Department of Energy & Climate Change

# UK Energy Sector Indicators 2013

31 October 2013

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This document is also available from our website at
www.gov.uk/government/organisations/department-of-energy-climate-change/series/uk-energy-sector-indicators

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## 9 Conversion Efficiencies



## 10 Energy Use 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/publications/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/organisations/department-of-energy-climate-change/series/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, 3 Whitehall Place – Area 6B, London SW1A 2AW).

## 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 indicator

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 indicator 10.14 Ownership and depth of loft insulation, included in the 2012 publication, has now been discontinued as the data is now shown in indicator 10.13 Insulation levels in Great Britain homes.

**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/organisations/department-of-energy-climate-change/series/decc-statistics-governance

**Estimated data**
Where feasible, charts have been updated to the latest possible year using provisional monthly data. Final energy data for 2012 were published in DECC's Digest of UK Energy Statistics 2013 on 25 July 2013, available on the DECC section of the gov.uk website at:
www.gov.uk/government/organisations/department-of-energy-climate-change/series/digest-of-uk-energy-statistics-dukes

**Time series for charts**
In general charts within this publication show data from 1980 through to 2012. 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. A list of sources and website addresses and a contact list are provided at the end of this publication on pages 99 and 100.

**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 = 2011-12, previous = 2010-11) | 51.59 | 58.22 |
| 2: Leverage of UK international climate change finance (ratio, current = Jan 10 – Mar 13, previous = Jan 10 – Sep 12) | 8.3 | 8.4 |
| 3: Proportion of Nuclear Decommissioning Authority's budget that is spent on decommissioning and cleaning up nuclear plants (%, current = 2012-13, previous = 2011-12) | 35 | 34 |
| | | |
| **Impact indicators** | **Current** | **Previous** |
| 1: The total number of energy efficiency installations (cavity wall and loft insulation) in GB households (million, current = July 2013, previous = April 2013) www.gov.uk/government/organisations/department-of-energy-climate-change/series/estimates-of-home-insulation-levels-in-great-britain | 29.67 | 29.53 |
| 2: The number of households in fuel poverty in England (million, current = 2011, previous = 2010)* www.gov.uk/government/organisations/department-of-energy-climate-change/series/fuel-poverty-statistics | 4.1 | 3.8 |
| 3: Percentage of energy consumed in the UK that has been generated from renewable sources (%, current = 2012, previous = 2011) www.gov.uk/government/organisations/department-of-energy-climate-change/series/uk-energy-in-brief | 4.1 | 3.8 |
| 4: The spare capacity of the UK's gas network (difference between maximum possible supply and actual peak demand) (% of actual peak demand, current = 2012-13, previous = 2011-12) www.gov.uk/government/organisations/department-of-energy-climate-change/series/uk-energy-in-brief | 79 | 58 |
| 5: The spare capacity of the UK's electricity network (difference between maximum possible supply and actual peak demand) (% of actual peak demand, current = 2012-13, previous = 2011-12) www.gov.uk/government/organisations/department-of-energy-climate-change/series/uk-energy-in-brief | 42 | 43 |
| 6: The impact of other countries' pledges to decrease their greenhouse gas emissions on predicted global emissions (GtCO2, current = 2012 estimate, previous = 2011 estimate) | 8-13 | 6-11 |
| 7: Total emissions of greenhouse gases from the UK (MtCO2, current = 2012 provisional, previous = 2011) www.gov.uk/government/organisations/department-of-energy-climate-change/series/uk-greenhouse-gas-emissions | 571.6 | 552.6 |
| 8: Reduction in the Nuclear Provision through decommissioning and clean-up (£billion, current = 2012-13, previous = 2011-12) | 2.4 | 1.9 |
| 9: The proportion of all UK energy supply from low carbon sources (%, current = 2012, previous = 2011) www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-trends | 11.9 | 12.0 |

| Other Data Sets | Current | Previous |
|---|---|---|
| 1: Average domestic electricity price (including taxes) (UK rank within the EU15, current = 2012, previous = 2011)** www.gov.uk/government/organisations/department-of-energy-climate-change/series/quarterly-energy-prices | 11th | 13th |
| 2: Average domestic gas price (including taxes) (UK rank within the EU15, current = 2012, previous = 2011)** www.gov.uk/government/organisations/department-of-energy-climate-change/series/quarterly-energy-prices | 15th | 15th |
| 3: Net UK energy import dependency (%, current = 2012, previous = 2011) www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-trends | 43.0 | 36.6 |
| 4: Final energy consumption (Mtoe, current = 2012, previous = 2011) www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-trends | 148.2 | 145.8 |
| 5: Temperature adjusted primary energy use (Mtoe, current = 2012, previous = 2011) www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-trends | 206.1 | 207.5 |
| 6: The size of the Nuclear Provision (£billion, current = 2012-13, previous = 2011-12) | -59.0 | -52.9 |

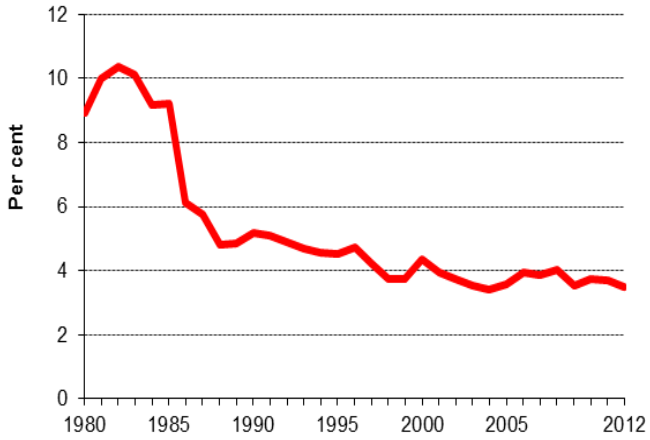
**Notes**

* The government has recently set out the new definition of fuel poverty which it intends to adopt under the Low Income High Costs (LIHC) framework – the data above relates to the 10 per cent definition (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)

** 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 2012

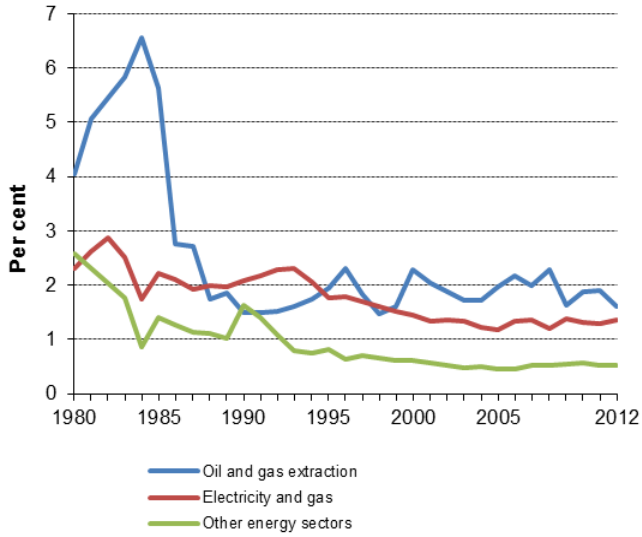



*(1) Data from 1997 onwards based on the SIC 2007 classifications*

*Source: Office for National Statistics*

- In 2012, the energy industries contributed about 3.5% to Gross Domestic Product (at basic prices).
- The contribution to Gross Domestic Product has remained at broadly the same level over the past decade, but well below the peak level of 10.4% achieved in 1982.

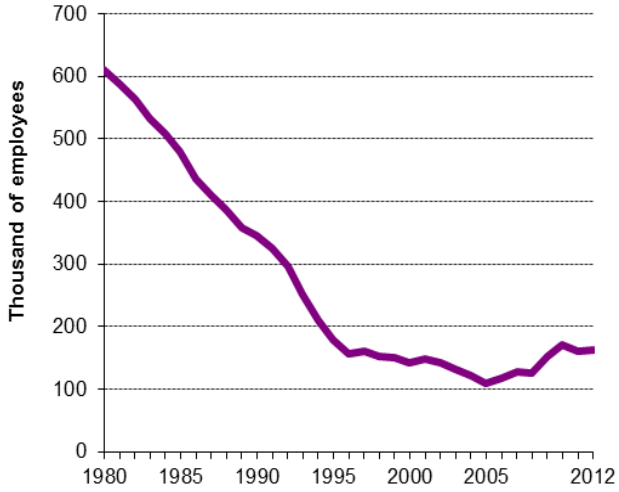
### Chart 1.2:
### Contribution to GDP by the energy sectors, 1980 to 2012




*Source: Office for National Statistics*

- 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 2012 the contribution to GDP by the oil and gas industry was 1.6%. The prices of oil and gas in 2012 were up 2% and 6% respectively compared to 2011.
- Between the early 1990s and up to 2005, the contribution to GDP by the electricity and gas sector fell steadily. It has since remained broadly the same at 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) also declined over the past two decades, but for the past few years it has remained at 0.5%.

**Chart 1.3:**
**Employment[(1)] in the energy industries, 1980 to 2012**

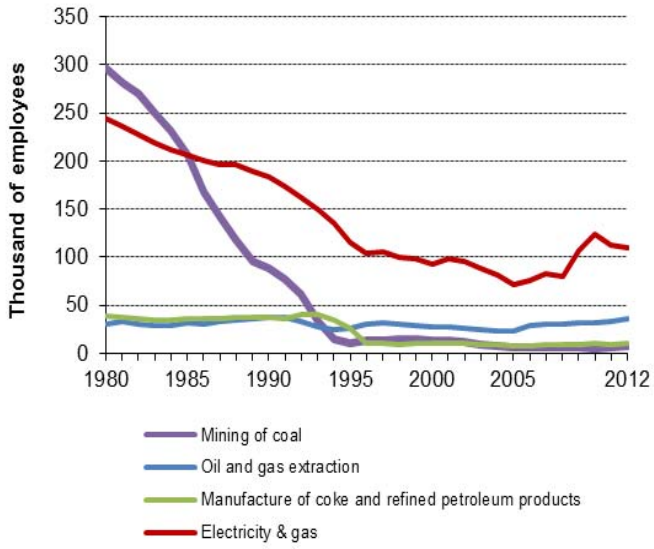



*(1) Data from 1996 onwards based on the SIC 2007 classifications*

*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 employment in the energy industries has increased at an average rate of 5.9% per year as a result of growth in the power and gas sectors.
- In 2012, employment in the energy industries stood at around 163,000, an increase of 1.2% over the previous year.

**Chart 1.4:**
**Employment in the energy sectors, 1980 to 2012**




*Source: Office for National Statistics*

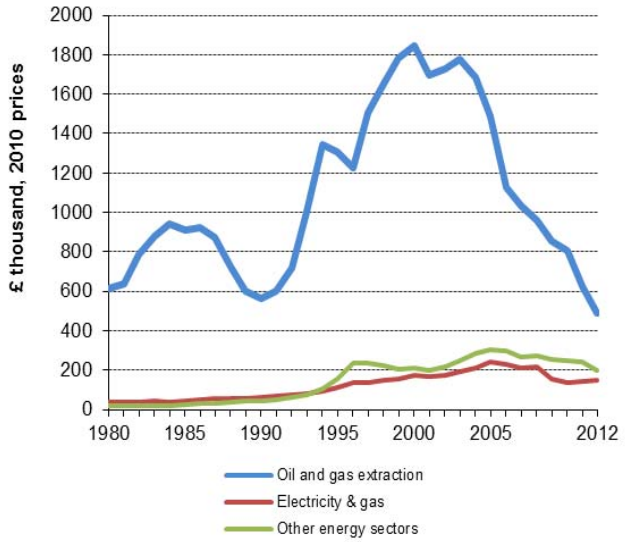
- Employment in coal and mining industries has declined since 1980, falling rapidly up to the mid-1990s as a result of a number of mine closures.
- Employment in the oil and gas industries has remained generally stable, but after a drop between 1995 and 2005 has grown gradually. In the manufacture of coke and refined petroleum products industries employment dropped slightly in the mid-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 fallen back slightly in the past two years.

**Chart 1.5:**
**Changes in the productivity of the energy industries, 1980 to 2012**


*Source: DECC estimates based on Office for National Statistics data*

- Since 1980 the productivity of the energy industries has increased overall more than 4-fold.
- Productivity peaked in 2005 at £521,000 per head. It has since fallen mainly as a result of a large decrease in oil and gas production. In 2012, productivity was £228,000 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 2012**

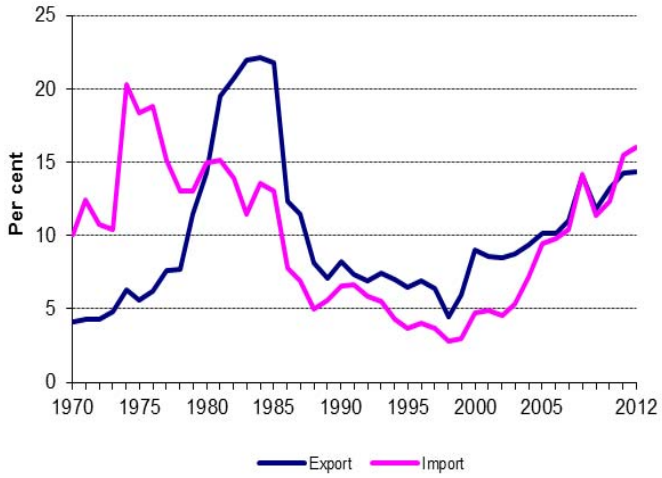



*Source: Office for National Statistics*
*Data from 1996 onwards based on the SIC 2007 classifications*

- 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 2012, it was 72% lower than the peak of 2003 at £490,000 per head at 2010 prices.
- Labour productivity in the electricity and gas industry increased steadily up to 2005 but subsequently fell. In 2012, it was £148,000 per head at 2010 prices, 39% below its 2005 level.
- Labour productivity in the other sectors comprising of coal mining and manufacture of coke and refined petroleum, has remained relatively constant since 1996.

