for medium consumers within the EU28 in 2013: converted to UK pence per kWh[(1)(2)(3)]



- In 2013, UK average domestic gas prices for medium consumers, including taxes, were the ninth lowest in the EU28 on a common pounds sterling currency basis, and were 15.7 per cent below the EU28 median.

- Average UK domestic gas prices for medium consumers, including taxes, have been the lowest or second lowest in the EU15 since 1998, when our records began.

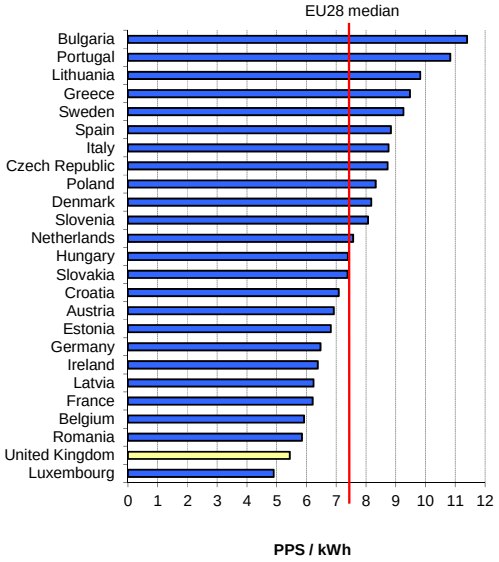
- In 2013, average UK domestic gas prices, including taxes, were the third lowest in the G7 behind USA and Canada (from IEA data).

Notes:
Tax component represents all taxes levied where not refunded.

(1) Converted using average 2013 exchange rates.
(2) Data not available for Cyprus, Finland and Malta.
(3) The prices for 2013 are averages of prices for the periods January - June 2013 and July - December 2013.

Source: Derived from Eurostat data.

Chart 8.4:
Domestic gas prices for medium consumers within the EU28 in 2013: PPS[(1)(2)(3)]



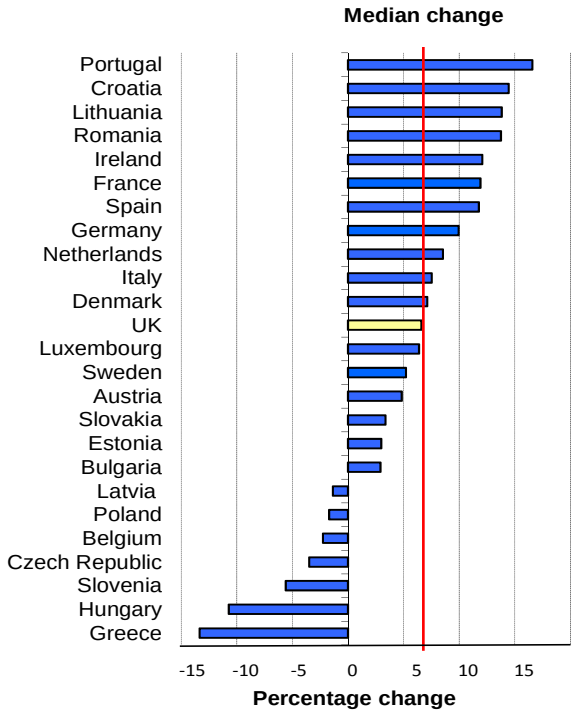
- In 2013, UK average domestic gas prices for medium consumers, including taxes, were the second lowest in the EU28 on a Purchasing Power Standards (PPS) basis.

- Data is shown using PPS exchange rates which takes account of the relative purchasing power of the currency and generally reduces the ranking of Western European countries.

Notes:
(1) Purchasing Power Standard (PPS) is an artificial common reference currency which eliminates the effect of price level differences across countries. One PPS buys the same given volume of goods/services in all countries.
(2) Data not available for Cyprus, Finland and Malta.
(3) The prices for 2013 are averages of prices for the periods January - June 2013 and July - December 2013.

Source: Derived from Eurostat data.

Chart 8.5:
Percentage change in domestic gas prices for medium consumers within the EU28, 2012 to 2013[(1)(2)(3)]



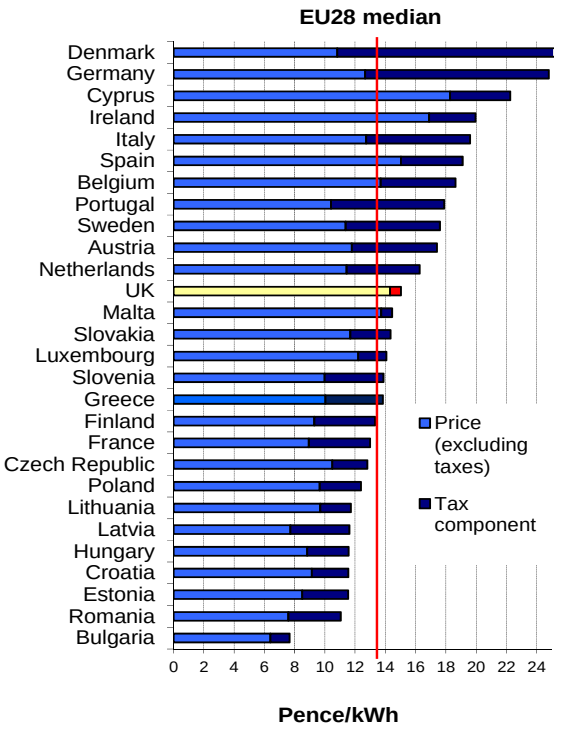
Notes:
Percentage changes in prices include all taxes where not refunded.

(1) There is only limited gas supply in Sweden and Portugal.
(2) Data not available for Cyprus, Finland, Greece and Malta.
(3) The prices for 2012 and 2013 are averages of prices for the periods January - June and July - December within each year and are based on prices converted to UK pence per kWh.

Source: Derived from Eurostat data.

- Between 2012 and 2013, UK average domestic gas prices for medium consumers, including taxes, rose by 6.6 per cent.
- Prices rose in 18 of the EU28 countries in 2013, similar to 2012 when prices rose in 16 of the EU28 countries.
- The largest increase in 2013 was in Portugal, with prices up by 16.6 per cent whilst the greatest decrease was in Greece where prices fell by 13.3 per cent.
- UK domestic gas prices were generally steady between the start of 2009 and the middle of 2011, but rose sharply in the second half of 2011. Prices first decreased in 2012 before increasing again after June 2012. This pattern was broadly consistent across the EU28.

Chart 8.6:
Domestic electricity prices for medium consumers within the EU28 in 2013: converted to UK pence per kWh[(1)(2)]



- In 2013, average UK domestic electricity prices for medium consumers, including taxes, were the twelfth highest within the EU28 on a common pounds sterling currency basis, and were 5.8 per cent above the EU28 median.

- UK domestic prices for medium consumers including tax were below the EU28 median from 2009 until 2012.

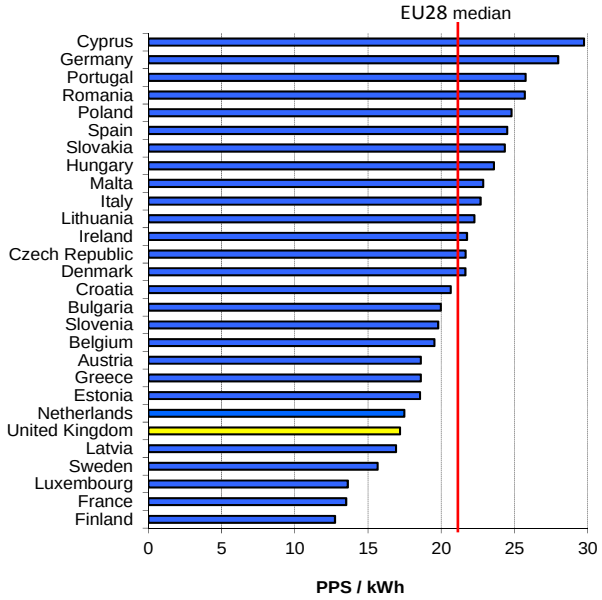
- In 2013, average UK domestic electricity prices, including taxes, were the fourth highest in the G7 behind Canada, USA and France (from IEA data).

Notes:
Tax component represents all taxes levied where not refunded.

(1) Converted using average 2013 exchange rates.
(2) The prices for 2013 are averages of prices for the periods January - June 2013 and July - December 2013

Source: Derived from Eurostat data.

Chart 8.7:
Domestic electricity prices for medium consumers within the EU28 in 2013: PPS[(1)(2)]



Notes:
(1) Purchasing Power Standard (PPS) is an artificial common reference currency which eliminates the effect of price level differences across countries. 1 PPS buys the same given volume of goods/services in all countries.

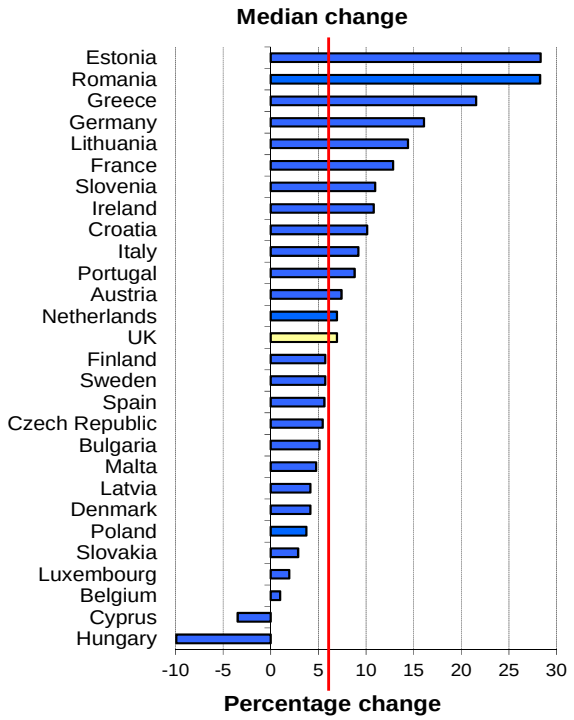
(2) The prices for 2013 are averages of prices for the periods January – June 2013 and July - December 2013

Source: Derived from Eurostat data.

- In 2013, UK average domestic electricity prices for medium consumers, including taxes, were the sixth lowest in the EU28 on a Purchasing Power Standards (PPS) basis.

- Data is shown using PPS exchange rates which takes account of the relative purchasing power of the currency and generally reduces the ranking of Western European countries.

Chart 8.8:
Percentage change in domestic electricity prices for medium consumers within the EU28, 2012 to 2013 (1)



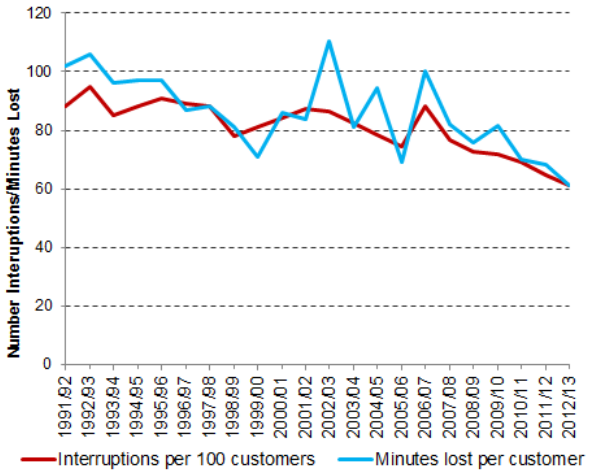
Notes:
Percentage changes in prices include all taxes where not refunded.

(1) The prices for 2013 are averages of prices for the periods January - June 2013 and July - December 2013 and are based on prices converted to UK pence per kWh.

Source: Derived from Eurostat data.

- Between 2012 and 2013, average UK domestic electricity prices for medium consumers, including tax, rose by 6.9 per cent.
- The largest increase was in Estonia and Romania, where prices rose by 28 per cent.
- Domestic electricity prices fell in two EU28 countries over this period; Cyprus with a price decrease of 3.5 per cent and Hungary with a price decrease of 9.9 per cent.
- UK domestic electricity prices (including taxes) fell slightly between July 2008 and July 2009, before rising sharply in the second half of 2011. The EU28 median price has shown slight increases since July 2008, with the exception of a 3% fall in the last half of 2011.

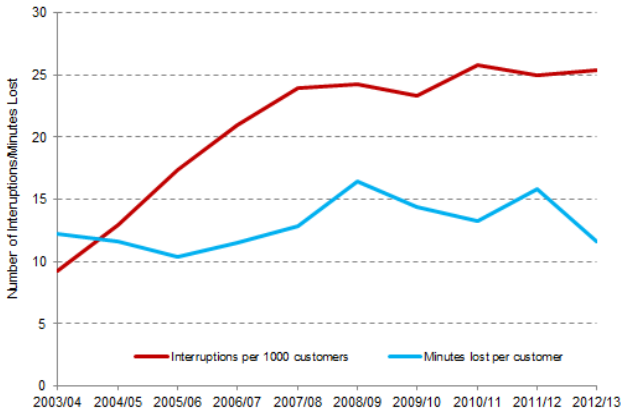
Chart 8.9:
Security and availability of electricity supply for the average customer, 1991/92 to 2012/13



Source: Ofgem.

- During 2012/13 there were 61 interruptions per 100 customers. This was 6 per cent lower than the 2011/12 figure of 65 interruptions per 100 customers.
- The average length of time without supply in 2012/13 was 61 minutes per customer. This was 10 per cent lower than the 2011/12 figure of 68 minutes per customer.
- Since the 1990s both interruptions and minutes lost per customer have been falling, suggesting an improvement in electricity supply security and availability over this period. However, there have been large fluctuations in the number of minutes lost per customer since 2000, mainly driven by weather conditions.

Chart 8.10:
Security and availability of gas supply for the average customer, 2003/04 to 2012/13

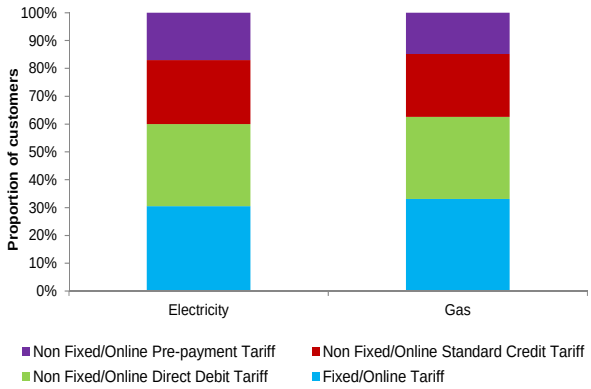


- During 2012/13 there were 25 interruptions per 1,000 customers, at about the same level as the 2011/12 figure.
- The average length of time without supply in 2012/13 was 12 minutes per customer. This shows a decrease on the 2011/12 figure of 16 minutes per customer.