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 2012**

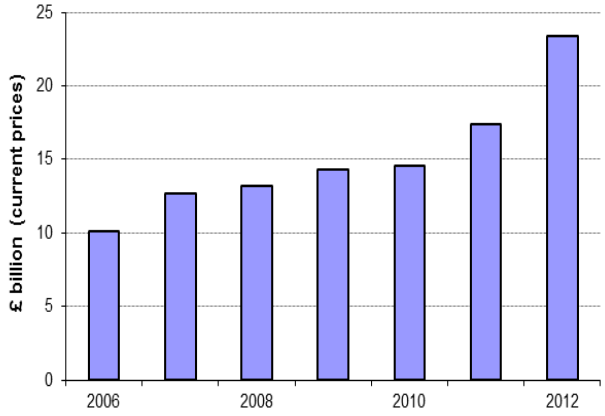



(1) Valued on a 'free on board' basis and at current prices

*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 16.1% of all UK imports and 14.3% of all UK exports.
- The UK became a net importer of energy in value terms in 2005 with a deficit of £5.0 billion. However in 2012 a slight increase in the price of crude oil resulted in this deficit increasing to £22.5 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.

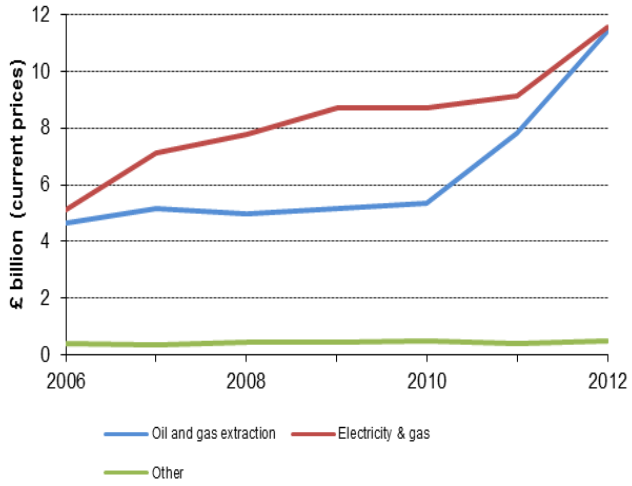
**Chart 1.8:**
**Investment by the energy industries, 2006 to 2012**




*Source: Office for National Statistics*

- Investment by the energy industries in 2012 was £23.4 billion (current prices), £6 billion higher than the previous year, driven mainly by oil and gas exploration and the electricity and gas sectors.
- Since 2006, investment in the energy industries has continued to grow and by 2012 was more than double the 2006 level.
- Due to a methodology and classification change from SIC2003 to SIC2007, data are only available from 2006 onwards.

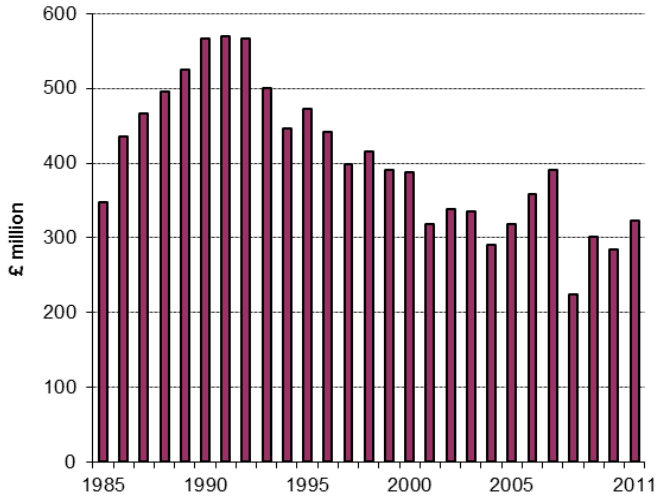
**Chart 1.9:**
**Investment by the energy sectors, 2006 to 2012**




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

- In 2012, investment in the oil and gas extraction sector more than doubled the 2010 level, as it increased by 46% over the previous year to £11.4 billion.
- Since 2006, there has been a significant increase in investment in the electricity and gas sectors. In 2012, investment in these sectors increased by 27% over the previous year, to £11.5 billion, more than twice the level in 2006.
- 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.
- Due to a methodology and classification change from SIC2003 to SIC2007, data are only available from 2006 onwards.

**Chart 1.10:**
**Research and Development by the energy industries [(1)], 1985 to 2011**



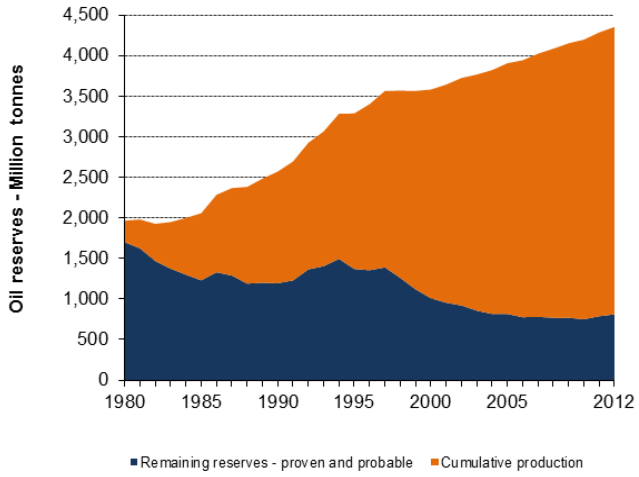

*[(1)] Includes water supply and mining.*

*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 2011, an estimated £323 million was invested in research and development by the energy and water industries in the UK, accounting for 1.9% of total research and development expenditure in UK businesses.

**Reliable Supplies of Energy**
**2 Resources**

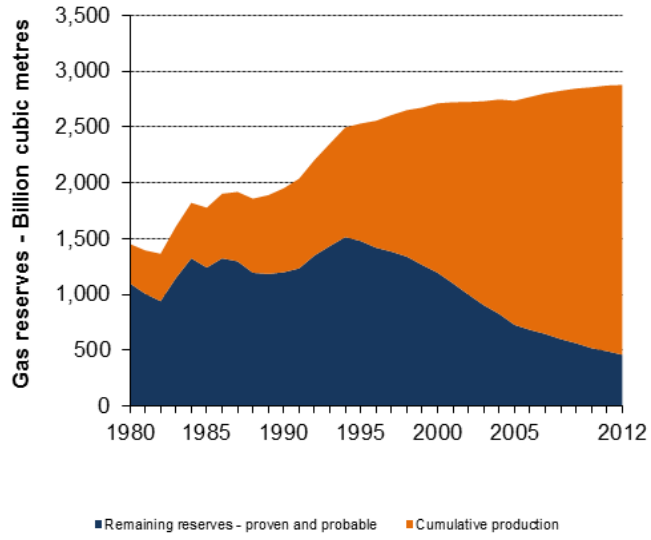
**Chart 2.1:**
**Cumulative oil production plus central estimates of remaining discovered oil reserves, 1980 to 2012**




*Source: DECC*

- Remaining reserves of oil have declined from the mid 1990s, but have remained broadly stable over the last several 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 2012 stood at 811 million tonnes, up from 788 million tonnes in 2011.

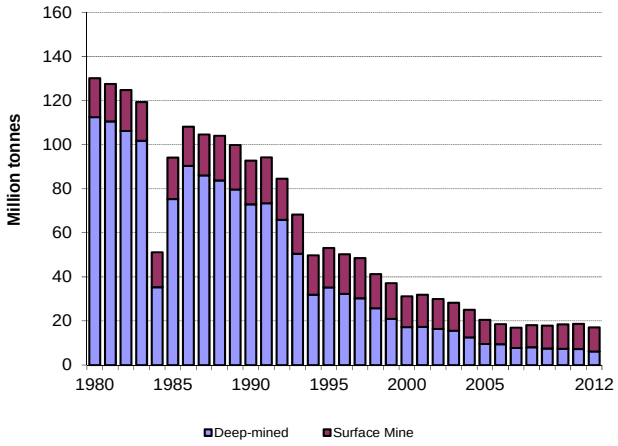
**Chart 2.2:**
**Cumulative gas production plus central estimates of remaining discovered gas reserves, 1980 to 2012**




*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 2012 stood at 461 Billion Cubic Metres, down from 493 Billion Cubic Metres in 2011.

**Chart 2.3:**
**Coal production, 1980 to 2012**




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 the miners' strike.

*Source: DECC, DUKES table 2.4*

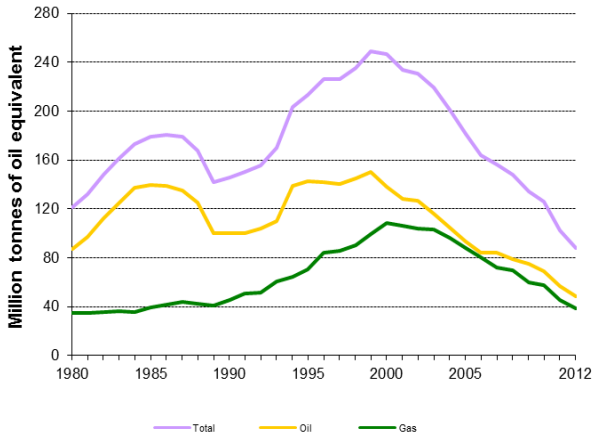
- UK coal production has declined from the 1980s, in response to falling demand caused by switching to cheaper imported coal and to gas for electricity generation. Deep mine closures owing to exhaustion of recoverable reserves also contributed to the decline. In 2012, 6 million tonnes were produced by deep mines.

- 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 2012, 11 million tonnes were produced by surface mines.

- 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 120 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 2,100 million tonnes of coal in offshore conditional licences for potential underground coal gasification operations.

**Chart 2.4:**
**UK Continental Shelf production, 1980 to 2012**



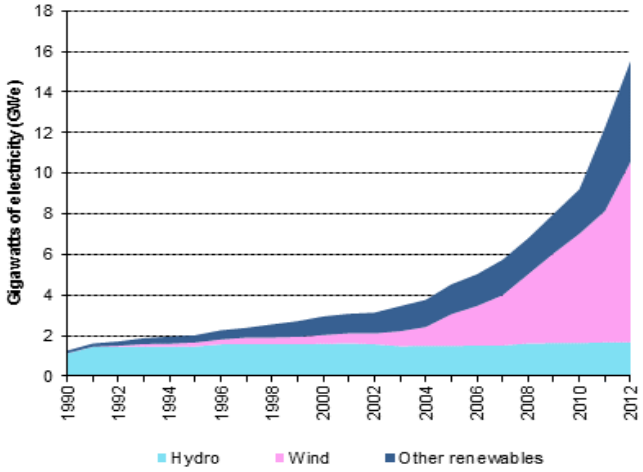

*Source: DECC, DUKES table 1.1.2*

- Oil production in 2012 at 48.8 million tonnes was 68% lower than the record 150.2 million tonnes in 1999, with output down 14% in 2012 compared to 2011, due to slowdowns and maintenance issues.

- As with oil, UK gas production is also declining as UK Continental Shelf reserves deplete. Gas production in 2012 at 38.9 million tonnes was 14% lower than in 2011 and 64% lower than the record 108.4 million tonnes in 2000.

- Long term decline rates in the last decade are around 9% per year.

**Chart 2.5:**
**Capacity [(1)] of renewable sources for electricity generation, 1990 to 2012**



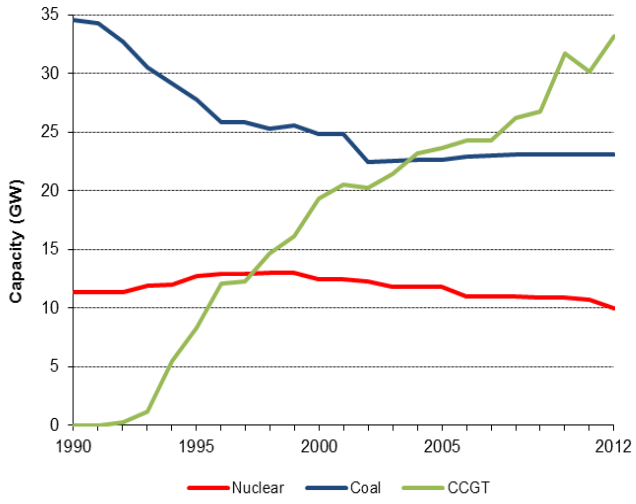

*(1) Installed capacity including wastes burned with biomass*
*Source: DECC, DUKES table 6.4*

- Renewable sources accounted for just under 11% of all electricity generating capacity in the UK in 2012. Over half of renewables capacity was wind, which first exceeded hydro capacity in 2005.

- The capacity for electricity generation from renewable sources other than hydro is 100 times its level in 1990 and over 3 times the level of five years ago.

- Renewable electricity contributed 10.8% of the UK's electricity generation in 2012. Renewable sources provided 4.1% of the UK's gross final energy consumption in 2012, as measured using the Renewable Energy Directive methodology, up from 3.8% in 2011.

**Chart 2.6:**
**Major Power Producers generation capacity, 1990 to 2012**




*Source: DECC, DUKES table 5.7*

- 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 19% of electricity generated and 12% of Major Power Producers (MPPs) generation capacity in 2012.

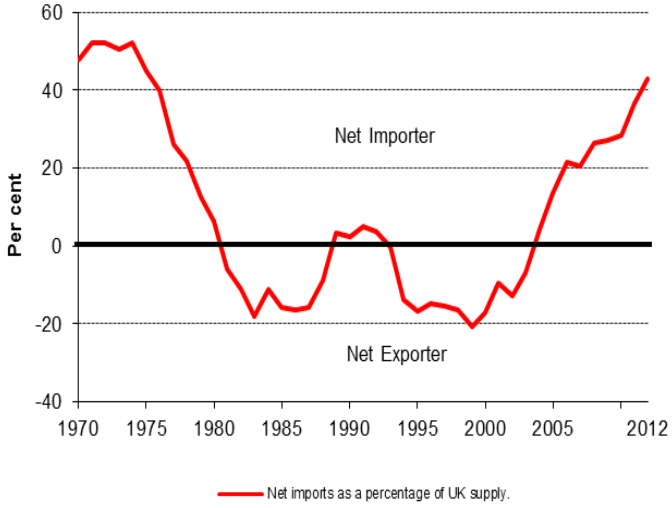
- There was a large fall in coal generation capacity in the 1990s. However, since 2002 coal capacity has been stable and was 23 GW in 2012, 43% of MPPs generation. Coal accounted for 39% of electricity generation in 2012, up from 30% in 2011, reflecting price differentials between coal and gas.

- Since 1992, Combined Cycle Gas Turbine (CCGT) capacity has continually increased. In 2012, it rose to record high of 33 GW, after a brief decrease in 2011. CCGT currently accounts for 41% of MPPs generation capacity and accounted for 26% of electricity generation in 2012.

- Total electricity generation capacity was 89 GW in 2012, compared to 78 GW in 2000 and 75 GW in 1990.

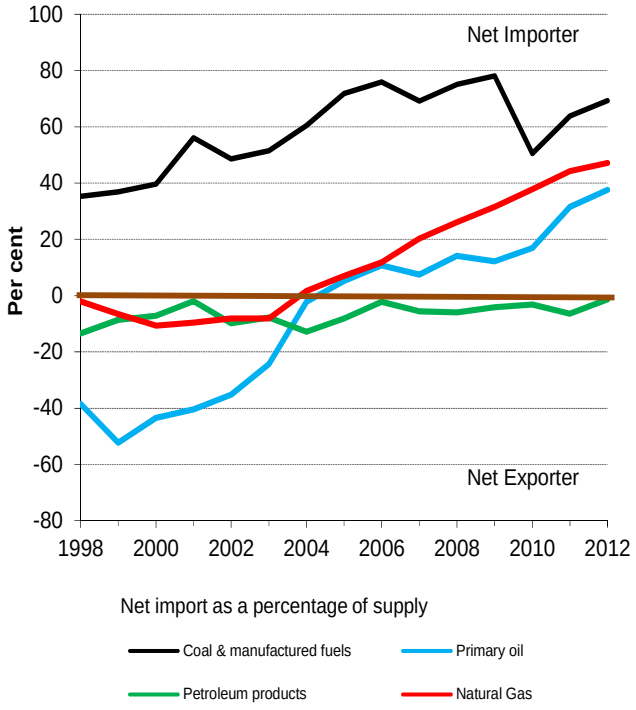
## Reliable Supplies of Energy
## 3 Energy Diversity

**Chart 3.1:**
**Import dependency, 1970 to 2012**




*Source: DECC*

**Chart 3.2:**
**Trade and consumption by fuel type, 1998 to 2012**




*Source: DECC*

- In the early 1970s energy imports accounted for over 50% of UK primary energy consumption.

- The UK became a net exporter of energy in 1981 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, but in 2004 the UK became a net importer again in volume terms with energy imports accounting for 4.5% of UK primary energy consumption. This figure has continued to increase and in 2012 was 43.0%.

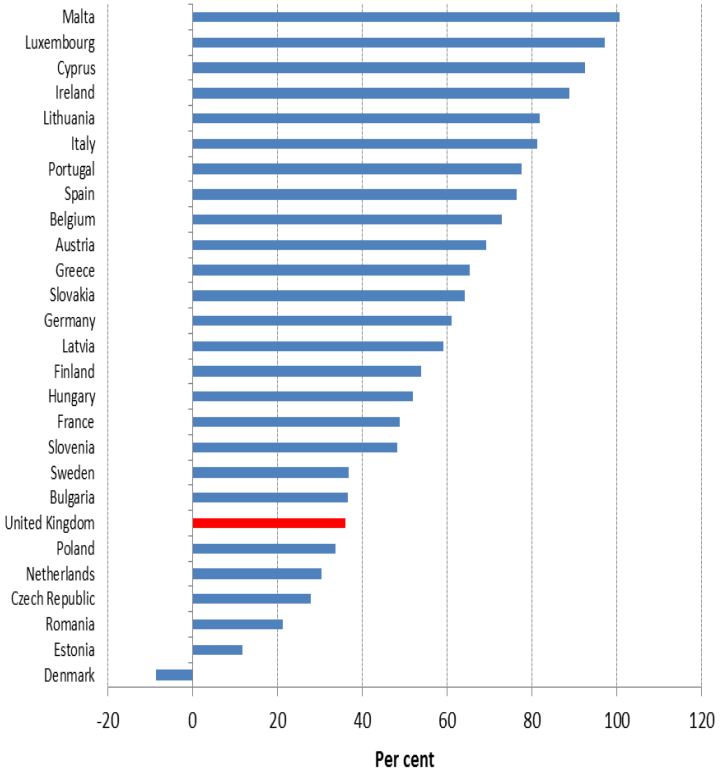
- Coal imports, including manufactured fuels, has been growing steadily to meet demand from generators and the steel industry, exceeding 70% of supply in 2005. However coal imports fell in 2010 due to stock use but rose again in recent years, accounting for 70% of UK primary coal consumption in 2012.

- Since 2005, the UK has been a net importer of primary oil and in 2012 import of primary oil accounted for 38% of the UK primary oil consumption.

- The UK remains a net exporter of petroleum products, although to a lesser extent in 2012 following the closure of the Coryton refinery. However, with the level of net imports of crude oil being higher than the level of net exports of petroleum products, the UK is a net importer of all oils.

- 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 2012, natural gas imports accounted for 47% of primary gas consumption.

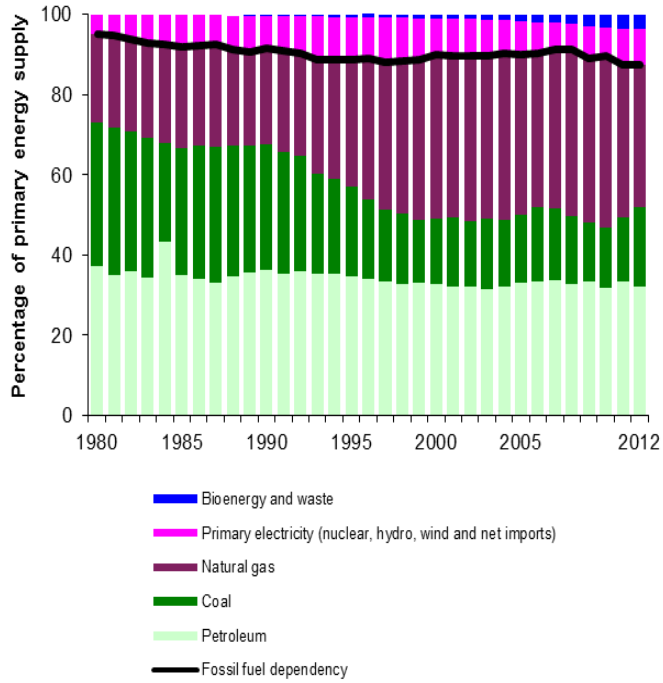
**Chart 3.3:**
**EU energy dependency, 2011**




*Source: Eurostat*

- Since becoming a net importer in 2004, the UK's import dependency has continued to increase.
- Latest comparable data from Eurostat for 2011 shows that the UK had the seventh lowest level of import dependency in the EU behind Denmark which remains a net exporter, Estonia, Romania, Czech Republic, Netherlands and Poland.

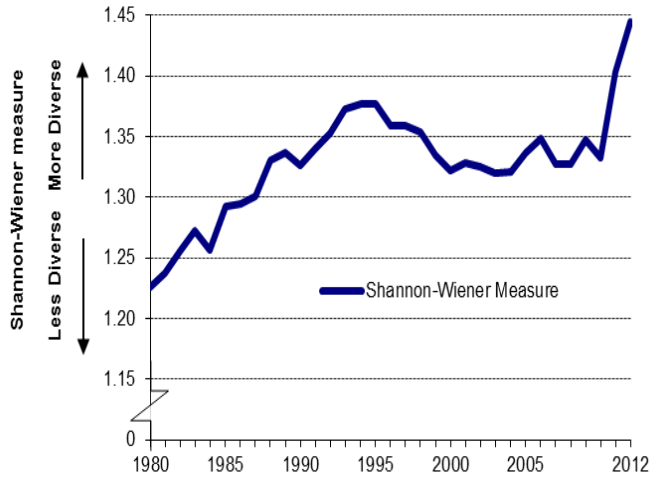
**Chart 3.4:**
**Shares of fuels contributing to primary energy supply; fossil fuel dependency, 1980 to 2012**




*Source: DECC*

- The mix of primary fuels consumed for energy purposes in the UK has become increasingly diverse since 1980.
- In the 1990s coal consumption fell as the amount of natural gas consumed increased. However since 2011, this trend has reversed with more coal and less gas being consumed.
- Fossil fuel dependency can be 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 2012, gas consumption fell while coal consumption increased, however as a result of a rise in the wind output and other renewables; fossil fuel dependency fell by 0.2 percentage points to 87.3%.

**Chart 3.5:**
**Diversity of supply of primary fuels[(1)], 1980 to 2012**

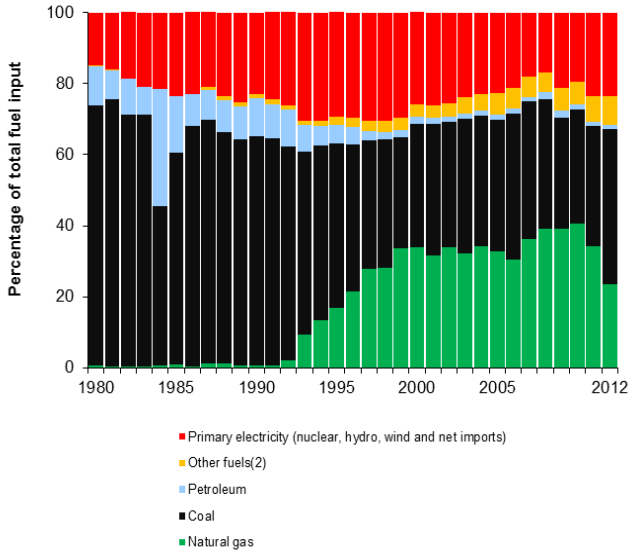



- There was a steady increase in diversity in the early 1990s as gas replaced coal for generation and nuclear electricity use increased.
- In the late 1990s as gas became the dominant non transport fuel there was a steady decline in diversity, which then remained broadly stable for the next few years.
- In 2005 and 2006 there was a small increase in diversity due to an increase in the use of coal and renewables. Over the past two years, diversity has continue to rise and the increase in 2012 was the result of more coal, wind and bio-energy being consumed, replacing the consumption of natural gas.

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

*Source: DECC*

**Chart 3.6:**
**Shares of electricity generated from different fuels [(1)], 1980 to 2012**




(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.