Notes:
An Ofgem assessment showed that the reported number of interruptions was understated and the duration of interruptions was significantly overstated due to data collection issues. Improvements have been made since 2008-09, increasing both the accuracy and completeness of data reported. Therefore some of the trends apparent in the data may be put down to an increase in reporting accuracy, rather than genuine changes in performance.

Source: Ofgem.

Chart 8.11:
Proportion of customers on fixed[(1)] or online[(2)] tariffs in Q2 2014

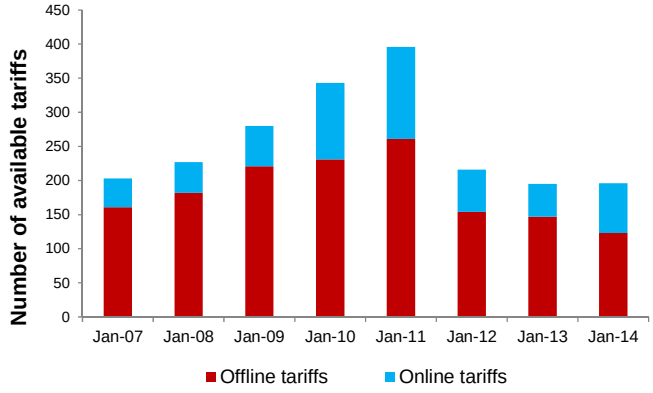


- In Q2 2014, around 30 per cent of electricity and 33 per cent of gas customers were on a fixed or online tariff (or both). This equates to approximately 8.3 million electricity and 7.2 million gas customers.
- In Q2 2007, around 5 per cent of electricity customers and 9 per cent of gas customers were on a fixed or online tariff.
- Generally, fixed and online tariffs are cheaper than standard tariffs. See notes for definitions of fixed and online tariffs.

Notes:
(1) A fixed tariff is one where the price a customer pays for fuel will not change for a set amount of time, regardless of price movements in the market.
(2) An online tariff is one where the customer is required to give meter readings, view bills and communicate with the company all via the internet.
A tariff can be both fixed and online.

Source: Domestic Fuels Inquiry data, DECC.

Chart 8.12:
Number of online and offline tariffs available to domestic consumers, January 2007 to January 2014

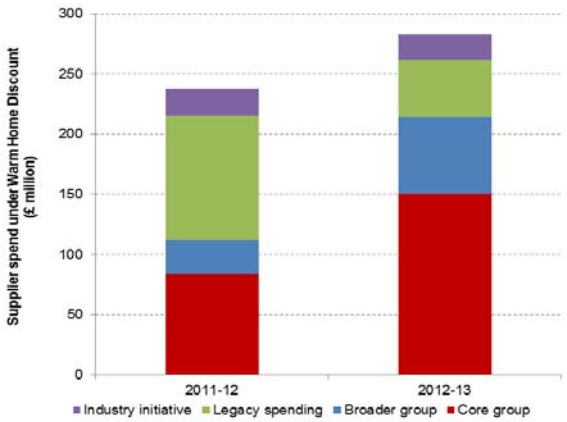


- Between January 2011 and January 2014, the total number of different tariffs available to domestic customers fell by 51 per cent, from 396 to 196.
- This is due to changes following OFGEM's Retail Market Review, aiming for a simpler, clearer and fairer domestic energy market and therefore reducing the number of tariffs available to customers.
- Over the same period, the number of offline tariffs available decreased from 261 to 123, whilst the number of online tariffs available decreased from 135 to 73.

Notes:
Dual Fuel tariffs are treated as separate tariffs, as are 'time of use' variations (e.g. Economy 7 and dynamic teleswitching tariffs). White label and small suppliers are included. Duplicates have been removed from those suppliers offer the same tariff but under different brand names.

Source: Ofgem.

Chart 8.13:
Suppliers' total annual spend on Warm Home Discount scheme (1), 2011/12 to 2012/13

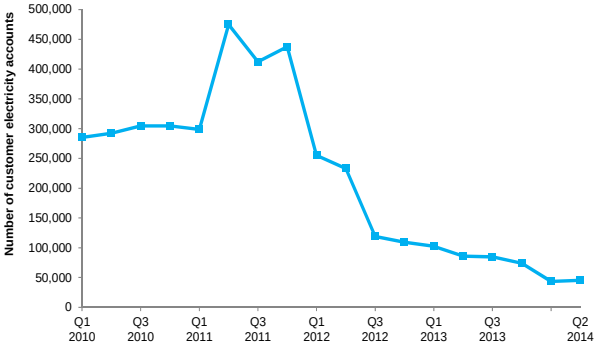


Notes:
(1) The Warm Home Discount (WHD) scheme came into effect on 1 April 2011. Under the scheme, suppliers that meet the criteria set out in the WHD Regulations 2011, are obligated to provide direct and indirect support, mainly financial, to customers in or at risk of fuel poverty over a period of four years.

The scheme has four elements - consumers in the core or broader group are eligible to receive rebates, suppliers can opt to support consumers through legacy arrangements which include social tariffs, or suppliers can offer wider support activities through industry initiatives.

Source: Warm Home Discount annual reports, Ofgem.

Chart 8.14:
Number of electricity customer accounts on accredited 'green'(1) tariffs, 2010 to Q2 2014



Notes:
(1) A 'green' tariff involves an energy provider adding extra units of electricity from renewable sources to the grid, or supporting a broad range of environmental projects that may or may not reduce carbon. A subset of these are accredited green tariffs, which have a 'Green label' (like a kite mark) to indicate that they will deliver a real, measurable environmental difference. These are accredited by the Green Energy Supply Certification Scheme:
www.greenenergyscheme.org/index.php

Source: Domestic Fuels Inquiry data, DECC.

- Supplier spending on customers in or at risk of fuel poverty, through the Warm Home Discount (WHD) scheme, increased by 19 per cent between 2011/12 and 2012/13, from £238m to £283m.

- Legacy spending decreased by £56m over the period, reducing its share of total WHD spending from 43 to 17 per cent. In contrast, there was an increase in spending in the core and broader groups by £102m, increasing their share of total WHD spending from 47 to 76 per cent.

- In 2012/13, about 1.6m consumers benefited from a rebate through the core or broader group, around 1.0m benefited from a legacy tariff or rebate, and just under 100,000 benefited from an industry initiative.

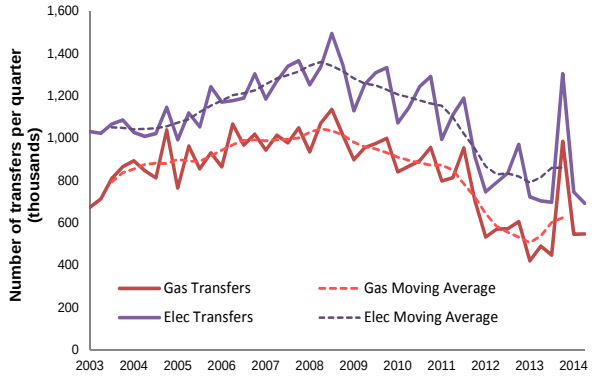
- Before the Warm Home Discount was introduced, social tariffs were one of the main sources of support for vulnerable consumers. In 2010/11 there were 1.0m consumers on social and discounted tariffs and supplier total annual spend on these tariffs accumulated to £92m.

- In Q2 2014, just over 45,000 electricity customers were on 'green' tariffs.

- The large fluctuation in the number of customers on these tariffs between Q1 2011 - Q3 2012 is due to the introduction and then expiration of some popular green tariffs.

- The Green Energy Supply Certification Scheme grants accreditation to green tariffs that meet their specified criteria. As old tariffs disappear from the market and new ones become available, fluctuations may be seen in the numbers of customers on accredited green tariffs. In particular, delays between new 'green' tariffs becoming available and becoming officially accredited can contribute to these fluctuations.

Chart 8.15:
Total number of energy supplier transfers[(1)] per quarter, 2003 to Q2 2014



Notes:
(1) Transfers refer to customers switching from one energy supplier to another and do not include switching payment method when staying with the same company, or where a customer switches to another offer provided within the same parent company. For electricity and gas (from January 2014) this includes all suppliers. Previous to this gas transfers only covered the main six suppliers.

The figures in this table do not include data on switching rates in Northern Ireland.

Source: Ofgem.

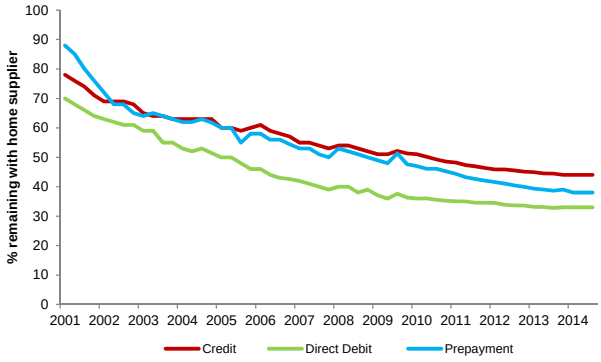
- Between Q1 2003 and Q3 2008, the number of gas and electricity transfers per quarter increased by 69 per cent and 45 per cent respectively. At its peak in Q3 2008, there were around 1.14 million gas transfers and 1.49 million electricity transfers during the quarter.

- The rapid decline in the number of transfers between Q3 2011 and Q2 2012 is likely to be due to several of the major energy suppliers ending doorstep selling in this period.

- There was a surge in transfer levels experienced in Q4 2013, which marked a 63% increase in gas and a 34% increase in electricity transfers on Q4 2012. This has since subsided in the first two quarters of 2014.

- The chart also shows the five-point moving average for each fuel. Both trends show the number of quarterly transfers decreasing from Q3 2008 until an increase in Q4 2013.

Chart 8.16:
Percentage of electricity customers serviced by their home supplier[(1)], Great Britain, 2001 to Q2 2014



Notes:
(1) Home supplier denotes the former public electricity suppliers within their own distribution areas, or their parent company. Non-home suppliers are new entrant suppliers and the former electricity suppliers outside of their distribution areas.

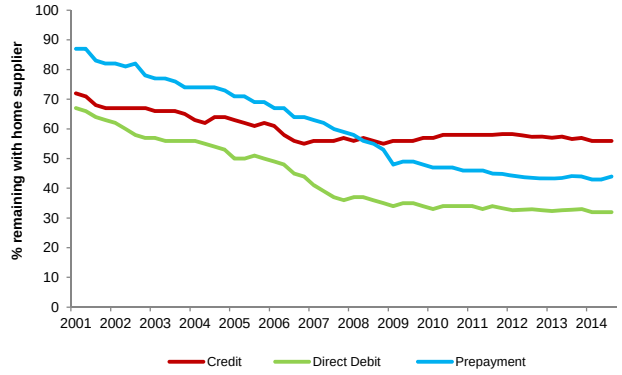
Source: Table 2.4.1, Quarterly Energy Prices, DECC.

- All domestic customers in Great Britain have been able to choose their electricity supplier since 1999, when domestic electricity markets were fully opened to competition. As a result, there have been almost constant quarterly declines in the number of customers remaining with their home supplier.

- In Q2 2014, 33 per cent of direct debit customers, 38 per cent of pre-payment customers and 44 per cent of standard credit customers remained with their home supplier.

- This compares to Q4 2000 when 70 per cent of direct debit customers, 88 per cent of pre-payment meter customers and 78 per cent of standard credit customers were with their home supplier.

Chart 8.17:
Percentage of gas customers serviced by their home supplier(1), Great Britain, 2001 to Q2 2014



Notes:
(1) Home supplier denotes British Gas Trading and non-home suppliers are all other domestic gas suppliers.

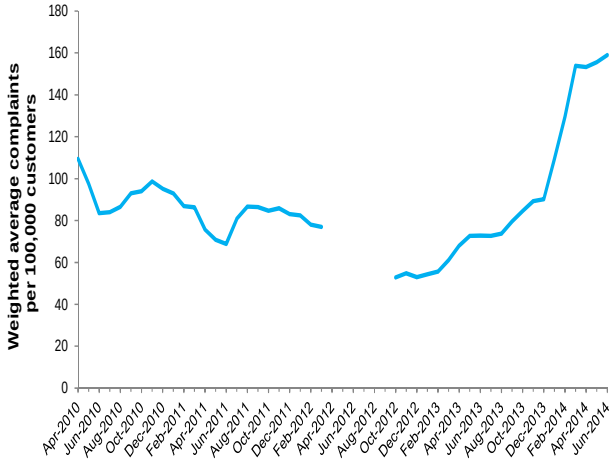
Source: Table 2.5.1, Quarterly Energy Prices, DECC.

- Whilst the domestic gas market was privatised in 1986, it wasn't until 2000 that all domestic customers in Great Britain were able to move away from their home supplier. As a result, there has been a steady decline in the number of customers remaining with their home supplier. However, since 2008 the percentage of gas customers with their home supplier has remained fairly steady.

- In Q2 2014, 32 per cent of direct debit customers, 44 per cent of pre-payment customers and 56 per cent of standard credit customers remained with their home supplier.

- All of these proportions have decreased since Q4 2000 when these figures were 67 per cent of direct debit customers, 87 per cent of pre-payment meter customers and 72 per cent of standard credit customers.

Chart 8.18:
Energy supplier performance regarding complaints handling, 3 month rolling average, April 2010 to June 2014



Notes:
Citizens Advice have created a proxy for performance based on the number of consumers that have contacted an independent organisation for advice or support with an energy problem. The companies have been ranked on the number of customer contacts to Citizens Advice consumer service, Consumer Futures and Ombudsman Services: Energy in relation to their market share during the last quarter. The different types of complaint have been weighted to reflect the seriousness of the complaint and the time and effort spent by the consumer to get their problem resolved.
This data relates to the Big Six energy companies only, i.e. British Gas, EDF Energy, E.ON, nPower, SSE and Scottish Power.