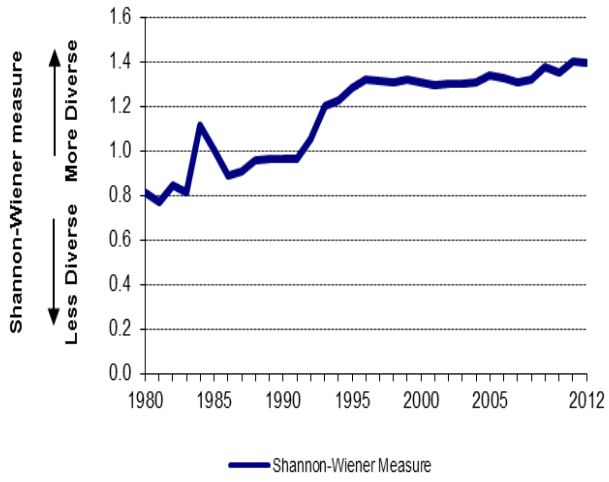
*Source: DECC, DUKES table 5.4*

- 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 to 24% in 2012, its lowest percentage for sixteen 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 44% in 2012. 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 fell to 19% in 2012.

**Chart 3.7:**
**Diversity of electricity generated from different fuels [(1)],1980 to 2012**



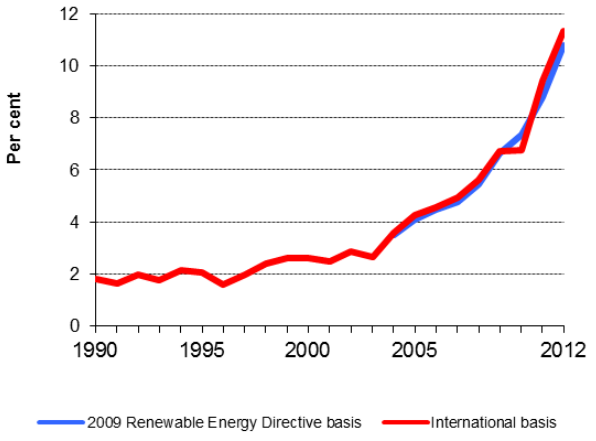

(1) Includes coal, oil, natural gas, nuclear, hydro and other (net imports, coke breeze, coke oven gas, blast furnace gas and renewable sources including wind).

*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 squeezed other fuels (particularly oil) from 10% of the total down to below 2%. More recently gas generation has declined, with coal and nuclear shares increasing, and the recent increase in renewable generation has further increased diversity.

**Chart 3.8:**
**Proportion of electricity generated by renewables, 1990 to 2012**




*Source: DECC, DUKES chapter 6*

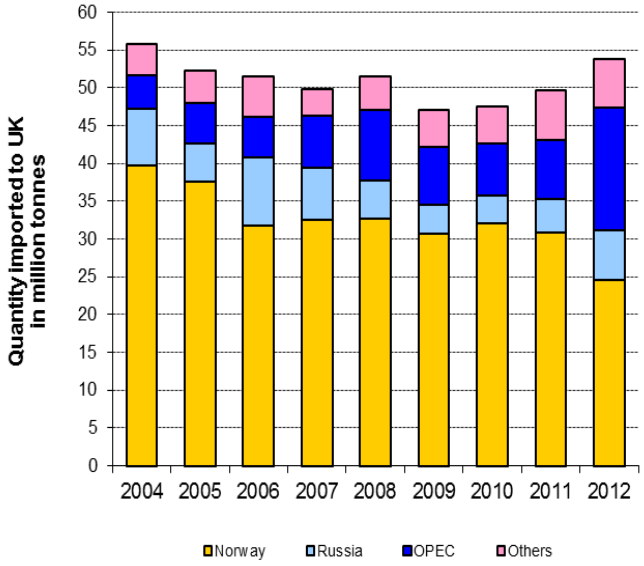
- Renewables provided a record 11.3% of the electricity generated (International basis) in the UK in 2012, an increase from 2.6% in 2000.

- 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).

- The UK has signed up to the EU Renewable Energy Directive, which includes a UK 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 2012, this measure was 10.8%.

**Chart 3.9:**
**Sources of oil imports, 2004 to 2012**



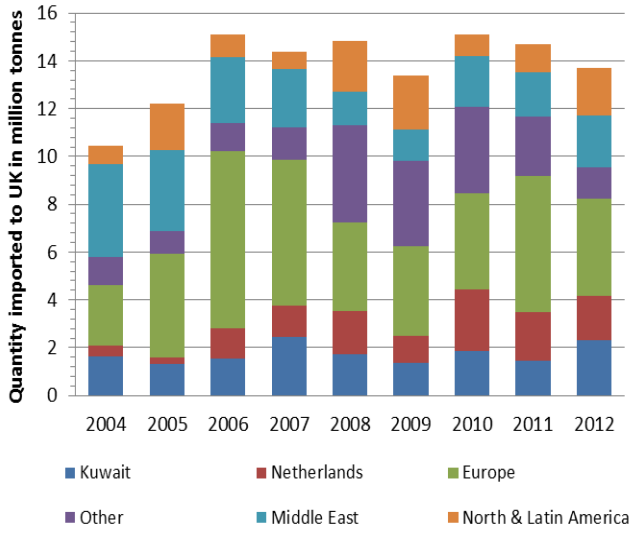

*Source: International Energy Agency, DECC*

- 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 2012 increased from 2011, with Norwegian imports decreasing to around 46 per cent of all imports, offset by an increase in imports from Russia and North African OPEC countries.

**Chart 3.10:**
**Sources of diesel and aviation fuel imports, 2004 to 2012**



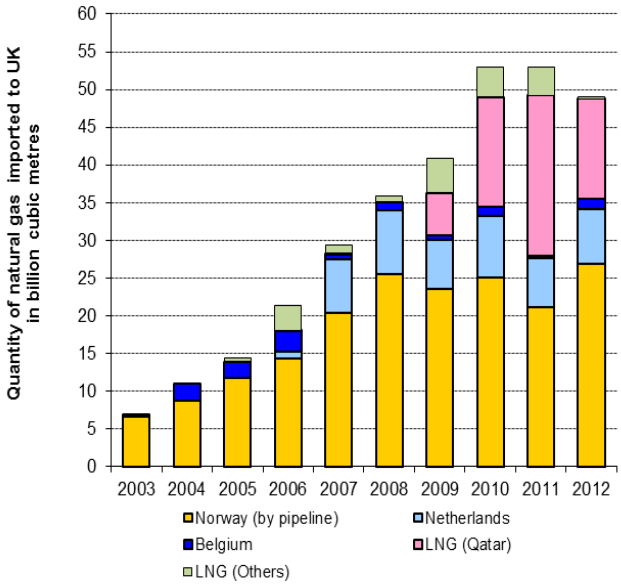

*Source: DECC*

- The UK is heavily dependent on imports for diesel fuel and aviation fuel. Net imports met over half of the UK's demand for aviation fuel, and a over quarter of the demand for diesel fuel.

- The main source for imports of aviation fuel is Kuwait, providing around a third of the UK's aviation fuel imports in 2012. Diesel fuel is predominantly supplied through Sweden, Russia and the Netherlands. Together, these accounted for two thirds of diesel imports in 2012.

- 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 2012**



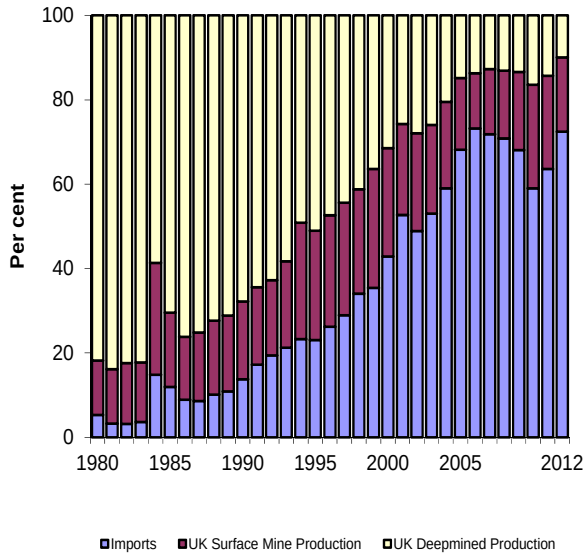

*Source: DECC, National Grid*

- UK gas production peaked in 2000 and has been in general decline since. With declining indigenous production, UK demand has increasingly been met through imports, with Norway the key supplier to the UK, meeting 55% of imports in 2012.

- In 2012 net imports of gas accounted for approximately half of gas output from the UK transmission system. Between 1997 and 2003, the UK was a net exporter.

- The key development in gas imports has been the increased LNG volumes following the opening of new facilities. LNG imports accounted for 47 of imports in 2011, but this fell to 28% in 2012 as LNG imports were in demand elsewhere in the world and pipeline maintenance in Norway was completed.

**Chart 3.12:**
**Shares of UK coal supply, 1980 to 2012**




*Source: DECC, DUKES table 2.4*

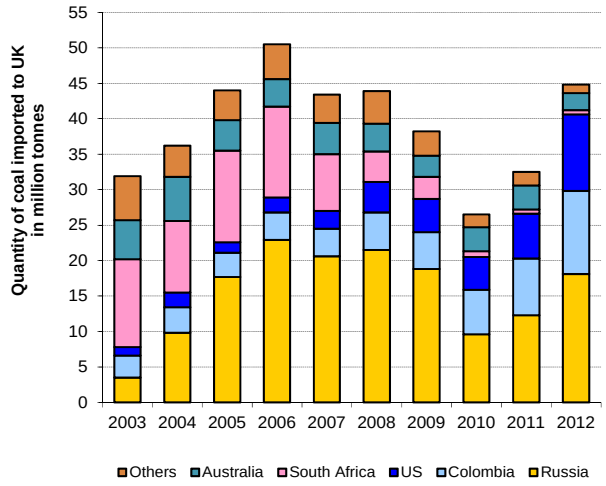
- UK coal production has declined since 1952 when it peaked at 228 million tonnes. This decline has meant that over the years the UK has become dependent on coal imports and in 2001 imports exceeded UK production.

- Coal imports in 2006 reached a record high at 50 million tonnes but declined to 27 million tonnes in 2010. Coal imports has risen since and were 45 million tonnes in 2012 (72 per cent of UK coal supply)[1].

- In 2012, steam coal, which is used for electricity generation, accounted for 88% of the total imports, 11% 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 2012**



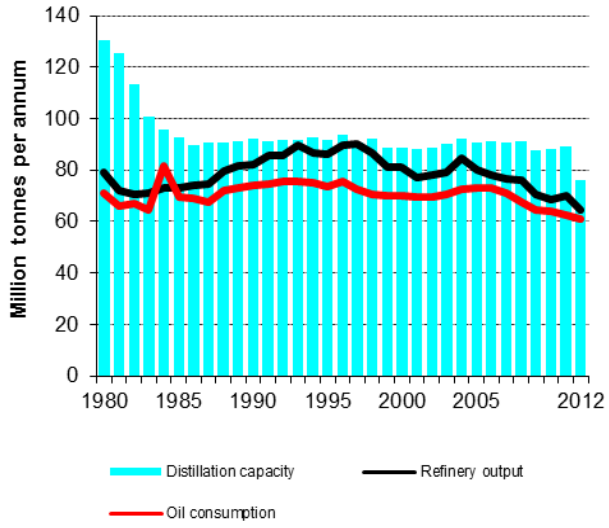

*Source: HM Revenue & Customs and DECC. Energy Trends table 2.4*

- Imported coal into the UK has predominantly been from five countries, Russia, Colombia, the US, South Africa and Australia. In 2012, 40% of UK's coal imports were from Russia, of which 97% was steam coal.

- Coal imports grew by 38% between 2011 and 2012, with significant growth in imports from the US, up 71%.

## Reliable Supplies of Energy
## 4 Capacity Utilisation

### Chart 4.1:
### Oil refinery utilisation, 1980 to 2012



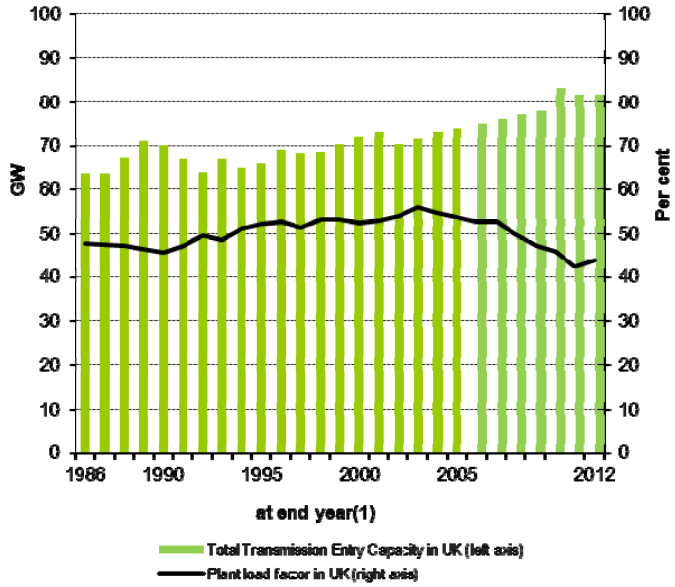

*Source: DECC*

- Improved refinery efficiency following modernisation in the 1990s has meant that the refinery output of all UK refineries is equal to 85 per cent of total distillation capacity in 2012, 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.

- Refinery output decreased sharply in the early 1980s. It then increased from 73Mt in 1984 to peak at 90Mt in 1997. Refinery output has decreased since then, and despite a short-lived increase in 2004, it decreased to 64Mt in 2012.

### Chart 4.2:
### Electricity generating capacity and average load factor for Major Power Producers, 1986 to 2012




(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.

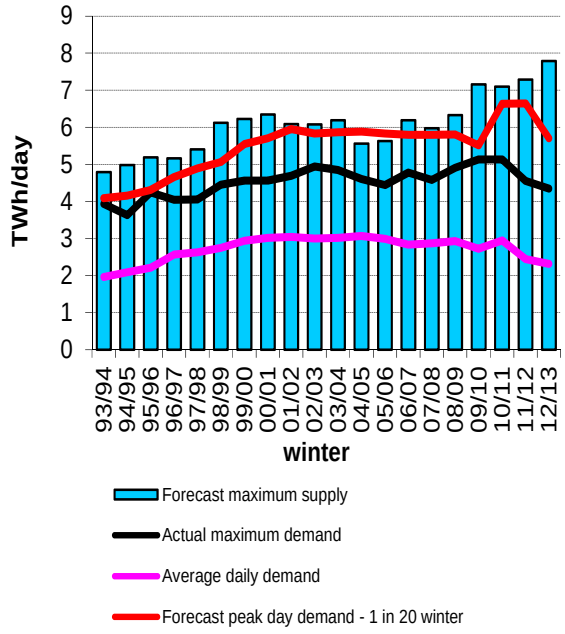
*Source: DECC*

- 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, falling again by a marginal fraction in 2012.

- 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 2012 the plant load factor was 44%, an increase on 2011's 43%.

- Maximum demand in 2011/12 was 57.5 GW, a very minor increase on the maximum demand in 2010/11.

**Chart 4.3:**
**Gas capacity – maximum supply, maximum demand and peak (1 in 20 winter) estimated demand, 1993/94 to 2012/13**



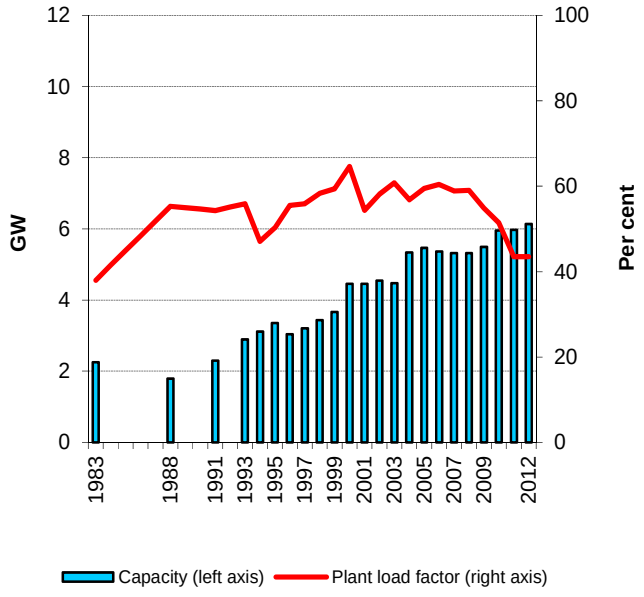

*Source: National Grid and DECC*

- Between 2011/12 and 2012/13, the ratio between forecast maximum supply and actual demand increased from 60 per cent to 79 per cent. This has been driven by both increased supply to the UK as well as lower demand in 2012/13.

- 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 7.79 TWh/day in 2012/13, as new LNG import facilities opened.

- The peak demand in 2012/13 was 4.5 per cent lower than 2011/2012 and 15 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 2012**




*Source: DECC and Ricardo-AEA , DUKES table 7.1*

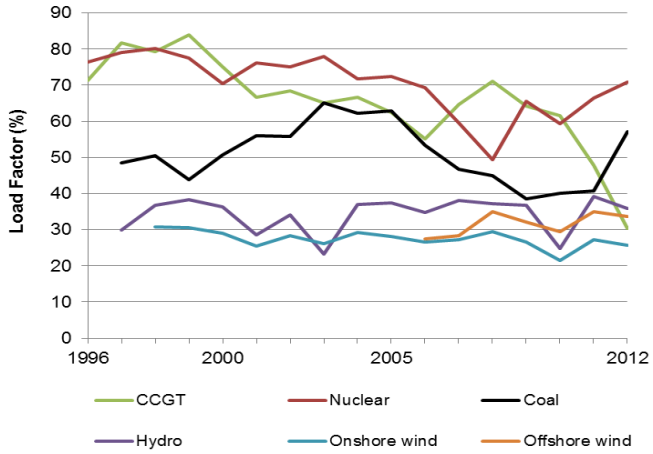
- Between 2011 and 2012, the 'Good Quality' electricity generation capacity of Combined Heat and Power (CHP) plants increased by nearly 3%.

- CHP plants generated around 6.4% of the total electricity generated in the UK in 2012.

- 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. In 2010, additional capacity was commissioned in the oil refineries sector but was under-utilised, leading to a drop in the load factor. In 2011, the load factor saw a further fall due to a change in the methodology for calculating Good Quality electricity outputs[1]. There was no change in the load factor between 2011 and 2012.

[1] See DUKES 2013 Chapter 7 paragraph 7.5 for further details

**Chart 4.5:**
**Load factors by technology type, 1996 to 2012**




*Source: DECC, DUKES table 5.10 and 6.5 for renewable technologies.*

- Load factors measure how intensively each type of plant has been used across the year.

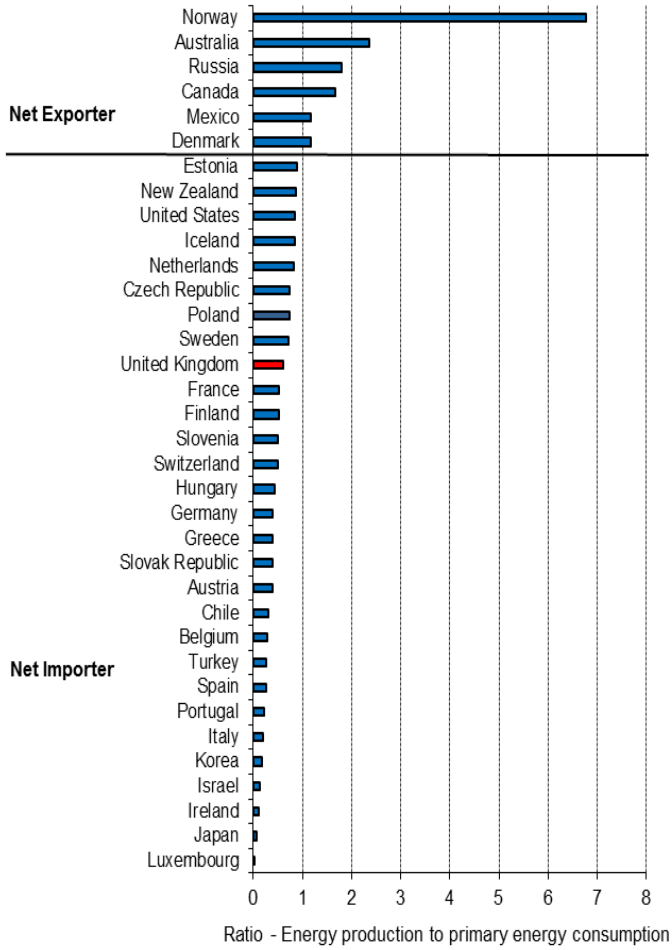
- Combined Cycle Gas Turbine (CCGT) stations' load factor generally fell from 1999 to the mid-2000s, while coal's increased, as gas prices relative to coal increased. After increasing in 2007 and 2008, as gas prices and nuclear availability fell, the CCGT load factor fell again in 2009 and 2010 due to a decrease in electricity demand and an increase in CCGT capacity. In 2012, the load factor fell sharply for the second year running to its lowest level for at least sixteen years, as generation from gas fell, due to high gas prices.

- Nuclear load factors declined in 2007 and 2008 as a result of maintenance outages to several stations. After an increase in 2009 as stations returned, further outages in 2010 saw the load factor fall again. In 2012, availability increased once more, with load factors reaching a seven year high.

- Hydro and wind load factors are highly dependent on the weather. Low rainfall in 2003 resulted in a decline in the hydro load factor. After higher subsequent load factors, low rainfall and wind speeds resulted in much lower load factors for both hydro and wind in 2010. In 2011, high wind speeds led to increases in the load factors for both onshore and offshore wind. Meanwhile, the highest rainfall levels for at least a decade led to hydro's load factor increasing to the highest level in 2011 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 as well as hydro decrease again.

## 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)], 2012**

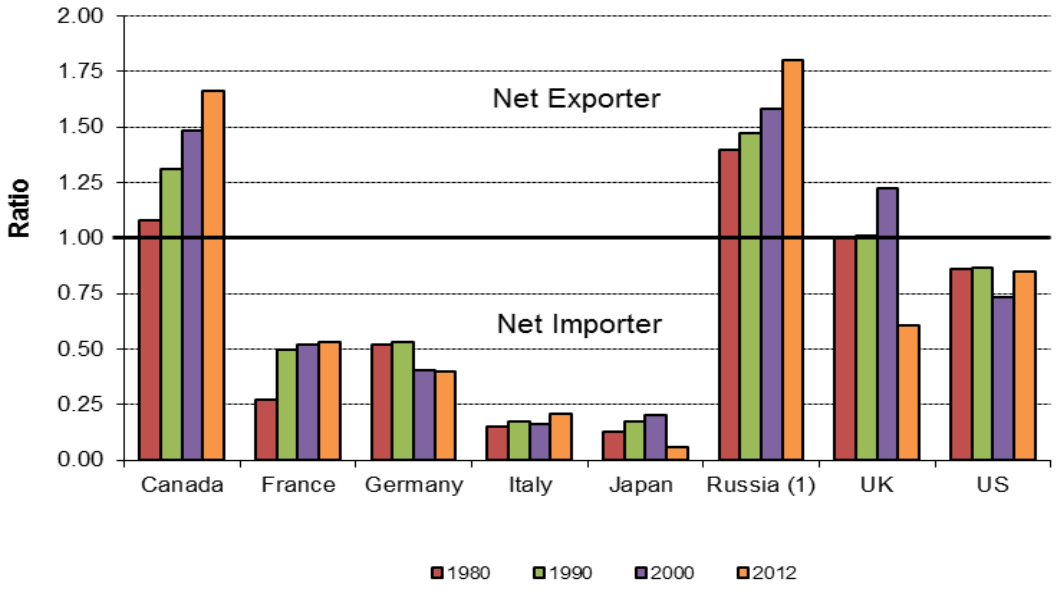



(1) Data for Russia is for 2011, the latest year for which the data are available.

*Source: International Energy Agency*

- There were only five OECD countries, which produced more energy than they consumed in 2012. Russia, which is included here as a G8 member was also a net exporter.
- Norway produced nearly 7 times more energy than it consumes; the next highest level is that of Australia at 2.4 times. By comparison the UK ratio is just above 0.6 and with Italy's just over 0.2.
- Amongst the G8 countries Canada, Russia and France have seen marked increases in this ratio since 1980 (see Chart 5.2). However, the ratio for the UK has fallen since 1980, specifically since 2000 as oil and gas production has fallen, although its ratio remains above other 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.

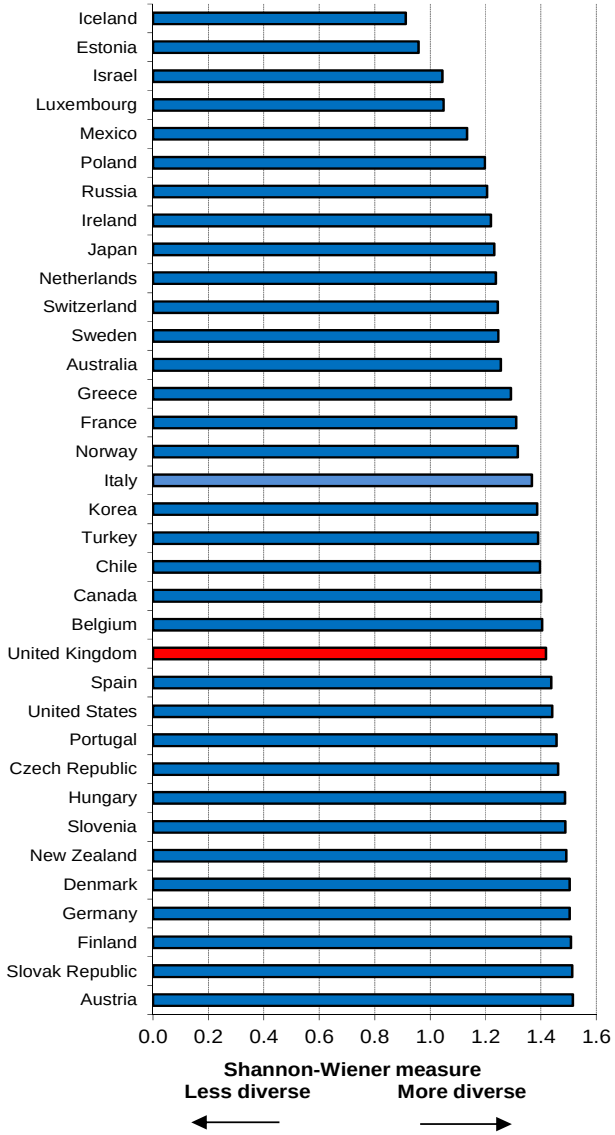
**Chart 5.2:**
**Ratio of energy production to primary energy consumption for G8 Countries, 1980 to 2012**




(1) Russia data for 1980 and 1990 estimated from Former USSR data. The latest year for which data is available for Russia is 2011.