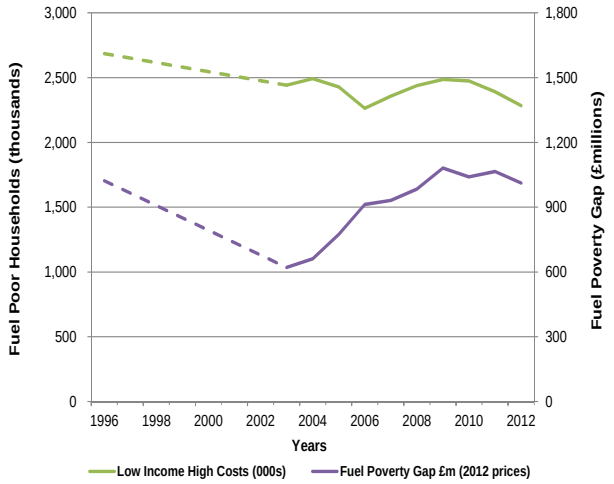
- In June 2014, the weighted average number of complaints was 159 per 100,000 customers. This is more than double the complaint level reached in June 2013.

- The latest data suggests that since October 2012 the number of complaints has been trending upward. No comparisons with previous period are currently possible due to a change in methodology.

- There is a break in the series as data prior to March 2012 was produced by the former Consumer Focus later rebranded as Consumer Futures now known as Citizens Advice. This model was continued by Consumer Futures and later Citizens Advice under new methodology from October 2012.

Source: Consumer Focus until March 2012, Consumer Futures from October 2012, Citizens Advice from April 2014.

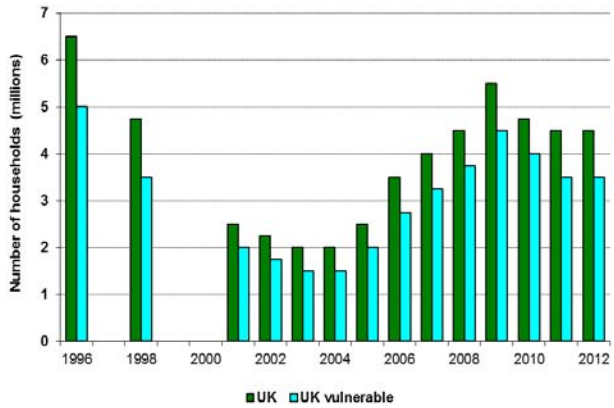
Chart 8.19:
Fuel poverty trends in England: the Low Income High Cost and Fuel Poverty gap measures, 1996-2012



Note:
Figures have not been calculated for the years 1997 to 2002. For further details on fuel poverty see: www.gov.uk/government/collections/fuel-poverty-statistics

Source: Fuel Poverty datasets, DECC

Chart 8.20:
Number of households and vulnerable (1) households in Fuel Poverty under the 10 per cent measure, UK, 1996 to 2012



Note:
Figures have not been calculated for 1997, 1999 and 2000. For further details on fuel poverty see: www.gov.uk/government/collections/fuel-poverty-statistics

(1) A vulnerable household is one that contains the elderly, children or someone who is disabled or has a long term illness.

Source: Fuel Poverty datasets, DECC

- Fuel poverty in England is measured by the Low Income High Costs definition, which considers a household to be fuel poor if they have required fuel costs that are above average (the national median level) and were they to spend that amount, they would be left with a residual income below the official poverty line.

- The LIHC measure consists of two parts: the number of households in fuel poverty and the depth of fuel poverty amongst these households. The depth is measured in terms of a fuel poverty gap which represents the difference between the modelled fuel bill for each household and the reasonable cost threshold for the household. This can be summed for all fuel poor households to give an aggregate gap.

- Under the LIHC measure, the number of households in fuel poverty in England has remained broadly flat over time. The fuel poverty gap has changed in response to energy prices. The gap decreased by about £400m between 1996 and 2003, increased by over £450m from 2003 to 2009, and then fell by about £70m up to 2012.

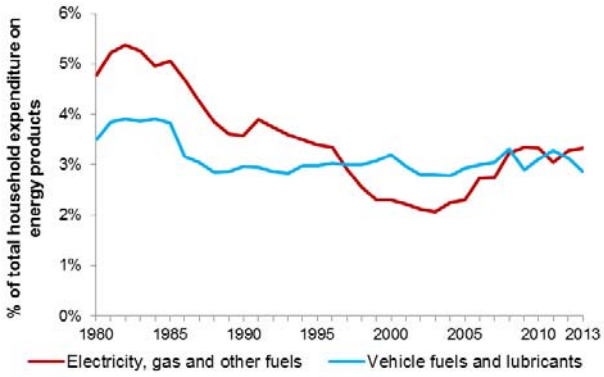
- Under the old 10 per cent definition, a household was said to be fuel poor if it needs to spend more than 10 per cent of its income on fuel to maintain an adequate level of warmth.

- UK figures are only available for the 10 per cent measure. Based on this, the number of fuel poor households in the UK has fallen from about 6.5 million in 1996 to 4.5 million in 2012.

- There has been a decrease of about 1 million households since 2009, reflecting a combination of rising incomes, improvements in energy efficiency, and a slight fall in fuel prices in 2010.

- The number of vulnerable fuel poor households in the UK is estimated to have fallen from about 5 million to about 3.5 million between 1996 and 2012.

Chart 8.21:
Proportion of total household expenditure on energy products, 1980 to 2013



Notes:
Other fuels include solid fuels, e.g. coal, and liquid fuels, e.g. domestic heating and lighting oil.

Vehicle fuels and lubricants include petrol, diesel, LPG, oil and lubricants, brake and other fluids and coolants.

Source: Office for National Statistics, Consumer Trends

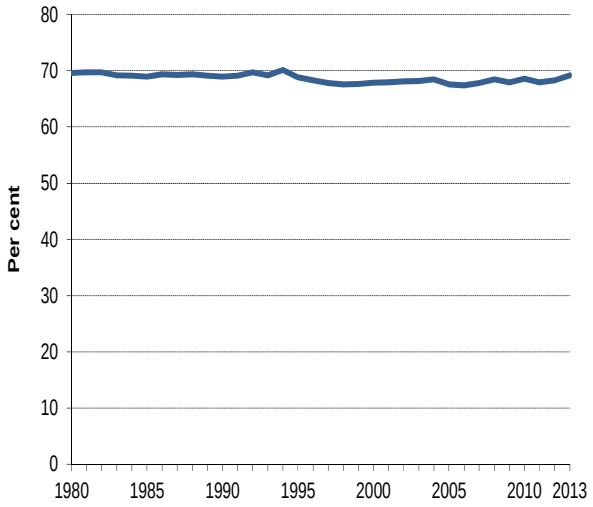
- In 2013, 3.3 per cent of household expenditure was spent on electricity, gas and other fuels, whilst a further 2.9 per cent was spent on vehicle fuels and lubricants.

- In the 1980s and 1990s, the proportion of household expenditure spent on gas, electricity and other fuels decreased. However, since 2003 the proportion has generally increased as a result of higher prices. This trend reversed in 2011 due to price cuts in 2010.

- After a fall in 1986, the proportion of household expenditure spent on vehicle fuels and lubricants remained at a roughly constant level before beginning to increase from 2004 onwards.

Environmental Objectives
9 Conversion Efficiencies

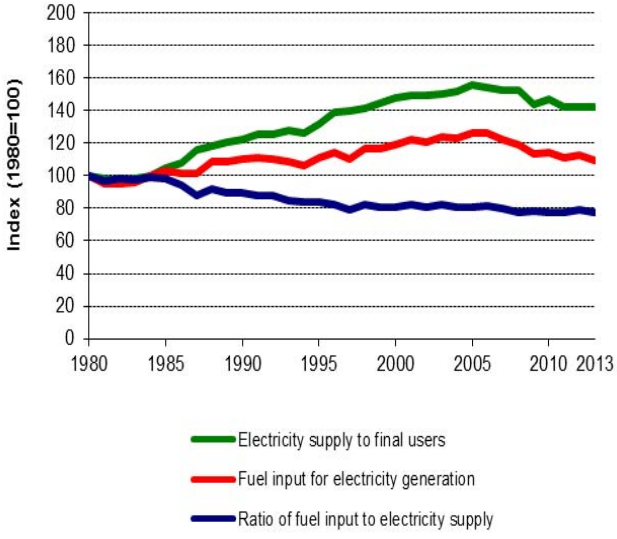
Chart 9.1:
Ratio of final to primary energy consumption, 1980 to 2013



Source: DECC

- The ratio of final consumption to primary consumption has generally remained fairly stable since 1980.
- Losses during conversion to secondary fuels, losses during distribution, and energy industry use account for the difference between primary consumption and final consumption.
- Since 1980, this difference has remained at around an average of 31% of primary consumption but in the last few years, increases in primary electricity from wind have resulted in lower losses, as by definition the final consumption of electricity from wind is set equal to primary consumption.

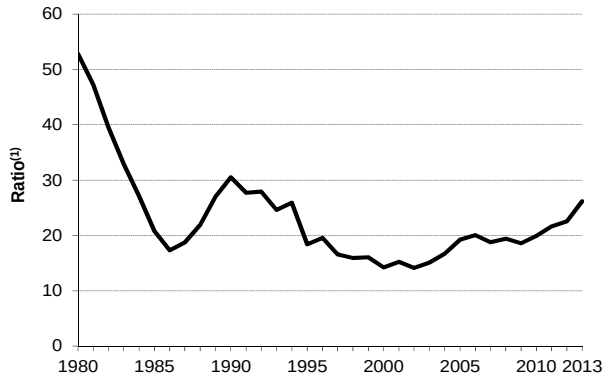
Chart 9.2:
Ratio of fuel use for electricity generation to electricity used by final users 1980 to 2013



Source: DECC

- Final users consumed 42% more electricity in 2013 than in 1980. Over the same period, total fuel use for electricity generation has risen by 10%. As a result the overall conversion ratio has fallen by 23% since 1980.
- Between 2000 and 2005, there was no distinct change in the overall conversion ratio because of fluctuations between, more thermally efficient, gas-fired generation and less efficient coal during this time.
- Fuel use fell in 2006 and 2007, as generation from gas increased at the expense of, less efficient, coal. Supply declined moderately between 2005 and 2008, before dropping steeply in 2009. After a fall in 2011, supply has remained stable, decreasing marginally in 2013. These changes, in addition to price driven changes in gas and coal use, have resulted in little change in the conversion ratio.

Chart 9.3:
Gas flaring relative to oil production, 1980 to 2013



(1) Cubic metres of gas flared per tonne of oil

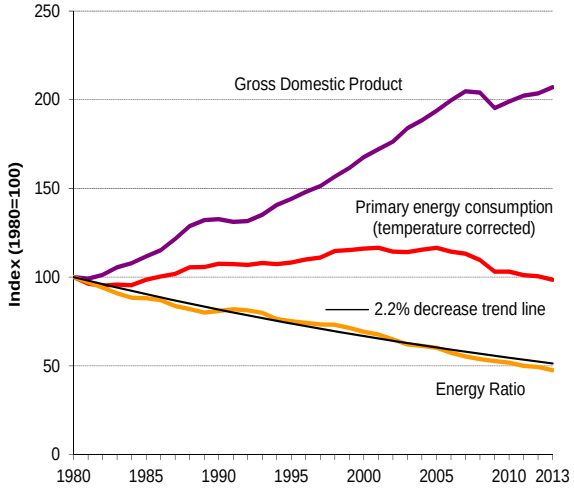
Source: DECC

- The proportion of gas flared to oil production fell during the mid-1980s. The subsequent safety work resulting from Piper Alpha led to the ratio increasing again until 1990 before declining through much of the 1990s. It has mostly risen since the turn of the century.

- Gas flaring in 2012 was lower than it otherwise should have been had their not been significant production issues at the Brent field. Brent typically flares some of the largest volumes of gas on the UKCS over a given year. Production issues in 2012 greatly reduced the amount of gas flared at Brent. In 2013 however, Brent resumed usual production and the field was the second highest producing oil field in terms of the quantity of gas flared. Combined this resulted in the proportion of gas flared to oil production increasing.

Environmental Objectives
10 Energy Use Indicators

Chart 10.1:
The energy ratio since 1980



Source: DECC; Office for National Statistics

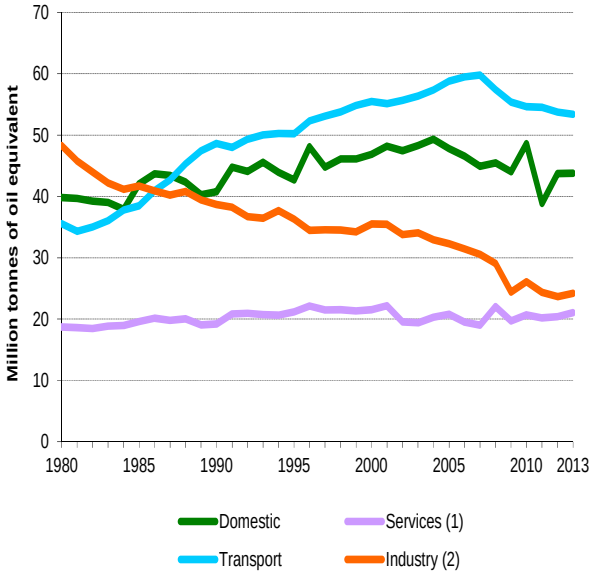
- The energy ratio is calculated by dividing temperature corrected primary energy consumption by Gross Domestic Product at constant (2010) prices.

- The energy ratio has fallen steadily, at around 2.2% per year since 1980, though since 2005 the rate has fallen at 2.9% per year.

- The downward trend in the ratio can be explained by a number of factors:

1. Improvements in energy efficiency (including the impact of the EU Emissions Trading System, Climate Change Agreements and the Carbon Reduction Commitment);
2. Fuel switching in generation;
3. A decline in the relative importance of energy intensive industries;
4. The fact that some uses, such as space heating, do not increase in line with output.

Chart 10.2:
Final energy consumption by sector, 1980 to 2013



(1) Services include the commercial sector, public administration and agriculture.
(2) Industry includes construction.

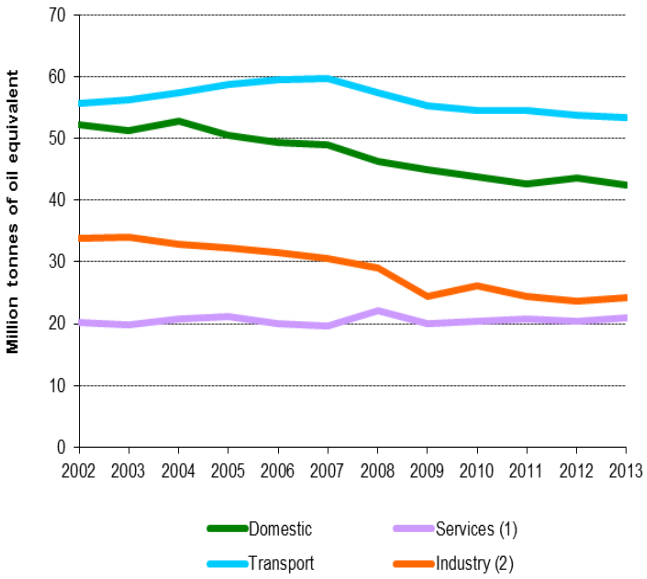
Source: DECC

- Transport has been the biggest single final energy user sector in the UK for more than two decades and accounted for 37% of final energy use in 2013. Generally transport consumption has grown year-on-year, but recently it has declined due to the economic slowdown and improved efficiency amongst other factors.

- Domestic consumption accounted for 31% of final energy use, whilst industrial consumption accounted for 17%. The remaining final energy was used by services including agriculture.

- Total final energy consumption (excluding non-energy use) rose 1% on 2012 to 142.5 million tonnes of oil equivalent in 2013. By sector, final energy consumption decreased by 0.7% in the transport sector while in the industry sector, final consumption increased by 2.4% and in the service sector 3.1% over the previous year. Domestic consumption was broadly the same despite the slightly colder weather in 2013.

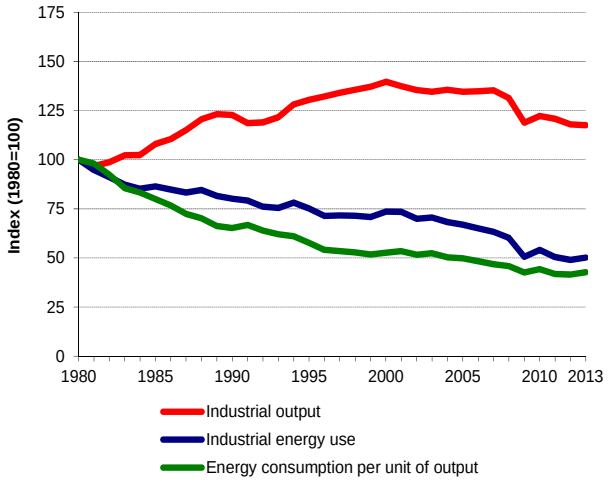
Chart 10.3:
Temperature corrected final energy consumption by sector, 2002 to 2013



Source: DECC

- On a temperature corrected basis, total final energy consumption has been on a downward trend since 2004.
- In 2013 consumption on that basis at 141.0 million tonnes of oil equivalent was 0.3% lower than in 2012.
- By sector, in 2013, domestic consumption fell by 2.8% from 2012, transport consumption fell by 0.7%, whilst service and industrial consumption rose by 3.0% and 2.4% respectively.
- A quarterly series on seasonally adjusted and temperature corrected final energy consumption is published in table 1.3c of Energy Trends.

Chart 10.4:
Industrial energy consumption and output, 1980 to 2013



Source: DECC; Office for National Statistics

- Total industrial energy consumption has fallen by 50% since 1980. Over the same period industrial output (constant 2010 prices) has risen by 17%.
- As a result energy consumption per unit of industrial output has fallen by 57% since 1980.
- There has been an improvement in energy efficiency over this period, but there has also been a decline in the importance in the UK economy of energy intensive industries and considerable fuel switching.
- Since 1980 energy consumption per unit of output has fallen by 2.5% per year on average; however the rate of decline has been lower more recently, and has averaged 1.6% since 2000.

Table 10.1:
Industrial energy use by sector in 2013

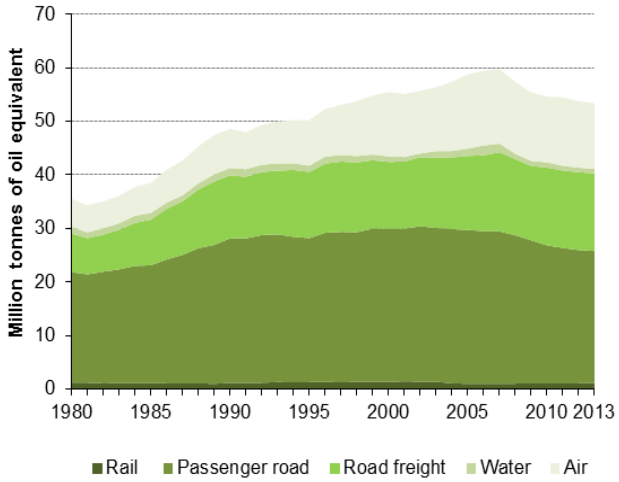
	Energy use (thousand tonnes of oil equivalent)
Engineering and metals	3,768
of which	
Iron and Steel[(1)]	1,346
Chemicals	3,392
Food, beverages and tobacco	2,866
Mineral products	2,822
Paper, printing and publishing	1,692
Textiles	778
Other industry[(2)]	8,913
All industrial energy use	24,231

(1) The definition of iron and steel presented here is based on the SIC 2007 code 24, excluding 24.4, 24.53 and 24.54.
(2) Includes construction.

Source: DECC

- Industrial energy use increased by 2.4% in 2013, compared to 2012.
- In 2013, the chemicals sector was the single biggest industrial consumer of energy, accounting for 14% of industrial consumption, similar to the previous year.
- Other major sectors include food, beverages and tobacco combined (12%), minerals (12%), paper, printing and publishing (7%) and the iron and steel industry (6%) of industrial consumption.

Chart 10.5:
Transport energy consumption[(1)] by type of transport, 1980 to 2013

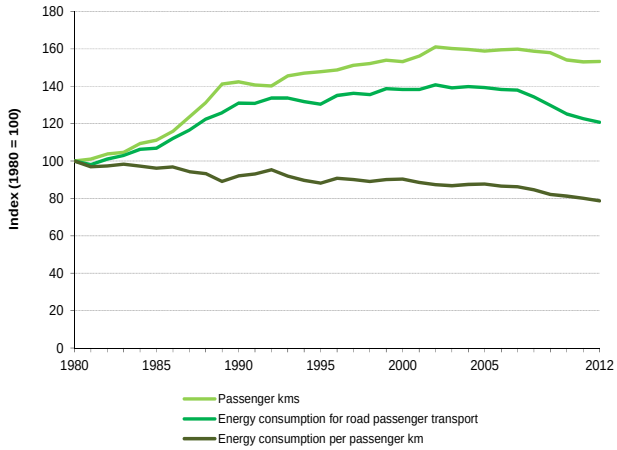


(1) Includes liquid biofuels.
(2) For rail transport, electricity consumed at transport premises is included from 1990 onwards.

Source: Department of Energy and Climate Change - Digest of UK Energy Statistics Annex, Table 1.1.5 and bespoke analysis of data supplied by Ricardo-AEA ECUK 2014 Table 2.01.

- Overall energy consumption in the transport sector has increased by 50% between 1980 and 2013. There was a sustained growth in consumption until 2007. Since 2007 consumption has reduced by 11%. This is likely to be in part due to the impact of the economic slowdown.
- Fuel consumption by road transport, the largest energy use within the transport sector, increased by 41% between 1980 and 2013.
- In 2013, fuel consumption in the air transport sector was more than double the 1980 level, but has fallen by 12% since its high in 2006, reflecting improved efficiency in the airline sector.

Chart 10.6:
Energy consumption[1] and distance travelled by road passengers[2], 1980 to 2012



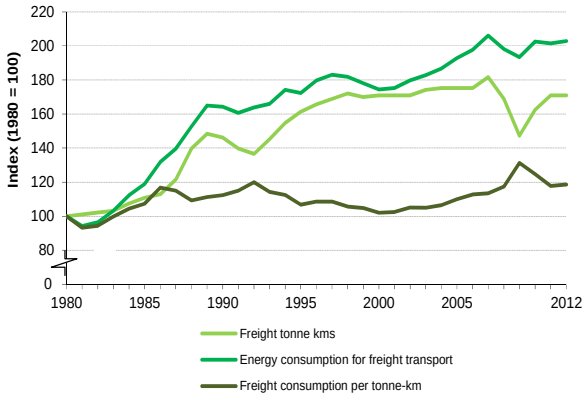
(1) Includes liquid biofuels.
(2) Data for 2012 has been estimated using 2011 values.

Source: Department of Energy and Climate Change; Digest of UK Energy Statistics Annex, Table 1.1.5 and bespoke analysis of data supplied by Ricardo-AEA, and Department for Transport - Transport Statistics GB.
ECUK 2014 Tables 2.01, 2.04 and 2.11

- Fuel use by road passenger vehicles has increased by 21% between 1980 and 2012.

- Road use and consumption both increased between 1980 and 1990, with passenger distance travelled increasing at a higher rate. After 1990, total consumption by road passenger transport flattened while distance travelled continued to increase. This led to a reduction in consumption per passenger km. In 2012 consumption per passenger km was 21% lower than 1980.

Chart 10.7:
Energy consumption[1] and distance travelled by road freight, 1980 to 2012



(1) Includes liquid biofuels.

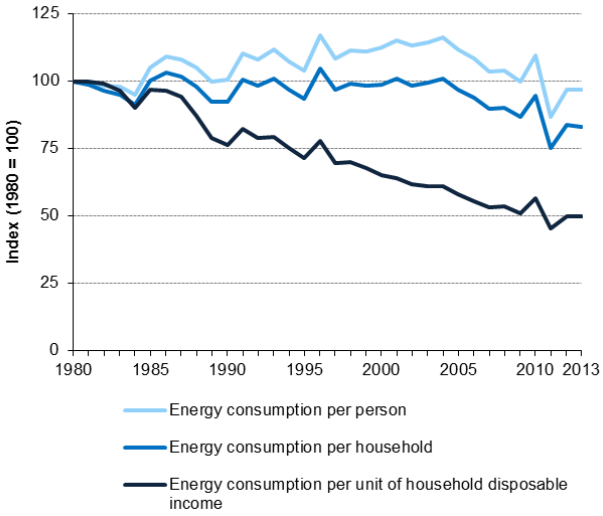
Source: Department of Energy and Climate Change; Digest of UK Energy Statistics Annex, Table 1.1.5 and bespoke analysis of data supplied by Ricardo-AEA and Energy and secondary analysis of data from the Department for Transport - Transport Statistics GB
ECUK 2014 Tables 2.01, 2.06 & 2.11

- Fuel use for road freight transport doubled between 1980 and 2012, whilst the number of freight tonne kilometres (tonne-kms) increased by 71% over the same period.

- Energy consumption per tonne-km of goods transported peaked in 2009 when it was 31% higher than in 1980. Since 2009 it has reduced and in 2012 it was 19% higher than in 1980.

- The dip in road freight in 2009 and the increase in the tonne-km ratio is as a result of the UK being in recession.

Chart 10.8:
Domestic energy consumption, 1980 to 2013



Source: Department of Energy and Climate Change - Digest of UK Energy Statisitics Table 1.1.5; Domestic Energy Fact File and bespoke analysis of data supplied by the Building Research Establishment; Office of National Statistics - Monthly Digest of Statistics and Household estimates, Communities and Local Government
ECUK 2014, Table 3.35.

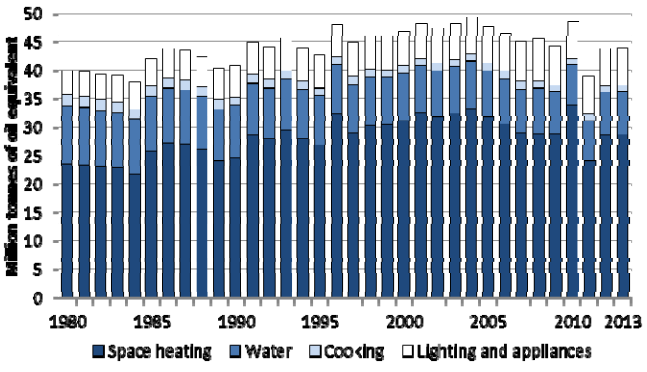
- Whilst energy consumption per household has remained broadly stable between 1980 and 2004, consumption per person generally increased until 2004. This divergence was due to the fall in the average number of people per household over the period.

- Since 2004, there has been an overall fall in household and per head energy consumption reflecting improved energy efficiency. The variation in this trend is due to weather and the recession.

- Domestic energy consumption per unit of disposable income has fallen in 2013 and was 50% below its 1980 level. The lowest level of energy consumption per unit of household disposable income was in 2011, when it was 55% below the 1980 level – 2011 experienced much milder weather conditions than usual.

- Temperature has a noticeable impact on domestic energy consumption and helps to explain some of the variation in consumption between years. For instance, 1996 and 2010 were especially cold.

Chart 10.9:
Domestic energy consumption by end use, 1980 to 2013

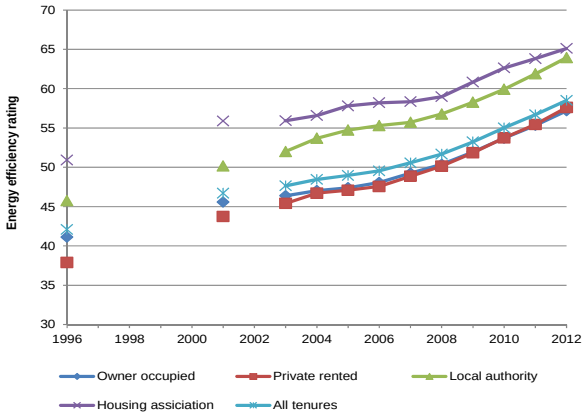


Source: Department of Energy and Climate Change - secondary analysis of data from the Building Research Establishment and Cambridge Architectural Research
ECUK 2014, Table 3.04

- In 2013, space and water heating accounted for 83% of the energy used in households. Space heating is susceptible to weather conditions and in particular to temperature variations.

- Since 1980, energy use for space heating has risen by 22%. Energy use for lighting and appliances increased 60%, while energy use for water heating and for cooking fell between 1980 and 2013, by 26% and 44% respectively.