*Source: International Energy Agency*

**Chart 5.3:**
**Diversity of primary energy supply [1] in OECD countries and Russia[2], 2012**

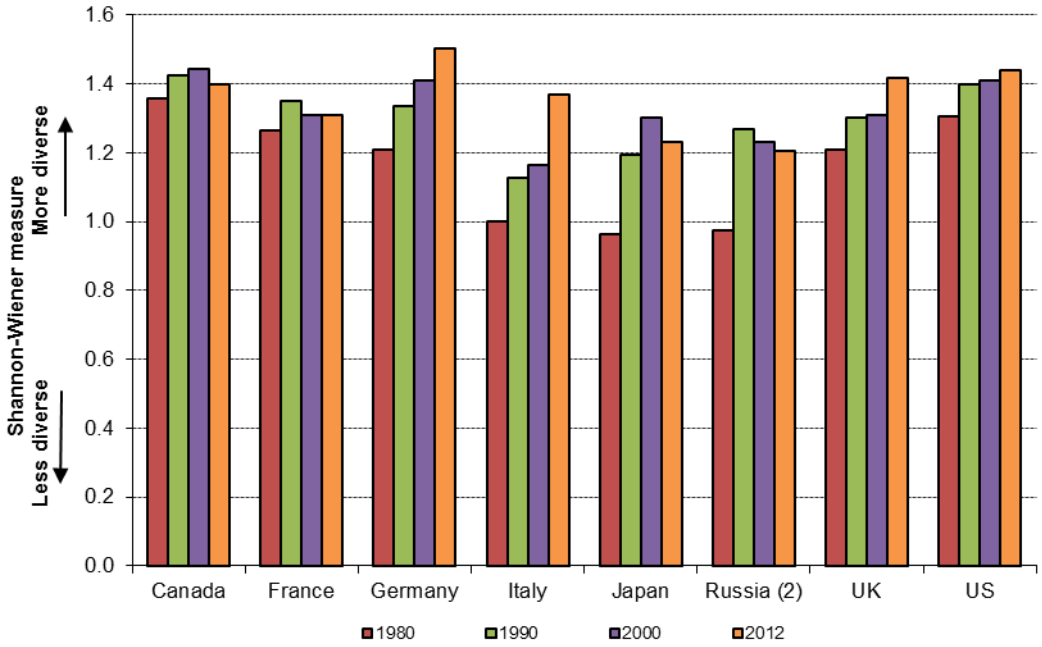



(1) Measured as Shannon-Weiner measure of diversity based on the shares of 5 groups of fuels: coal, oil, gas, primary electricity and biofuels & waste.
(2) Data for Russia is for 2011, the latest year for which data are available.

*Source: International Energy Agency*

- The UK has a diverse fuel mix comprising of coal, gas, oil, nuclear and renewables.
- 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 Japan, the diversity measure has fallen as a result of a sharp fall in nuclear due to the Fukushima incident and more reliance instead on fossil fuels.

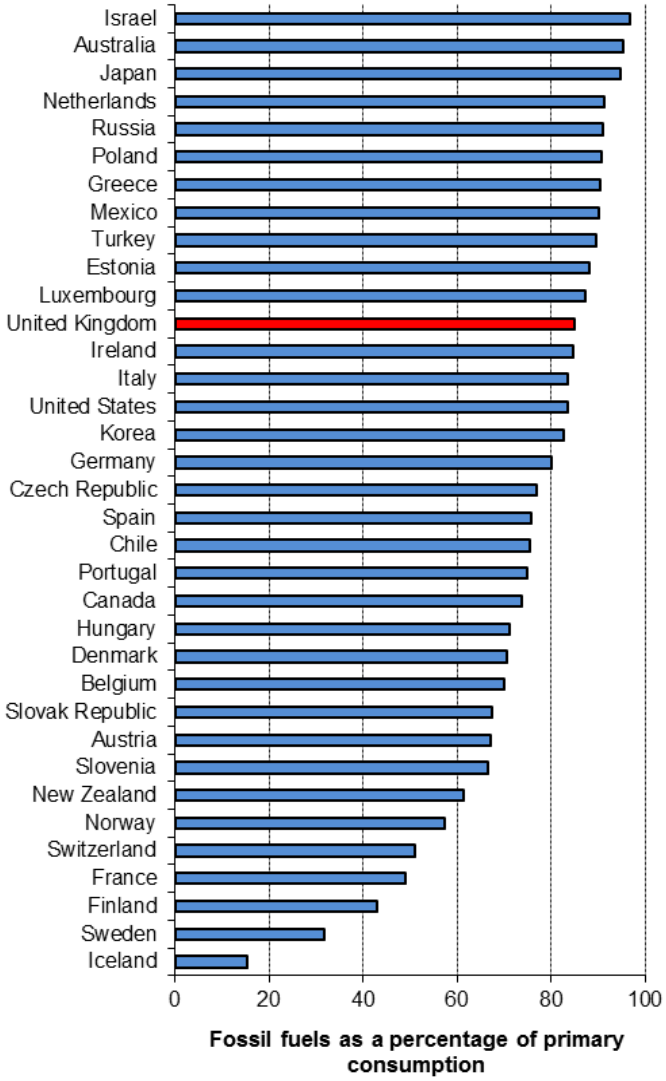
**Chart 5.4:**
**Diversity of primary energy supply(1) for G8 Countries, 1980 to 2012**




(1) Based on the shares of five groups of fuels: coal, oil, gas, primary electricity and waste.
(2) Russia data for 1980 and 1990 estimated from Former USSR data. The latest year for which data is available for Russia is 2011.

*Source: International Energy Agency*

**Chart 5.5:**
**Fossil fuel dependency in OECD countries and Russia[(1)], 2012**

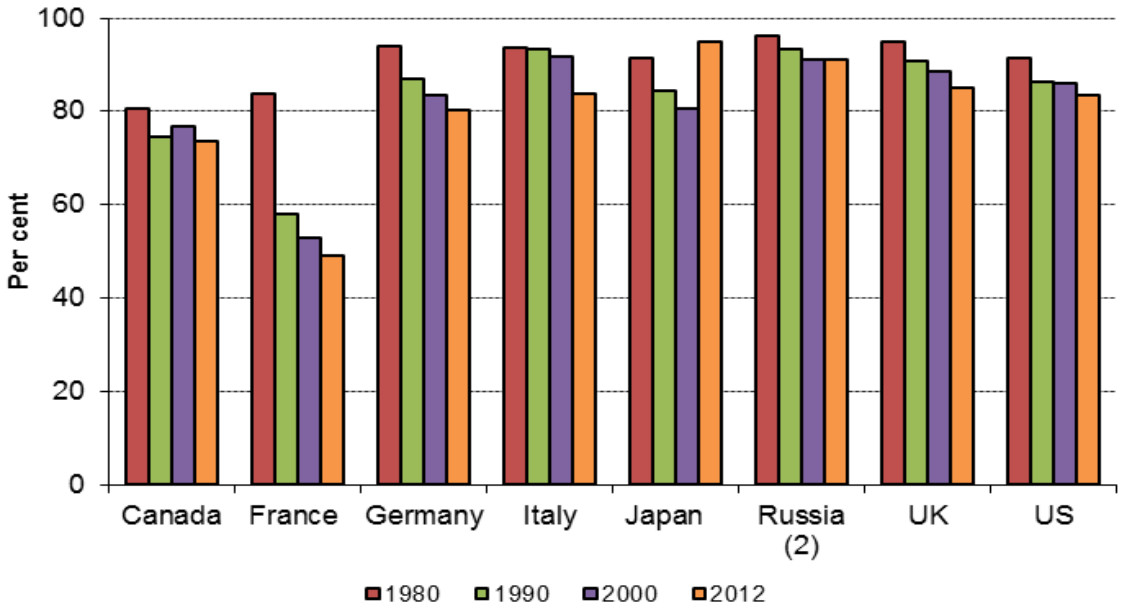



(1) Data for Russia is for 2011, the latest year for which data are available.

*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 sources of nuclear or hydro electricity, or geothermal heat.
- Most G8 countries have reduced their dependence on fossil fuels since 1980 (see Chart 5.6) by developing these 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 2012 was due to the impact of the nuclear disaster in March 2011.
- In the UK the growth of nuclear and renewable sources of electricity has reduced our dependence on fossil fuels from 95% of primary energy supply in 1980 to 85% in 2012.

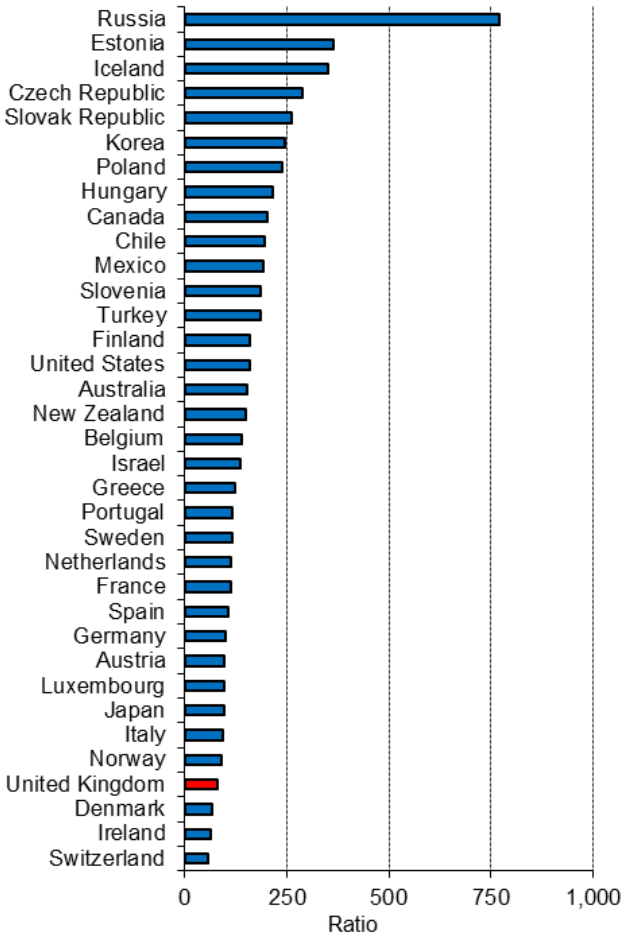
**Chart 5.6:**
**Fossil fuel dependency(1) for G8 Countries, 1980 to 2012**




(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 2011.

*Source: International Energy Agency*

**Chart 5.7:**
**The energy ratio[(1)] in OECD countries and Russia[(2)], 2012**

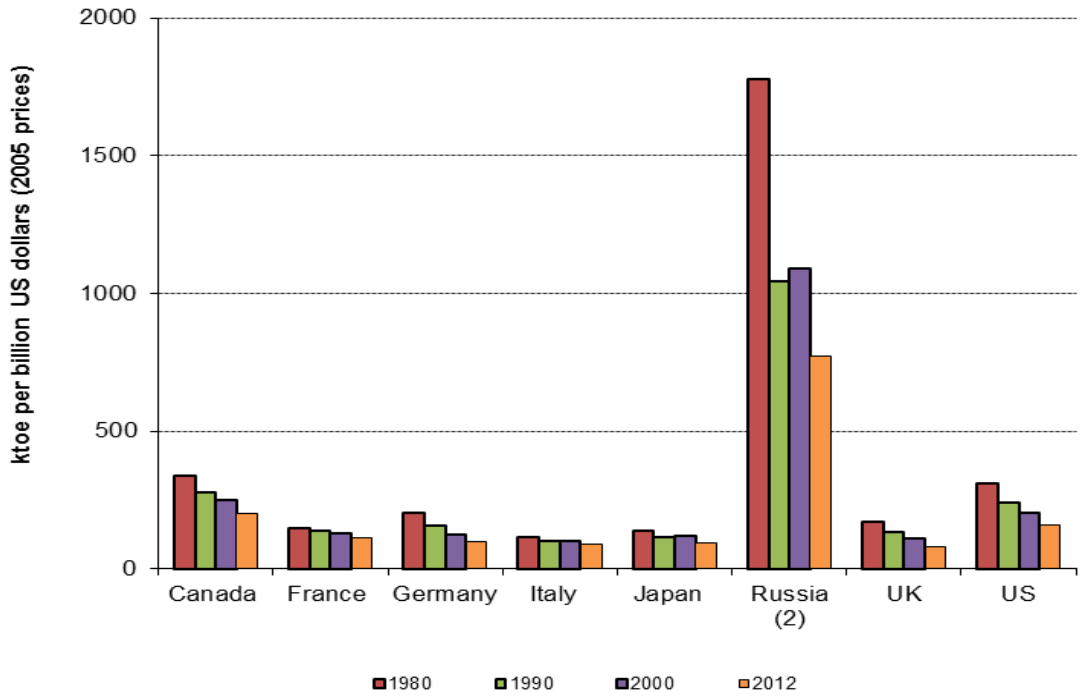



(1) Energy consumption (thousand tonnes of oil equivalent) per billion US dollars (2005 prices)
(2) Data for Russia is for 2011, the latest year for which data are available.