Chart 10.10:
SAP rating of housing stock, 1996 to 2012



SAP ratings were calculated using SAP 2009

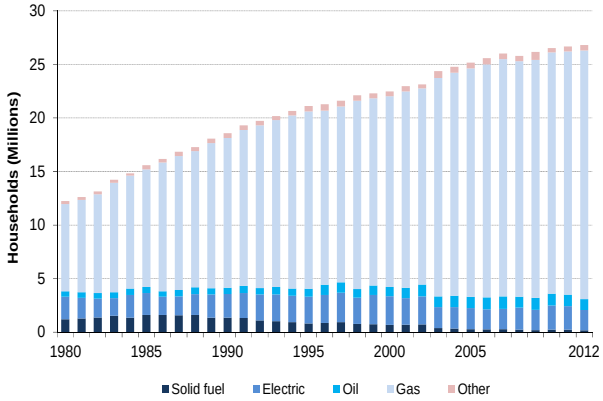
Source: DCLG: English House Condition Survey 1996 - 2007, English Housing Survey 2008 onwards, dwelling sample

- The Standard Assessment Procedure (SAP) provides a means of rating the energy efficiency of a dwelling and is based on estimates of space and water heating costs. A rating of 100 indicates an extremely efficient house.

- The energy efficiency of England's housing stock has risen from an average SAP rating of 42 in 1996 to 59 in 2012. Improvements have been made in all tenures. Housing association stock continues to be the most energy efficient with a SAP rating of 65 but privately rented homes have made the greatest improvement, from a rating of 38 in 1996 to 58 in 2012.

- The increases in SAP rating are due to major developments in building and insulation standards, new building standards, government support schemes to provide retro-fit installations, and the replacement of inefficient heating systems, such as open coal fires, by more efficient, mainly gas-fired, central heating.

Chart 10.11:
Ownership of central heating in United Kingdom by type, 1980 to 2012

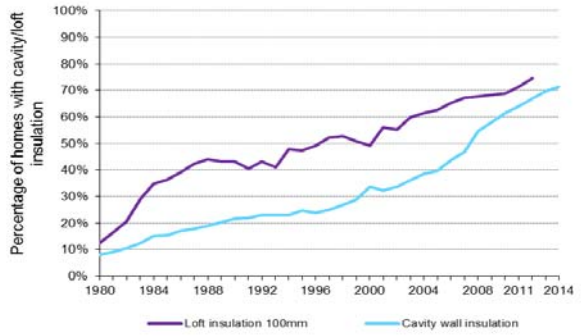


Source: Domestic Energy Fact File and bespoke analysis of data supplied by the Building Research Establishment
ECUK 2014 Table 3.16.

- In 1980, 12.2 million homes had central heating. This had risen to 26.8 million homes in 2012. This represents an increase from 58% of the housing stock in 1980 to 97% in 2012.

- Of all the houses that owned central heating in 2012, 84% had gas-fired systems.

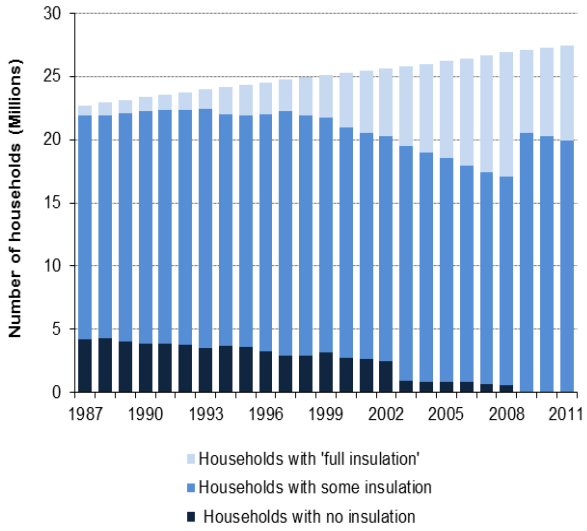
Chart 10.12:
Insulation levels in United Kingdom homes, 1980[1] to 2014



Source: DECC - ECUK 2014 Table 3.19, 3.20, 3.21, 3.23.

- At the start of April 2014, 71% of homes with cavity walls had cavity wall insulation, this compares to 8% in 1980.
- At the start of April 2014, 69% of properties with a loft had 125mm of loft insulation, this compares to 12% of properties in 1980 having at least 100mm of loft insulation.
- In April 2014, 3% of homes with solid walls had solid wall insulation.
- In 2012, 94% of houses had some double glazing, compared with 20% in 1980.

Chart 10.13:
Thermal efficiency[2] of housing stock in United Kingdom, 1987[3] to 2011

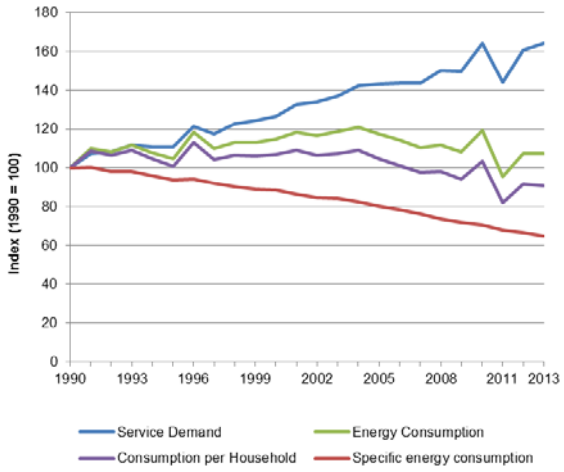


Source: DCLG: English Housing Condition Survey, English Housing Survey
UK Housing Fact File Table 6f

- Levels of home insulation in the United Kingdom have improved over the last twenty five years. Approximately 765,000 homes (3%) had full insulation in 1987, compared with 7.5 million (27%) by 2011.
- The increase has been driven largely by the rapid growth in loft insulation, cavity wall insulation and double-glazing.
- Households with full insulation are defined as homes with at least 80% of windows double glazed, at least 100mm loft insulation and cavity wall insulation.

[1] Data pre-2003 are based on a different data source and this has led to a discontinuity in the series for loft insulation.
[2] Households with 'full insulation' are households that have at least 100mm of loft insulation (for properties with a loft), cavity wall insulation, and at least 80% of rooms with double glazing. Households with no insulation are households that have no loft insulation, no cavity wall insulation and no double glazing.
[3] There is a discontinuity in the data between 2008 and 2009, due a change in methodology.

Chart 10.14:
Specific energy consumption for households, 1990 to 2013



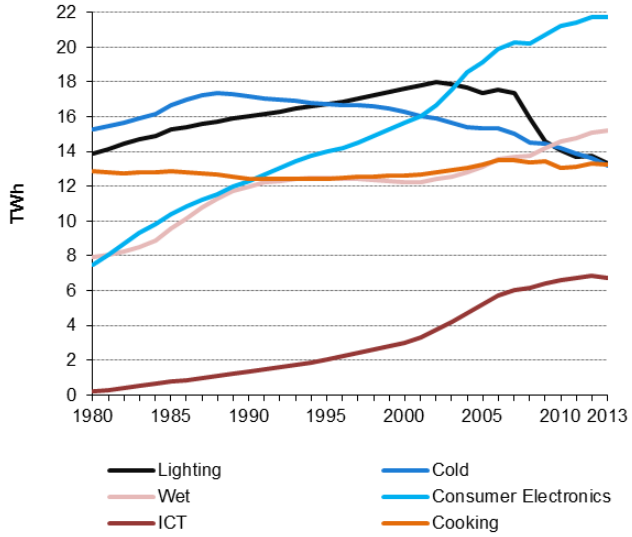
Source: Department of Energy and Climate Change - secondary analysis of data from the Digest of UK Energy Statistics
ECUK 2014, Table 3.36.

- Specific energy consumption is defined as the change in the energy required to produce a constant level of energy service in households. It is a modelled alternative to energy intensity, and takes account of changes in energy service demand (such as level of household comfort or hot water use).

- Service demand and energy consumption, which are both dominated by space heating, show a fluctuating trend because of variations in the weather from year to year. However the specific energy consumption, which is dominated by cumulative insulation levels and boiler efficiencies, behaves much more steadily.

- Service demand is 64% higher in 2013 than the 1990 level after rising from the 2011 figure (which was 44% higher than 1990 levels) and remaining constant with 2010 levels (64% higher than 1990 levels). Before this, it had followed a steep upward trend since 1997. Specific energy consumption has shown a decline, with the 2013 figure 35% below the 1990 level.

Chart 10.15:
Electricity consumption by household domestic appliance by broad type, 1980 to 2013



Source: Market Transformation Programme, DEFRA. Department of Energy and Climate Change ECUK 2014, Table 3.10.

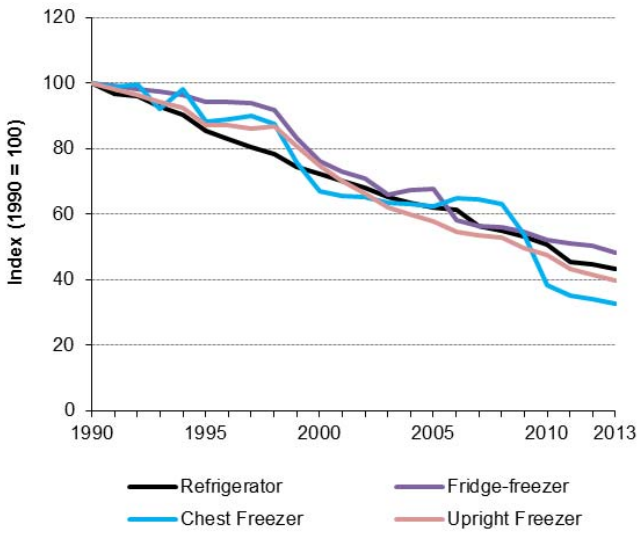
- The total amount of electricity consumed by domestic household appliances increased by 45% between 1980 and 2013. Since 1980, electricity consumption by ICT appliances has risen considerably from 0.18 TWh to 6.7 TWh, with increases of more than 40% a year between 2001 and 2006.

- Although the consumption by lighting and cold appliances remains high, consumption for these groups has gradually decreased over the past ten years due to an increase in energy efficiencies, and greater use of energy saving light bulbs.

- The appliance groups used in this chart are detailed below:

Lighting: Standard light bulb, halogen, fluorescent strip lighting, energy saving light bulb and LED.
Cold appliances: Refrigerators, freezers and combined fridge-freezers.
Cooking appliances: Electric ovens, electric hobs, kettles and microwaves.
Consumer electronics: TVs, VCR/DVDs, games console, power supply units and set top box.
ICT: Computers, monitors and printers.
Wet appliances: Washing machines, tumble dryers and dishwashers.

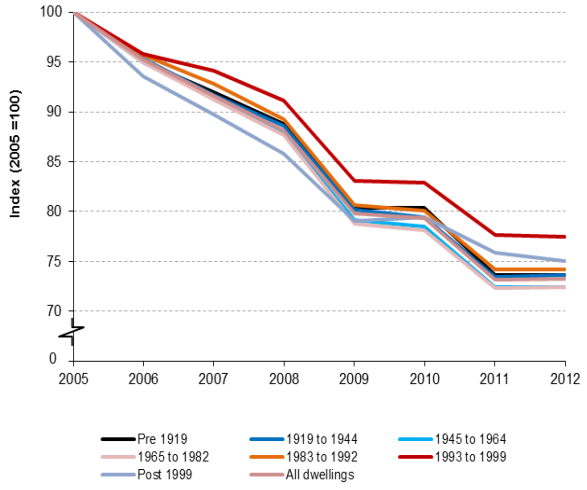
Chart 10.16:
Energy consumption of new cold appliances in the United Kingdom, 1990 to 2013



Source: Market Transformation Programme, DEFRA. Department of Energy and Climate Change ECUK 2014 Table 3.15

- Cold appliances accounted for over one fifth of all domestic lights and appliance electricity consumption in 2013.
- The improvements in new cold appliance consumption for each of the cold appliances listed are more marked since 1994, when energy labelling was introduced. Consumption includes the effects of changing efficiency and changing service (e.g. the introduction of larger, frost free appliances).
- Energy efficiency for new cold appliances has improved the most for chest freezers and upright freezers, which consumed 67% and 60% less electricity respectively in 2013 than they did in 1990.

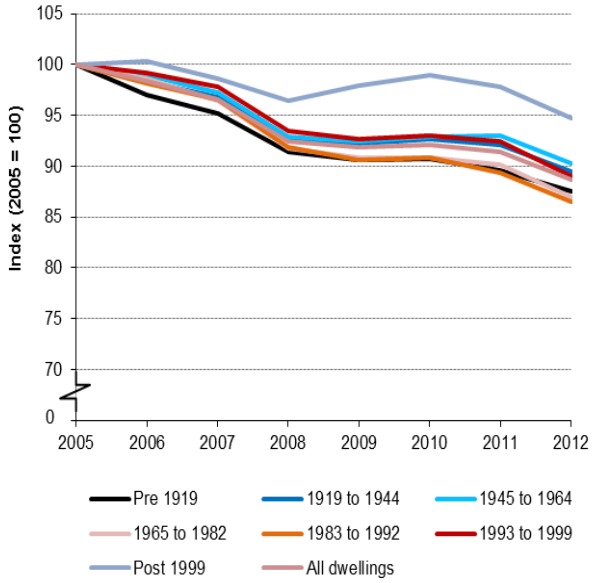
Chart 10.17:
Median domestic gas consumption (temperature corrected) in England and Wales, 2005 to 2012, by age of property



Source: DECC - National Energy Efficiency Data-framework (NEED) 2014, Consumption headline tables, Table 7.

- Temperature corrected median domestic gas consumption has reduced between 2005 and 2012 in properties of all ages.
- The change in median annual gas consumption between 2005 and 2012 for each group was between 23 and 28 per cent. Homes built between 1945-1964 and 1965-1982 had the greatest percentage decrease over the period.
- Properties built after 1999, had the lowest median gas consumption in 2012 of 11,400 kWh. Properties built between 1919 and 1944 had the highest median gas consumption in 2012 of 14,700 kWh.

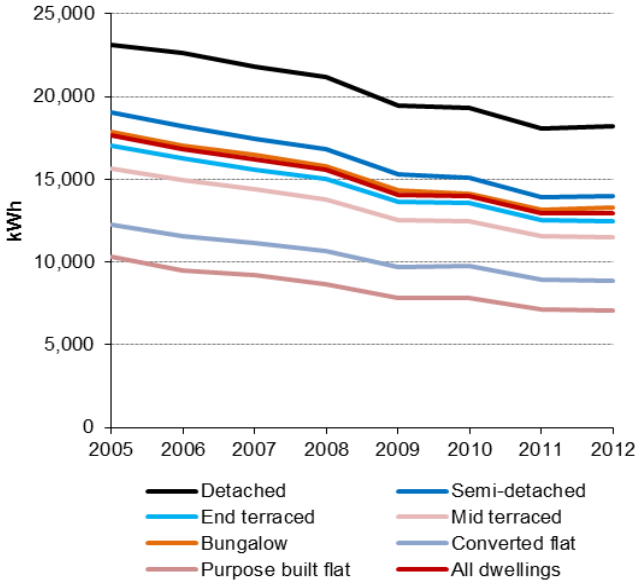
Chart 10.18:
Median domestic electricty consumption in England and Wales, 2005 to 2012, by age of property



Source: DECC - National Energy Efficiency Data-framework (NEED) 2014, Consumption headline tables, Table 8.

- Median domestic electricity consumption has reduced between 2005 and 2012 in homes of all ages.
- Electricity use is driven more by the activities of households than the design of the building.
- Overall median electricity consumption reduced by 11% between 2005 and 2012. Most age groups have followed this trend except the post 1999 group where median consumption reduced by 5%, although the actual consumption of this group remained lower throughout the period.

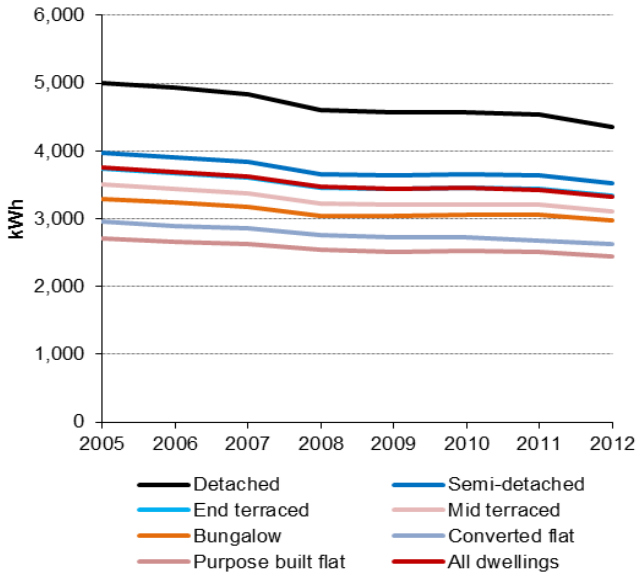
Chart 10.19:
Median domestic gas consumption (temperature corrected) in England and Wales, 2005 to 2012, by property type



Source: DECC - National Energy Efficiency Data-framework (NEED) 2014, Consumption headline tables, Table 5.

- Median domestic gas consumption has reduced between 2005 and 2012 for all property types.
- Overall median gas consumption reduced by 27% between 2005 and 2012. Purpose built flats experienced a greater reduction at 32%, whilst detached properties saw a smaller reduction at 21%.
- In 2012, detached properties typically consumed the most gas (18,200 kWh), followed by semi-detached properties (14,000 kWh).

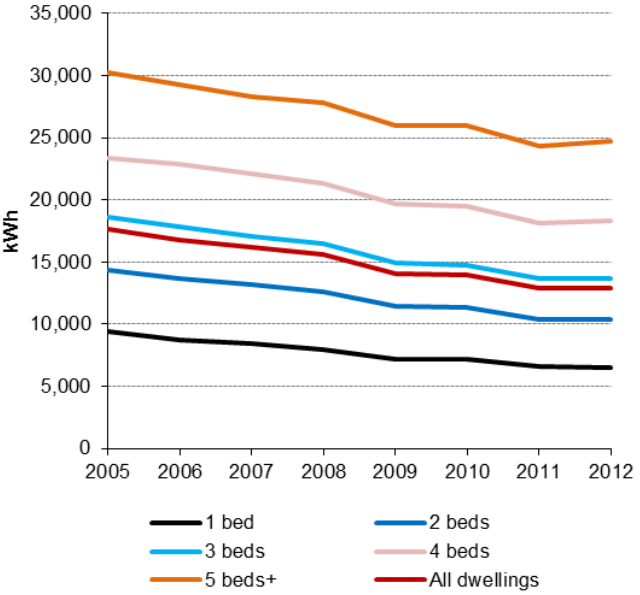
Chart 10.20:
Median domestic electricity consumption in England and Wales, 2005 to 2012, by property type



Source: DECC - National Energy Efficiency Data-framework (NEED) 2014, Consumption headline tables, Table 6.

- Median domestic electricity consumption has reduced between 2005 and 2012 in all property types.
- Overall median electricity consumption reduced by 11% between 2005 and 2012. This reduction was similar for all property types.
- In 2012, detached properties typically consumed the most electricity (4,400 kWh), with purpose built flats consuming the least (2,400 kWh) – relative consumption has remained similar in each year presented.

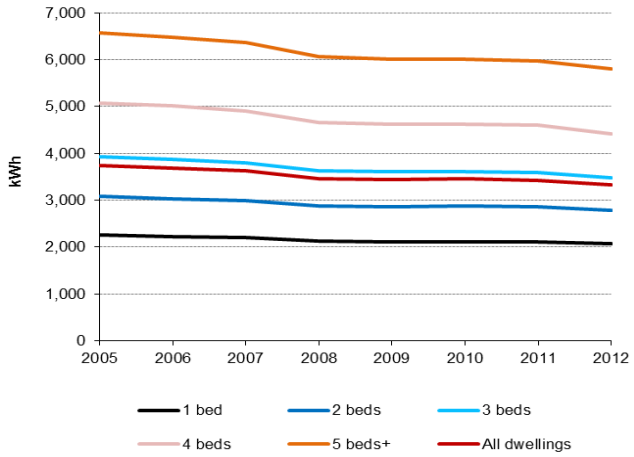
Chart 10.21:
Median domestic gas consumption (temperature corrected) in England and Wales, 2005 to 2012, by number of bedrooms



Source: DECC - National Energy Efficiency Data-framework (NEED) 2014, Consumption headline tables, Table 3.

- Temperature corrected median domestic gas consumption has reduced between 2005 and 2012 in homes of all sizes.
- Gas consumption has reduced at a faster rate in smaller homes with a 31% reduction in one bedroom homes compared to an 18% reduction in homes with five or more bedrooms between 2005 and 2012.
- Median gas consumption in 2012 for one bedroom properties was 6,500 kWh, this compares to 24,700 kWh for properties with five or more bedrooms.

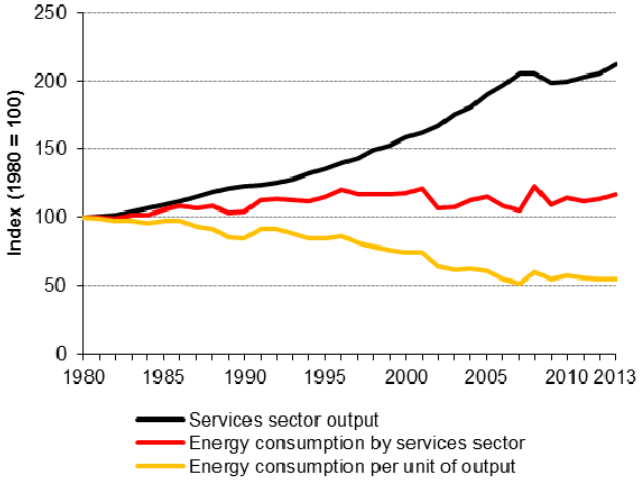
Chart 10.22:
Median domestic electricity consumption in England and Wales, 2005 to 2012, by number of bedrooms



Source: DECC - National Energy Efficiency Data-framework (NEED) 2014, Consumption headline tables, Table 4.

- Median domestic electricity consumption has reduced between 2005 and 2012 in homes of all sizes.
- There is little variation in the rate of change in consumption for properties of different sizes. Changes were between and 9% and 13% for all groups.
- Median electricity consumption in 2012 for one bedroom properties was 2,100 kWh, this compares to 5,800 kWh for properties with five or more bedrooms.

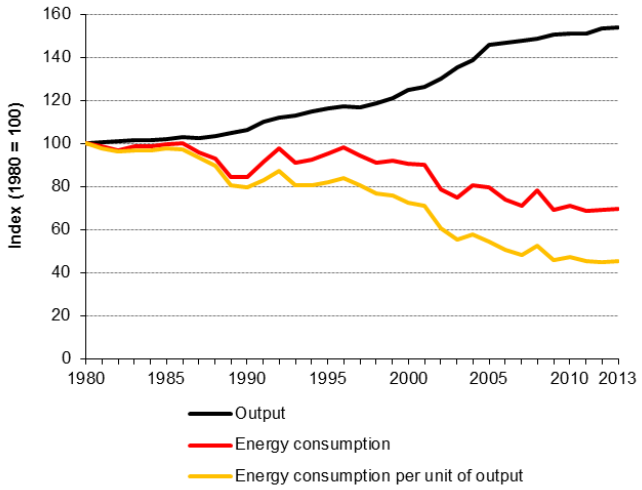
Chart 10.23:
Service sector energy consumption and output, 1980 to 2013



Source: DECC - secondary analysis. Office for National Statistics - United Kingdom Economic Accounts. ECUK 2014 table 5.22.

- Overall energy consumption per unit of output in the service sector has fallen by 45% since 1980, as output has risen at a significantly faster rate than energy consumption.
- Most of the fall in intensity is likely to be due to higher efficiency although structural change within the sector has also brought about some reduction in energy use.
- Charts 10.23 and 10.24 split service sector energy consumption between public services and private commercial sub-sectors.

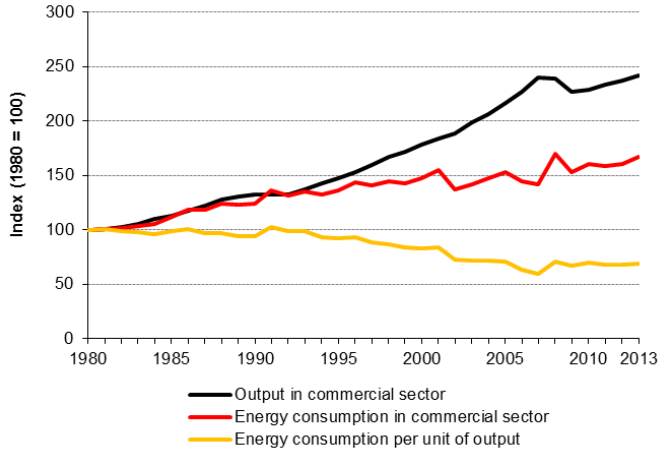
Chart 10.24:
Final energy use and value added by public administration, 1980 to 2013



- Since 1980 energy use by the public administration sector has fallen by 30%.
- Over the same period, output, has grown by 54% from its 1980 level.
- As a result, the amount of energy used per unit of output was 55% lower in 2013 than in 1980.

Source: DECC - secondary analysis. Office for National Statistics - United Kingdom Economic Accounts. ECUK 2014 table 5.24

Chart 10.25:
Final energy use by commercial and other services, 1980 to 2013

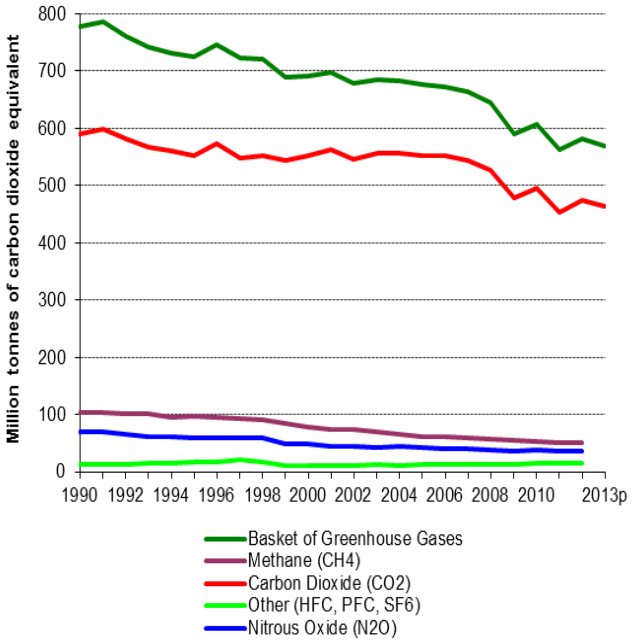


- Energy use by commercial and other services has increased by 67% since 1980.
- However over the same period, the output, by this sector has more than doubled.
- As a result, energy use per unit of output in 2013 was 31% lower than in 1980.

Source: Office for National Statistics; Department of Energy and Climate Change
ECUK 2014 Table 5.23

Environmental Objectives
11 Energy and the Environment

Chart 11.1:
Emissions of greenhouse gases, 1990 to 2013p



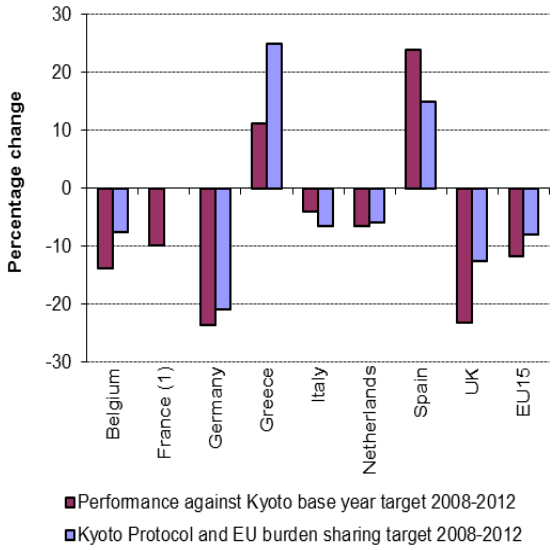
Source: DECC

- Provisional estimates show that since 1990, UK greenhouse gas emissions have fallen by 27%.

- In 2013, UK emissions of the 'basket' of six greenhouse gases, covered by the Kyoto Protocol and weighted by global warming potential, were provisionally estimated to be 569.9 $MtCO_2$ equivalent. Between 2012 and 2013 emissions fell by 1.9%, largely due to less fossil fuel being used, particularly in the generation of electricity.