*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 dependence on 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 the 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 was nearly four times higher than the level of that in the next highest 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 service based economy.

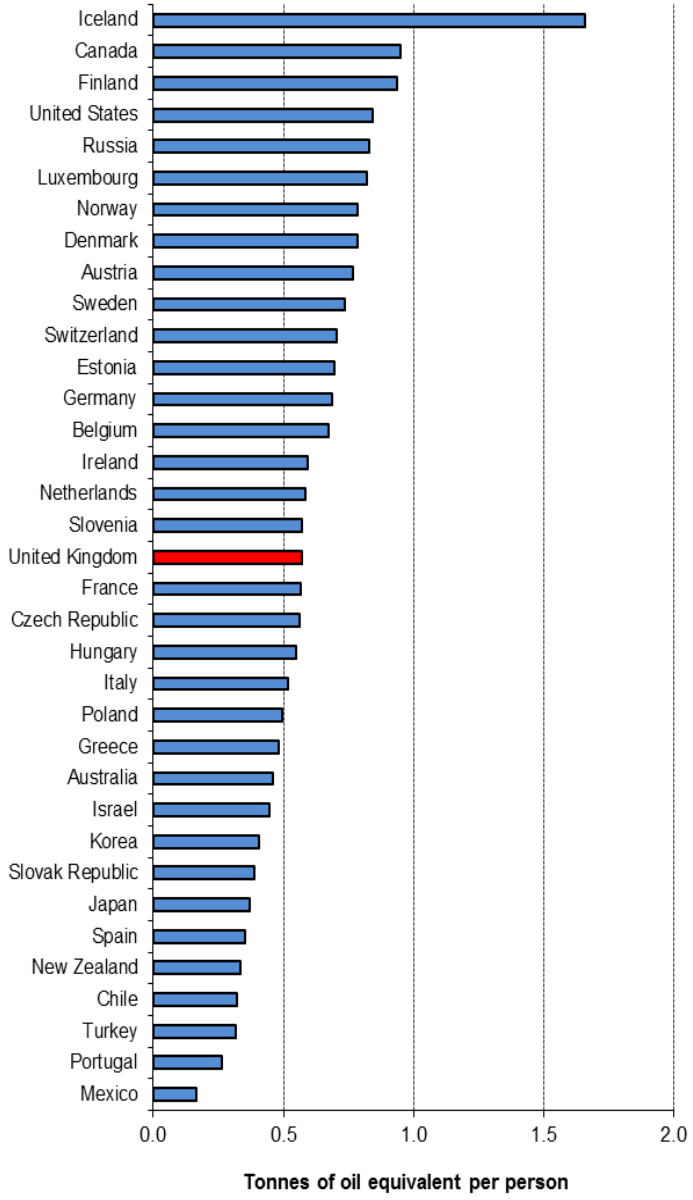
**Chart 5.8:**
**The energy ratio(1), for G8 Countries 1980 to 2012**




(1) Energy consumption (thousand tonnes of oil equivalent) per billion US dollars (2005 prices).
(2) Russia data for 1980 and 1990 estimated from Former USSR data. The latest year for which data is available for Russia is 2011.

*Source: International Energy Agency*

**Chart 5.9:**
**Household[(1)] energy use per person in OECD countries and Russia, 2011**

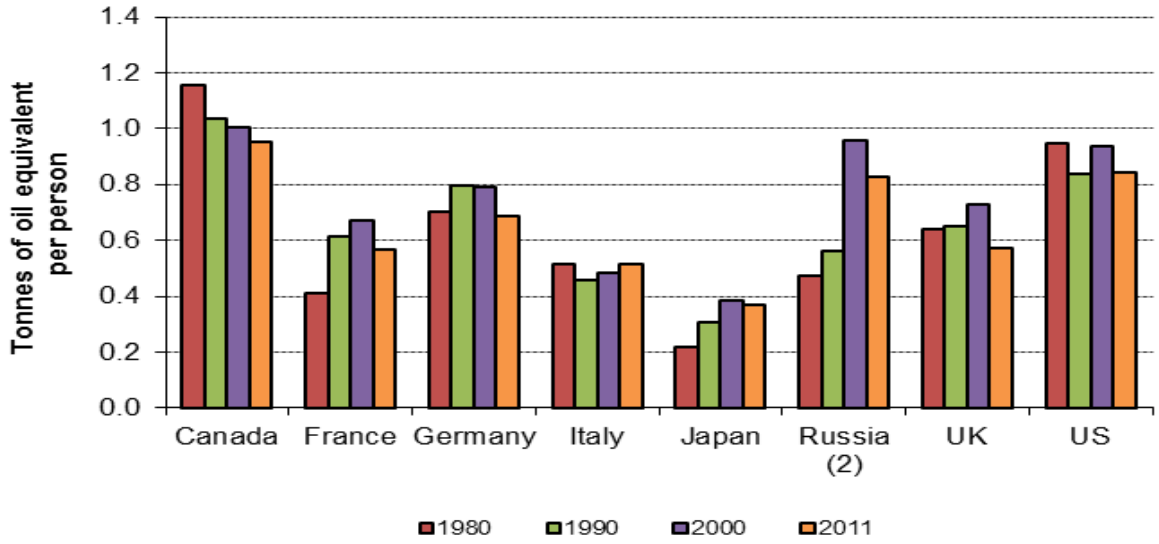



- The OECD countries vary considerably in the amount of energy each person uses at home. This variation is a combination of many factors, such as climate, house size, household size, comfort levels, energy efficiency and energy prices.
- Amongst the G8 group, some countries most noticeably France, Japan and Russia saw increases in energy use per person from their 1980 levels (see Chart 5.10). In contrast Canada and the US saw a decline in average energy use as energy efficiency measures took effect, whilst levels have remained broadly similar for Germany and Italy.
- In the UK, between 1980 and 2004 there was a relatively modest rise in the household energy use per person, but in subsequent years this trend has reversed, with an average rate of decline since 2005 of 4%.

(1) excludes fuels used for transport

*Source: International Energy Agency*

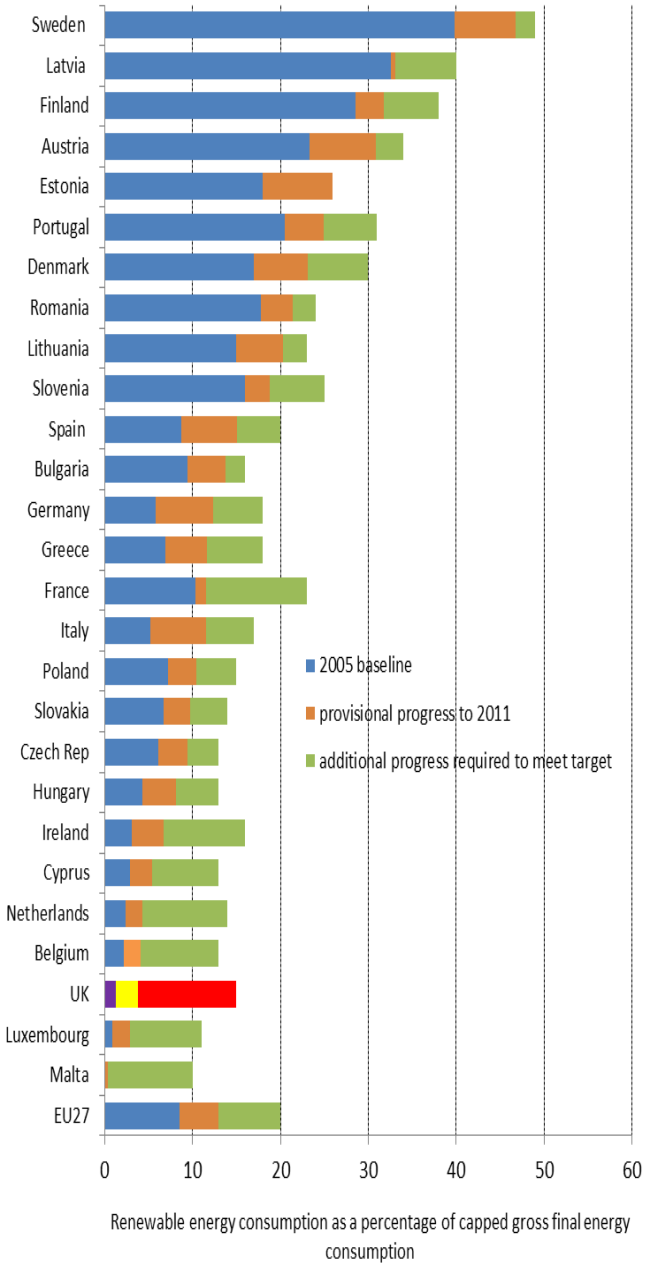
**Chart 5.10:**
**Household[(1)] energy use per person for G8 Countries, 1980 to 2011**




(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, 2011[1]**

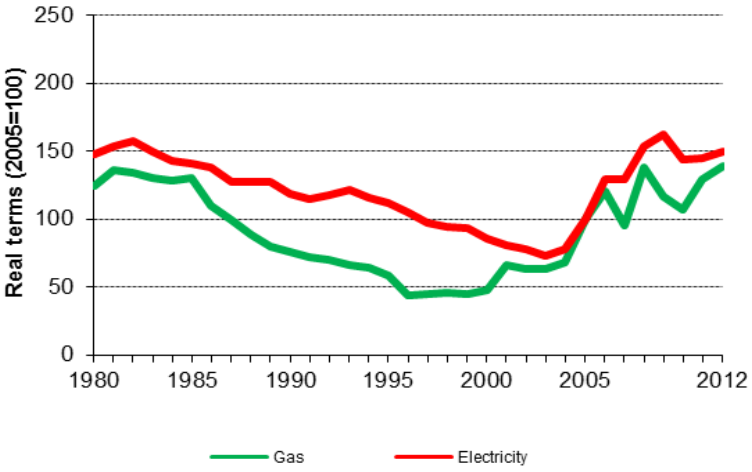



*[1] Data for Belgium and Hungary have been estimated by Eurostat.*
*Source: Eurostat*

- 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 2011 indicates Estonia has exceeded its 25 per cent target, and that that three further member states (Sweden, Bulgaria and Romania) are within 3 percentage point of achieving their targets. The UK in 2011 ranked third lowest in the ratio of renewable energy to final consumption, with Malta and Luxembourg having lower percentages. The scale of challenge, as measured by the additional progress required to meet countries target, is greatest for France, followed by the UK, Netherlands, Malta, and Ireland.
- The UK have published provisional progress data for 2012; this shows further progress was made during the year, with the renewables contribution rising from 3.8 to 4.1 per cent.

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

### Chart 6.1a:
### Fuel price indices[(1)] for the industrial sector, 1980 to 2012 including the Climate Change Levy

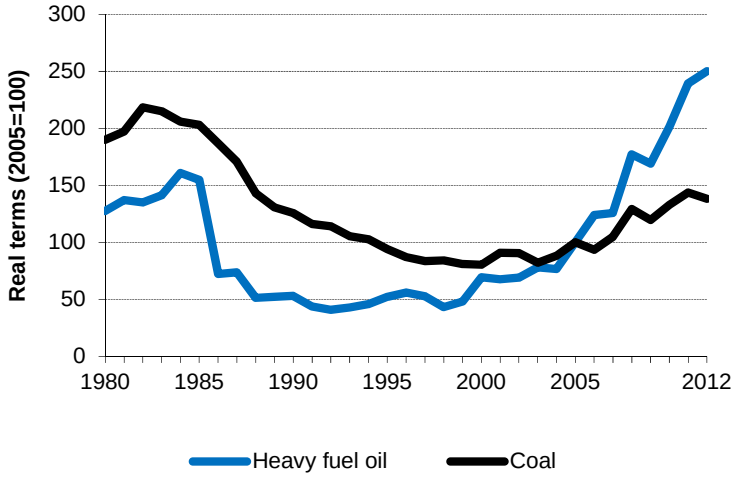



(1) Prices deflated using the GDP (market prices) deflator (2005=100)

*Source: DECC*

- In 2012, annual average real term industrial electricity prices, including the Climate Change Levy (CCL), rose by 3 per cent compared to 2011. Average gas prices, including CCL, rose by 8 per cent.
- Electricity prices were at a real term high in 1982 before falling steadily for 20 years. Since 2002 prices have increased by 93 per cent, exceeding the previous 1982 peak by 4 per cent in 2009 before falling by 12 per cent in 2010 then rising by 1 per cent in 2011.
- Gas prices fell steadily between 1981 and 1996 before rising to reach a real-term peak in 2008. Since 2002, prices have more than doubled, reaching a new real term peak in 2012.