- Carbon dioxide accounts for the majority of UK greenhouse gas emissions. In 2012, the latest year for which final results are available, carbon dioxide accounted for about 82% of the total UK greenhouse emissions while methane and nitrous oxide contributed about 9% and 6% respectively, with the remaining, consisting of the fluorinated gases such as hydro-fluorocarbon (HFC), per-fluorocarbon (PFC) and sulphur hexafluoride (SF6), around 3%.

Chart 11.2:
Progress towards meeting Kyoto targets to reduce greenhouse gas emissions for selected EU countries



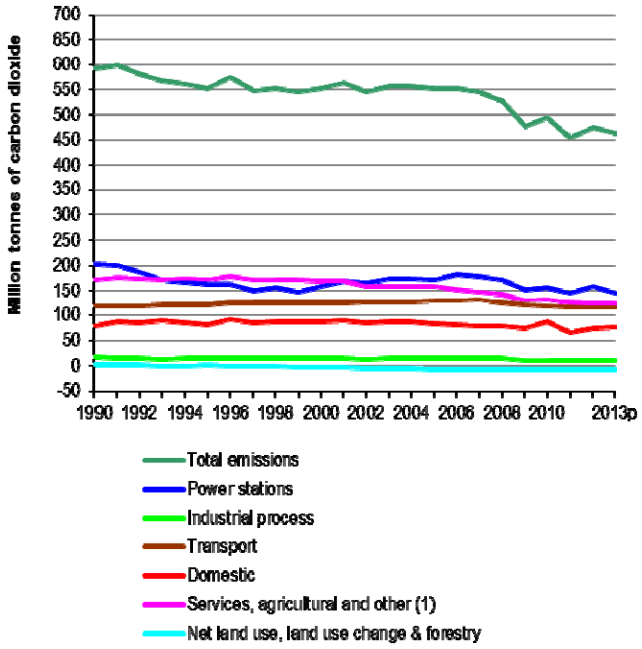
- Under the Kyoto protocol, the EU has agreed to reduce emissions by 8.0% relative to the 1990 level over the period 2008-2012.

- By 2012, emissions among the EU15 had fallen by 11.8%. The largest reduction in emissions among the eight largest emitters of greenhouse gases in the EU15 was from the UK where emissions fell by 23.2% from the base year level of 1990, well below the burden sharing target of -12.5% for the period 2008-2012. Spain however had the largest increase, up 24%.

(1) Kyoto Protocol and EU burden sharing target for France is 0%.

Source: European Environment Agency

Chart 11.3:
Carbon dioxide emissions on a National Communication basis, 1990 to 2013p



(1) Includes commercial and public service, military aircraft and naval vessels, fugitive emissions from solid fuels and natural gas and waste.

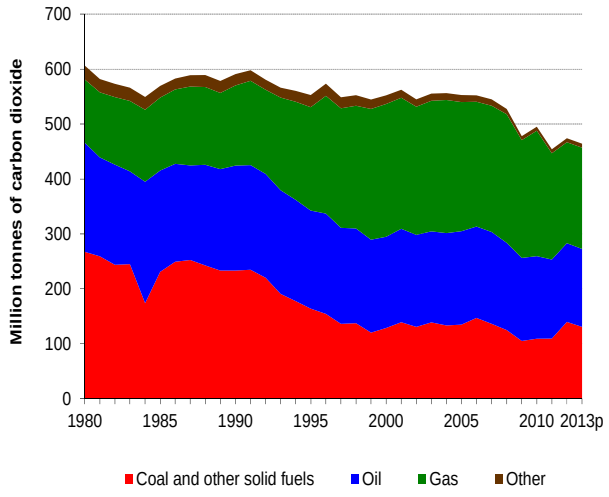
Source: DECC

- Carbon dioxide is the main greenhouse gas, accounting for about 82% of the total UK greenhouse gas emissions in 2013.

- It is provisionally estimated that 464.3 million tonnes of carbon dioxide were emitted in the UK in 2013, a fall of 2.1% from the previous year, primarily at power stations where less fossil fuels were used for electricity generation. However since 1990, net carbon dioxide emissions have fallen by around 21%.

- The significant reduction in carbon dioxide emissions between 2008 and 2009 was due to a number of factors, including fuel switching from coal and gas to nuclear for electricity generation as well as lower fossil fuel consumption by industry and in road transport as the economy contracted. Similarly between 2010 and 2011, more nuclear but less gas was used in generation and domestic consumption of fossil fuel also fell due to the warmer weather. Increased coal generation in 2012 led to a small increase in emissions.

Chart 11.4:
Carbon dioxide emissions by fuel type, 1980 to 2013p



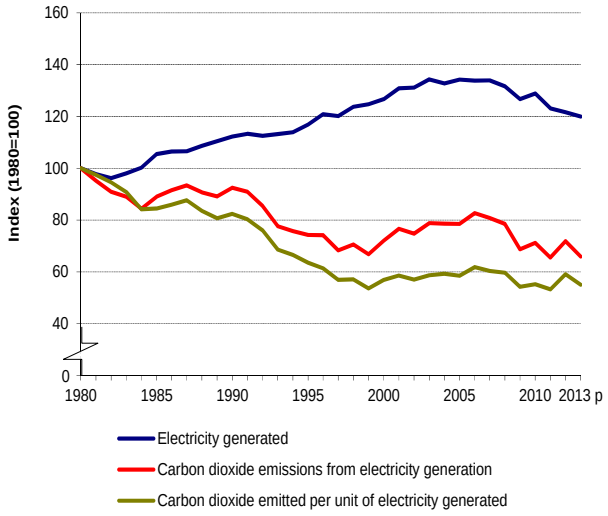
Source: DECC

- It is estimated that CO_2 emissions from fossil fuels, including fuel used for generating electricity, decreased by 21% to 456.9 $MtCO_2$ over the period 1980 to 2013.

- Inland consumption of fossil fuels has been on the decrease over the past few years resulting in a decrease in carbon dioxide emissions. The longer-term reduction in carbon dioxide emissions is largely due to the shift from coal to gas use in generation and improved energy efficiency. Oil consumption has remained broadly stable over the years.

- Data for 1990-2011 have been reviewed using the improved methodology available at: www.gov.uk/government/publications/uk-greenhouse-gas-emissions-statistics-user-guidance

Chart 11.5:
Power station emissions of carbon dioxide, 1980 to 2013p



Source: DECC, DUKES 5.1.3 and Table 1 climate change data

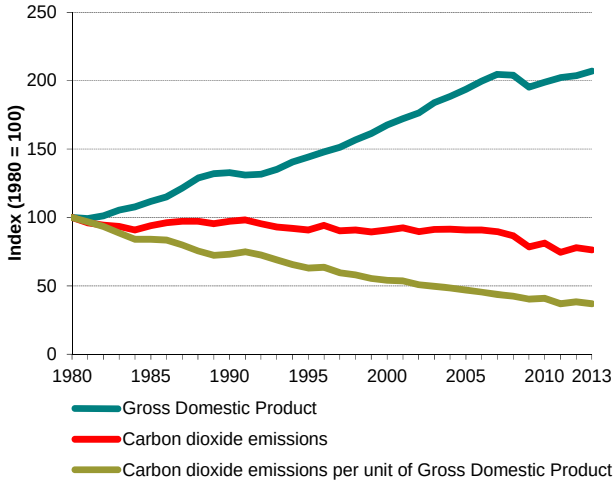
- Provisional data for 2013 indicates that emissions of carbon dioxide from power stations have fallen by 34% since 1980, whilst electricity generation has risen 20%.

- Carbon dioxide emissions per unit of electricity generated have fallen 45% since 1980. The decrease in 2013 was largely due to less coal and less gas used for electricity generation.

- Between 2000 and 2006 emissions increased as price fluctuations resulted in greater use of coal. Also, a reduction in nuclear generation resulted in more coal and gas being used. However since 2007, demand for electricity has declined and with less coal but more gas generally being used in generation, emissions from power stations has also been on the decline, although 2012 deviated from this trend with increased coal use.

- The long-term improvements are a result of the switch from coal to gas, improvements in the efficiency of power stations, and the increasing contribution of nuclear power and renewable energy sources.

Chart 11.6:
Carbon intensity, Carbon dioxide emissions per unit of GDP 1980 to 2013p

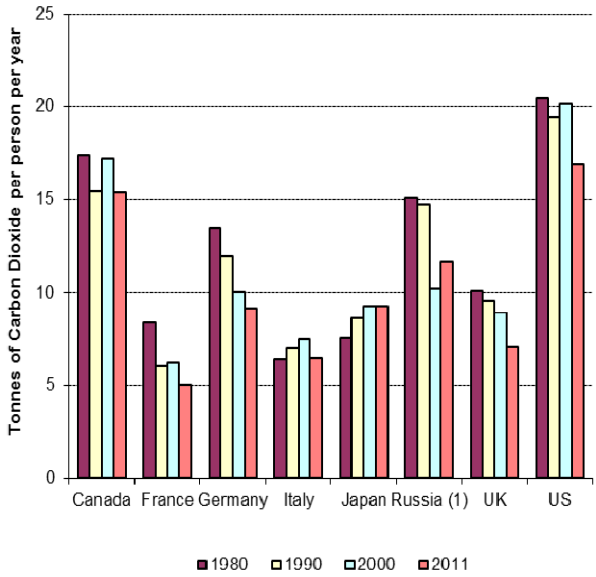


Source: DECC; Office for National Statistics

- Carbon dioxide emissions per unit of GDP decreased by 63% between 1980 and 2013 while GDP (at constant 2010 prices) increased more than doubled.

- Carbon dioxide emissions have fallen steadily over the period despite substantial economic growth. This is due to energy being used in a more efficient way; changes in the structure of the economy; and the increased use of fuels that are less carbon intensive.

Chart 11.7:
Carbon dioxide emissions per head for G8 countries, 1980 to 2011

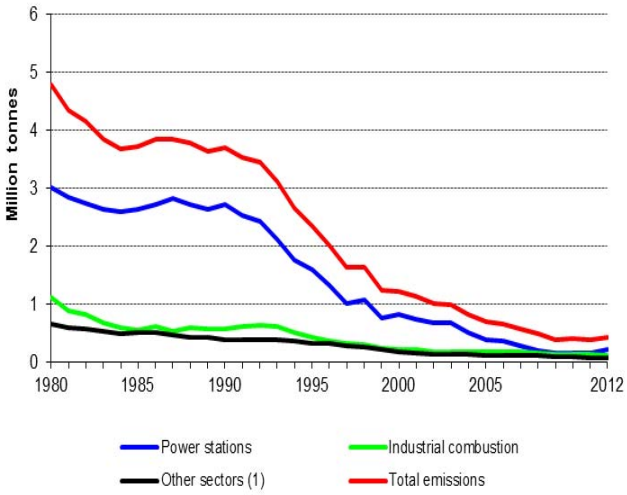


(1) 1980 data for Russia has been estimated using former USSR data

Source: International Energy Agency

- The UK has seen a consistent decline in carbon dioxide emissions per head since 1980. Italy and Japan on the other hand have seen gradual increases over the same period, although for Italy the latest data suggest a drop in its emissions per head.
- Of the G8 countries, France has the lowest absolute level of carbon dioxide emissions per head, largely due to significant nuclear generation. However relative to Germany and the UK, it has seen little reduction since 1990.

Chart 11.8:
Sulphur dioxide emissions by sector, 1980 to 2012

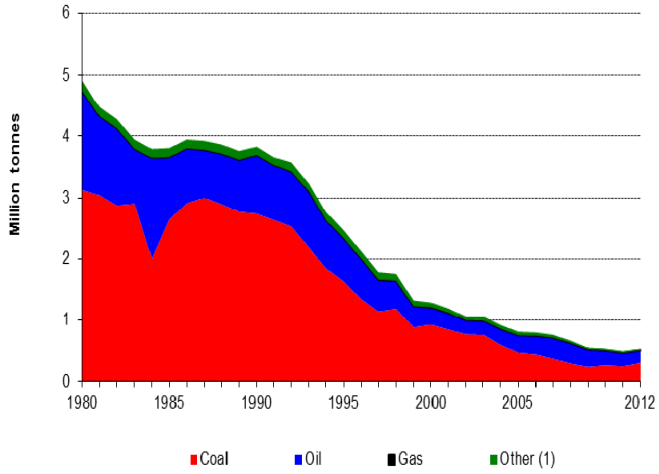


(1) Includes domestic, commercial, public services, transport and agriculture.

Source: National Atmospheric Emissions Inventory

- Sulphur dioxide is one of the two main causes of acid rain.
- Most of the sulphur dioxide emissions come from power stations accounting for 53% in 2012.
- Emissions from power stations have fallen by 92% since 1980.
- The progressive installation of flue gas desulphurisation since 1993 has had a notable effect. More recently the Large Combustion Plant Directive will also have added to the reduction in sulphur dioxide emissions.

Chart 11.9:
Sulphur dioxide emissions by fuel, 1980 to 2012



(1) Includes other solid fuels and non-fuel sources.

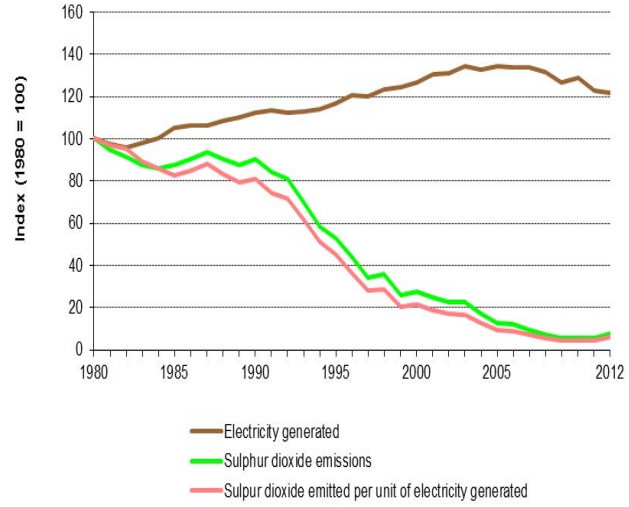
Source: National Atmospheric Emissions Inventory

- Sulphur dioxide is produced during the combustion of sulphur containing fuel, such as coal and oil. The main source of sulphur dioxide has consistently been the energy industries accounting for 66% of the total in 2012.

- In 1980, 3.1 million tonnes of sulphur dioxide were produced as a result of coal being burned. By 2012 this had fallen to 0.3 million tonnes, a decrease of about 92%.

- There has been a large fall in sulphur dioxide emissions from oil over the same period; the majority of the reduction resulted from lower emissions from fuel oil because of lower consumption. In 2012, just 0.1 million tonnes were produced compared with 1.5 million tonnes in 1980.

Chart 11.10:
Power station emissions of sulphur dioxide, 1980 to 2012

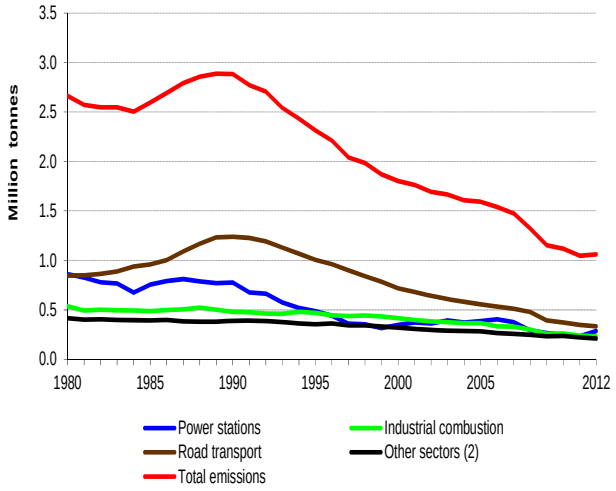


Source: National Atmospheric Emissions Inventory; DECC

- Power stations accounted for 53% of UK sulphur dioxide emissions in 2012. Historically coal-fired stations have been the largest source of sulphur dioxide emissions, but the gradual change in fuel mix of UK power stations (to more nuclear and gas-fired plant) and improvements in generation efficiency and abatement has led to a 92% reduction in sulphur dioxide emissions since 1980.

- In 2012, electricity generated fell by 1%, however sulphur dioxide emissions increased 36% at power stations as more coal were used in generation.

Chart 11.11:
Nitrogen oxides emissions by source(1), 1980 to 2012

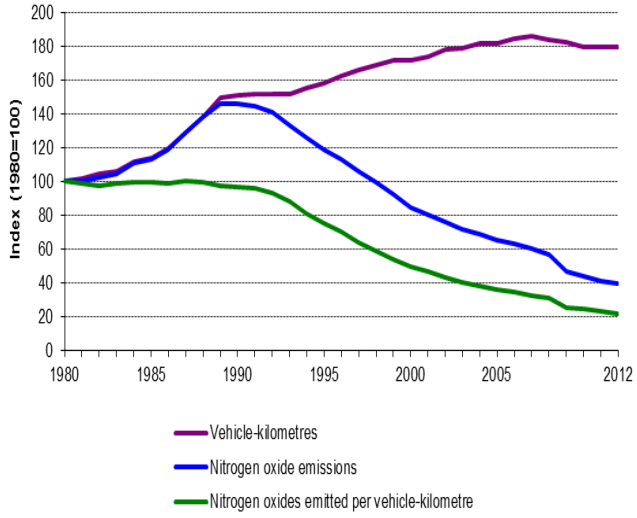


(1) Expressed as nitrogen dioxide equivalent.
(2) Includes domestic, commercial, public services, other transport, petroleum refining, agriculture and waste treatment and disposal.

Source: National Atmospheric Emissions Inventory

- Nitrogen oxides add to the natural acidity of rainfall.
- However since 1990, nitrogen oxide emissions have rapidly declined. In 2012, nitrogen dioxide emissions at 1.1 million tonnes were 63% lower than the 1990 level.
- In 2012, 31% of nitrogen oxide emissions were generated by road transport, with a further 27% coming from power stations.
- Emissions from power stations have declined due to the reduction in the use of coal and the installation of low NOx burners on coal fired power stations.

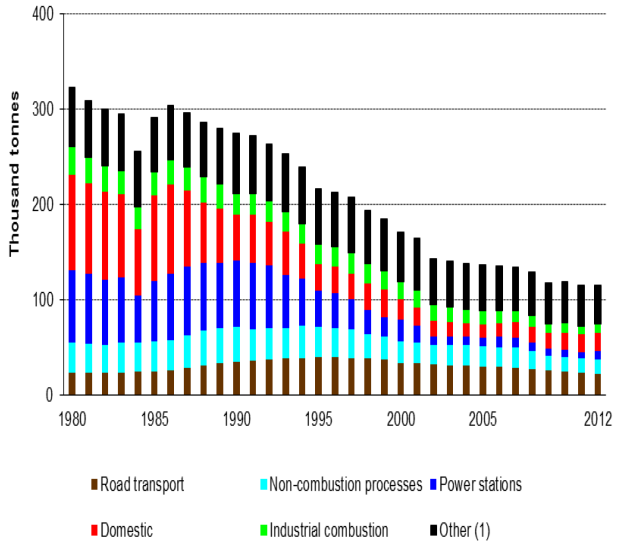
Chart 11.12:
Road transport emissions of nitrogen oxides, 1980 to 2012



Source: National Atmospheric Emissions Inventory; Department for Transport

- Nitrogen oxide emissions from road transport rose steadily between 1980 and the early 1990s in line with the increase in the volume of road transport.
- Since the early 1990s these emissions have declined, largely due to the tighter emissions standards for heavy goods vehicles.
- The introduction of catalytic converters on all new cars in 1993 has also contributed in reducing emissions.
- In 2012 emissions per vehicle kilometre travelled were 77% below their 1990 level.

Chart 11.13:
PM_{10} emissions by source, 1980 to 2012



(1) Includes the commercial and public sector, agriculture, petroleum refining and other transport.

Source: National Atmospheric Emissions Inventory

- Emissions of PM_{10} (particles measuring 10µm or less) have remained broadly stable over the past few years, having fallen by an estimated 65% since 1980.

- The domestic sector has seen the largest fall from 99,700 tonnes in 1980 to 19,400 tonnes in 2012 due to lower use of coal and oil for heating. Also over the same period, emissions from power stations have fallen from 75,900 tonnes to 8,600 tonnes.

- In 2012, road transport accounted for 20% of the total PM_{10} emissions with the domestic sector 17% and non-combustion processes (from construction, quarrying and industry) 13%.

Technical notes

Two technical measures, the Shannon-Wiener measure of diversity and the Herfindahl-Hirschman measure of concentration, are used in UK Energy Sector Indicators.

Shannon-Wiener

The Shannon-Wiener measure of diversity has been chosen because it places weight on the contributions of smaller participants in various fuel markets as they provide the options for future fuel switching. This is done by multiplying the market share by the natural log of the market share, which diminishes the impact of larger participants. However, it is recognised that there are shortcomings in using only one indicator to represent a concept as complicated as diversity.

It is expressed by the following equation:

> **Shannon-Wiener measure =** The market share multiplied by the natural log of the market share for each fuel in the market summed together

In mathematical terms, that is:

> **Shannon-Wiener measure =** $-\sum_i \rho_i \ln(\rho_i)$
>
> where ρ_i represents the proportion of the total supplied by fuel *i*.

The minimum value that the Shannon-Wiener measure can produce is zero which occurs when only one fuel is available for use. In this case, there would be no diversity of supply.

The Shannon-Wiener measure of diversity can be used to see how diversity of a particular market is changing over time. It should not be used to compare different markets with each other.

Five fuels have been used to calculate the Shannon-Wiener measure of diversity for primary energy supply. If each fuel making up our energy supply provided an equal proportion, the value of the coefficient would be 1.61 showing total equality, the largest possible value for the Shannon-Wiener measure in this case. This is also true for the calculation behind electricity generation. For the international comparisons five fuels are used with the maximum value being 1.61.

Herfindahl-Hirschman

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

It is expressed by the following equation:

> **Herfindahl-Hirschman measure =** The square of each participant's market share added together across all participants in the market

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

The Herfindahl-Hirschman measure of concentration in 2013 was calculated assuming 44 generating companies, 20 to 27 electricity supply companies, depending on the sector, and 10 to 17 gas supply companies, again depending on the sector.

Energy Efficiency Indicators

Traditionally, energy intensity (e.g. energy consumption per household, or per unit of economic output in business) has been used as a proxy for an energy efficiency indicator. However, intensity trends also include changes in the composition of energy service demand (e.g. level of household comfort or hot water use) or structural changes in Business (at sub-sectoral and product levels). Specific Energy Consumption (SEC) is defined as the change in the energy required to maintain a particular level of energy service (in households) or to produce a defined unit of physical product in business (at a suitably disaggregated level). SEC is therefore a better indicator of energy efficiency changes than energy intensity. It is important to remember that SEC falls as it improves whereas efficiency rises – but the rates of change are equivalent. An overall SEC indicator for a sector is obtained by combining sub-indicators for individual services or sub-sectors, using energy consumption as the weighting factors.

- In the chart 10.14, service demand and consumption – both dominated by space heating – show considerable fluctuations about the trend because of variations in the weather from year to year, whereas the SEC – dominated by cumulative insulation levels and boiler efficiencies – behaves much more steadily.

Emissions

Emissions are reported on either an Intergovernmental Panel on Climate Change (IPCC) basis, for emissions of greenhouse gases, or on a United Nations Economic Council for Europe (UNECE) basis, for emissions of other air pollutants. The source categories and coverage differ slightly between the two, in that the IPCC basis uses different source category definitions and includes some extra categories to the UNECE basis. The IPCC basis includes emissions and removals from land use change and all emissions from domestic aviation and shipping, but excludes international marine and aviation bunker fuels. The UNECE basis excludes land use change and also international shipping in UK ports, but includes aviation emissions below 1000 metres to cover take-off and landing cycles. Greenhouse gas emissions data on the IPCC basis are available for years since 1990, whilst data for all other pollutants are available from 1970. Greenhouse gas emissions are also reported in terms of high level sectors called National Communication categories. These are a small number of broad, high-level sectors, and are as follows: energy supply, business, transport, public, residential, agriculture, industrial processes, land use land use change and forestry (LULUCF), and waste management. These high-level sectors are made up of a number of more detailed sectors, which follow the definitions set out by the International Panel on Climate Change (IPCC), and which are used in international reporting tables which are submitted to the UNFCCC every year.

List of European and International Organisations by country

EU15	EU28	G7	G8	OECD
Austria	Austria	Canada	Canada	Australia
Belgium	Belgium	France	France	Austria
Denmark	Bulgaria	Germany	Germany	Belgium
Finland	Croatia	Italy	Italy	Canada
France	Cyprus	Japan	Japan	Chile
Germany	Czech Republic	United Kingdom	Russia*	Czech Republic
Greece	Denmark	United States	United Kingdom	Denmark
Ireland	Estonia		United States	Estonia
Italy	Finland			Finland
Luxembourg	France			France
Netherlands	Germany			Germany
Portugal	Greece			Greece
Spain	Hungary			Hungary
Sweden	Ireland			Iceland
United Kingdom	Italy			Ireland
	Latvia			Israel
	Lithuania			Italy
	Luxembourg			Japan
	Malta			Korea
	Netherlands			Luxembourg
	Poland			Mexico
	Portugal			Netherlands
	Romania			New Zealand
	Slovakia			Norway
	Slovenia			Poland
	Spain			Portugal
	Sweden			Slovakia
	United Kingdom			Slovenia
				Spain
				Sweden
				Switzerland
				Turkey
				United Kingdom
				United States

** Russia temporarily suspended from the G8 with effect from 24 March 2014.*

List of sources and website addresses

Department of Energy and Climate Change (DECC)	www.gov.uk/government/organisations/department-of-energy-climate-change
DECC statistics	www.gov.uk/government/organisations/department-of-energy-climate-change/about/statistics
BP Statistical Review of World Energy	www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy.html
The Coal Authority	www.gov.uk/government/organisations/the-coal-authority
Citizens Advice	www.adviceguide.org.uk/england/consumer_e/consumer_protection_for_the_consumer_e/consumer_citizens_advice_consumer_service_e.htm
Department for Communities and Local Government (DCLG)	www.gov.uk/government/organisations/department-for-communities-and-local-government
Department for Environment, Food and Rural Affairs (DEFRA)	www.gov.uk/government/organisations/department-for-environment-food-rural-affairs
Department for Transport (DfT)	www.gov.uk/government/organisations/department-for-transport
European Commission	http://ec.europa.eu/index_en.htm
European Environment Agency	www.eea.europa.eu/
Eurostat	http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/
HM Revenue and Customs (HMRC)	www.gov.uk/government/organisations/hm-revenue-customs
International Energy Agency (IEA)	www.iea.org/
Market Transformation programme	http://efficient-products.ghkint.eu/
National Atmospheric Emissions Inventory	http://naei.defra.gov.uk/
National Grid	www.nationalgrid.com/
Office for National Statistics (ONS)	www.ons.gov.uk/ons/index.html
Ofgem (The Office of Gas and Electricity Markets)	www.ofgem.gov.uk
Platts	www.platts.com/
Ricardo-AEA	www.ricardo-aea.com/cms/

Contact list

The following people in the Department of Energy and Climate Change may be contacted for further information about the topics listed:

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North Sea profits, operating costs and investments	Mike Earp	5784	Mike.Earp@decc.gsi.gov.uk
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Domestic energy prices	Sam Trewin	5162	Sam.Trewin@decc.gsi.gov.uk
Fuel poverty	Liz Whiting	5435	Liz.Whiting@decc.gsi.gov.uk
Energy and the environment	Anwar Annut	5060	Anwar.Annut@decc.gsi.gov.uk
Emissions of greenhouse gases	Laura Bates	5471	Climatechange.Statistics@decc.gsi.gov.uk
Calorific values and conversion factors	Iain MacLeay	5048	Iain.MacLeay@decc.gsi.gov.uk
Sub-national energy consumption	Claire Pini	6289	Claire.Pini@decc.gsi.gov.uk
Energy efficiency	Mary Gregory	5856	Mary.Gregory@decc.gsi.gov.uk
General enquiries on energy statistics		5056	energy.stats@decc.gsi.gov.uk

All the above can be contacted by fax on 0300 068 5006

In addition, there is a general enquiry number, which the deaf and hard of hearing can use to contact DECC: 0300 060 4000

Calling DECC from overseas

Some overseas callers have experienced problems connecting to our 0300 numbers. If you have difficulties calling an extension from overseas, please call our dedicated 24 hour switchboard, +44 (20) 7979 7777. Your call will then be put through to a named person or extension.

More information on DECC statistical data is available on the DECC section of the gov.uk website at: www.gov.uk/government/organisations/department-of-energy-climate-change/about/statistics

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