### Chart 6.1b:
### Fuel price indices[(1)] for the industrial sector, 1980 to 2012 including the Climate Change Levy

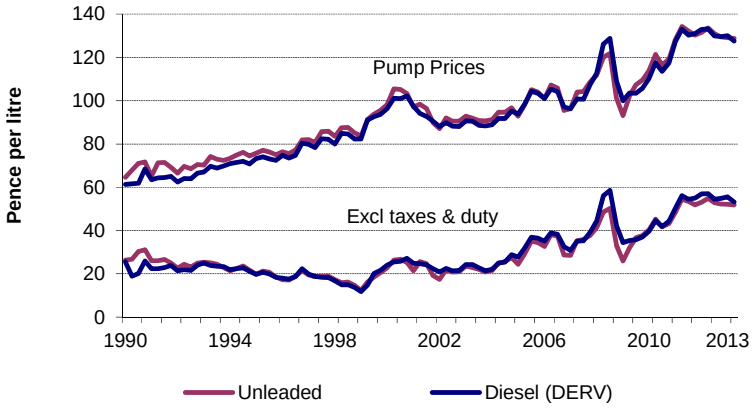



(1) Prices deflated using the GDP (market prices) deflator (2005=100)

*Source: DECC*

- In 2012, annual average real term industrial heavy fuel oil prices rose by 5 per cent compared to 2011. Coal prices, including CCL, fell by 4 per cent.
- Heavy fuel oil prices, which move daily with changes in the price of crude oil, rose at a fast rate 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 prices hit a new real term peak as 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.
- 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 6.2:**
**Petrol and diesel prices indices[(1)], 1990 to Q2 2013**

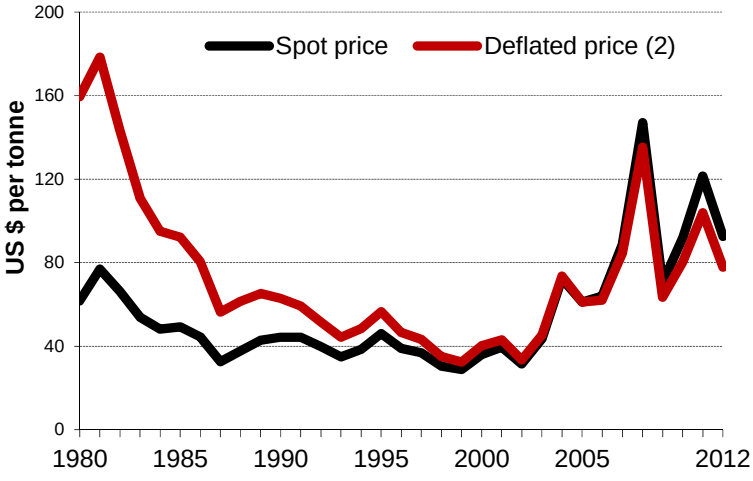



(1) Prices deflated using the GDP (market prices) deflator (2005=100)

*Source: DECC*

- The real term pump price of unleaded petrol in Q2 2013 is about 40% higher than in Q2 2003. Over the same period the price excluding duty and taxes has increased by 126%.
- The real term pump price of diesel in Q2 2013 is 41% higher than in Q2 2003. Over the same period the price excluding duty and taxes has increased by 120%.
- In Q2 2013 the price differential between unleaded petrol and diesel was 1.3 pence /litre (1.0%).
- Petrol and diesel retail prices peaked 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 2012.

**Chart 6.3:**
**Trends in the NW European marker price of coal[(1)], 1980 to 2012**

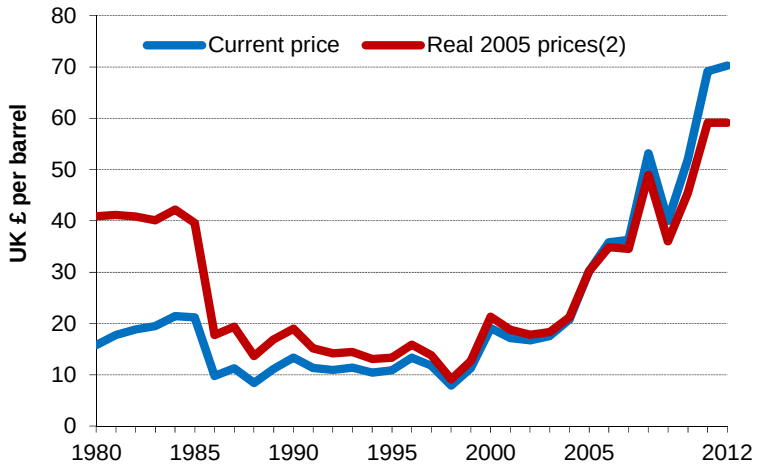



(1) Imported steam coal mostly for power stations, adjusted to a common energy content of 26 GJ/tonne.
(2) Prices deflated using the GDP (market prices) deflator (2005=100)

*Source: Platts; DECC*

- In 2012, the average spot price for a single delivery to North West Europe of imported coal was US$92.48 (£58.16) 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, prices fell sharply in 2009 before increasing once more in 2010 and 2011 then falling back in 2012. In real terms, the price in 2012 was more than double the level in 2002, but 25 per cent lower than in 2011.

**Chart 6.4:**
**Trends in the price of Brent crude oil[(1)], 1980 to 2012**




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

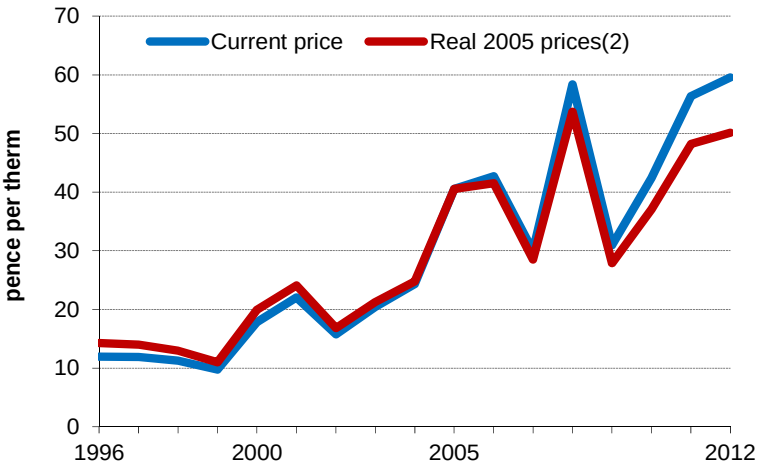
*Source: Platts; DECC*

- Between 1998, when prices troughed, and 2000, prices increased from record low levels by 134 per cent in real terms. Prices subsequently fell in 2001 and remained around this level until 2004, when continuing concerns over the situation in Iraq and OPEC capacity led to an annual increase in prices of 16 per cent in real terms. Prices increased further over the period 2005 to 2008, with prices in 2008 increasing by 42 per cent in real terms compared to 2007. Prices in 2009 fell by 26 per cent in real terms compared to 2008, but prices in 2010 rose by 26 per cent in real terms on 2009 prices, and prices in 2011 rose by a further 30 per cent in real terms. In 2012, real terms prices were flat compared to 2011.

- Between 2002 and 2012, Brent crude oil's one month forward price increased by 231% in real terms.

- In $ terms, crude oil prices have stayed above $100 per barrel in all months except one since February 2011.

**Chart 6.5:**
**Trends in the wholesale price of gas[(1)], 1996 to 2012**




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

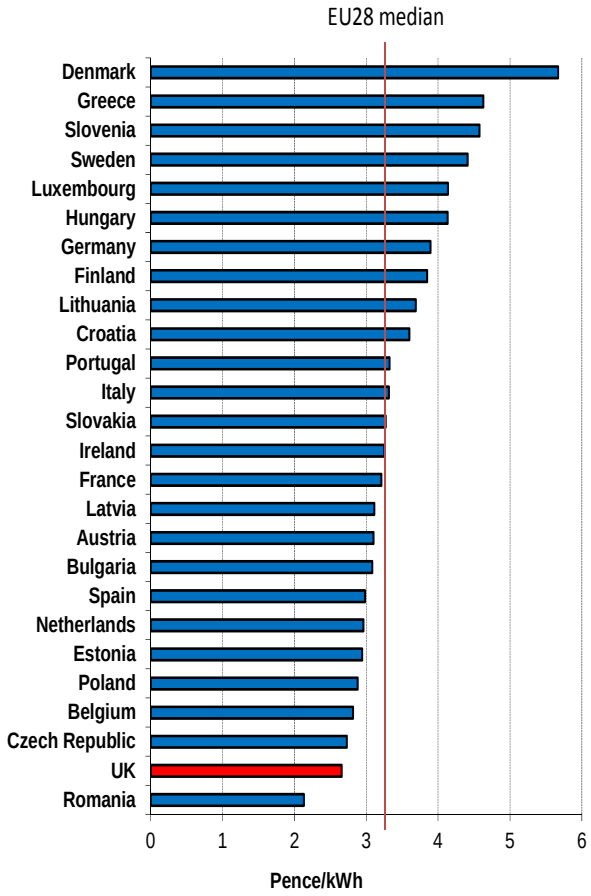
*Source: BP Statistical Review of World Energy, DECC*

- Gas prices 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 2008, increasing by 88 per cent over 2007's price.

- In 2012, the wholesale price of gas rose by 6 per cent (4 per cent in real terms) compared to 2011, to levels just below the 2008 real term peak.

**Chart 6.6:**
**Industrial gas prices for medium consumers within the EU28 in 2012: converted to UK pence per kWh[(1)(2)(3)]**




- In 2012, UK industrial gas prices for medium consumers, including tax, were the second lowest (to Romania) within the EU28 on a common pounds sterling currency basis, and were 18 per cent below the EU28 median.

- Prices for small consumers including tax were the second lowest in the EU28 and were around 23 per cent lower than the EU28 median. Prices for large consumers including tax were third lowest in the EU28 and around 17 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 UK prices did spike in 2006 above EU median levels.

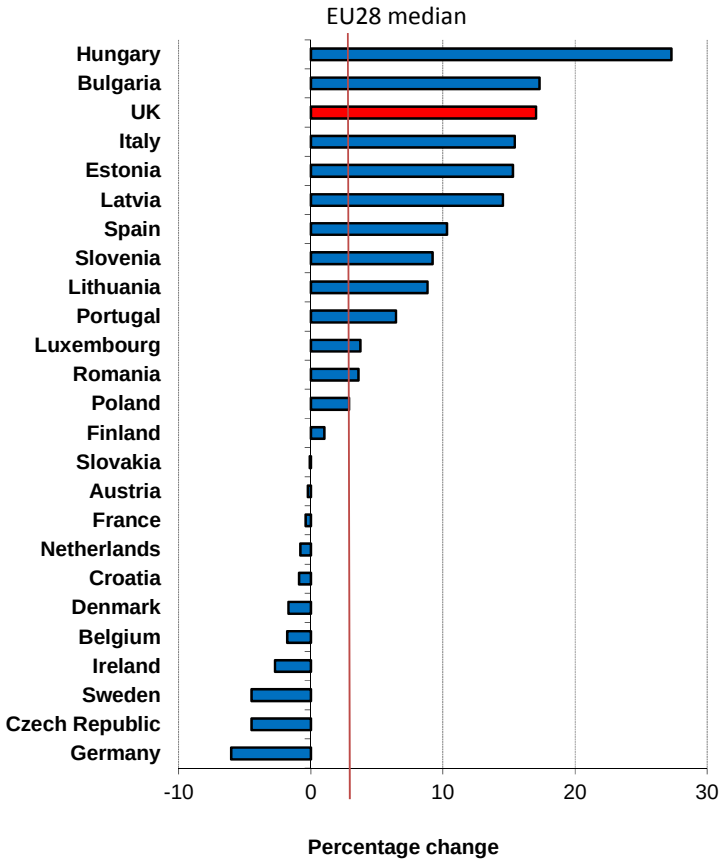
- In 2012, average UK industrial gas prices, including taxes where not refunded, were the third lowest in the G7, with prices in the US and Canada estimated to be lower than the UK (from IEA data).

Notes: Price include taxes where not refunded

(1) Converted using average 2012 exchange rates.
(2) Data not available for Cyprus and Malta.
(3) The prices for 2012 are averages of prices for the periods January - June 2012 and July - December 2012.

*Source: Derived from Eurostat data.*

**Chart 6.7:**
**Percentage change in industrial gas prices for medium consumers within the EU 28: 2011 to 2012[(1)(2)(3)]**



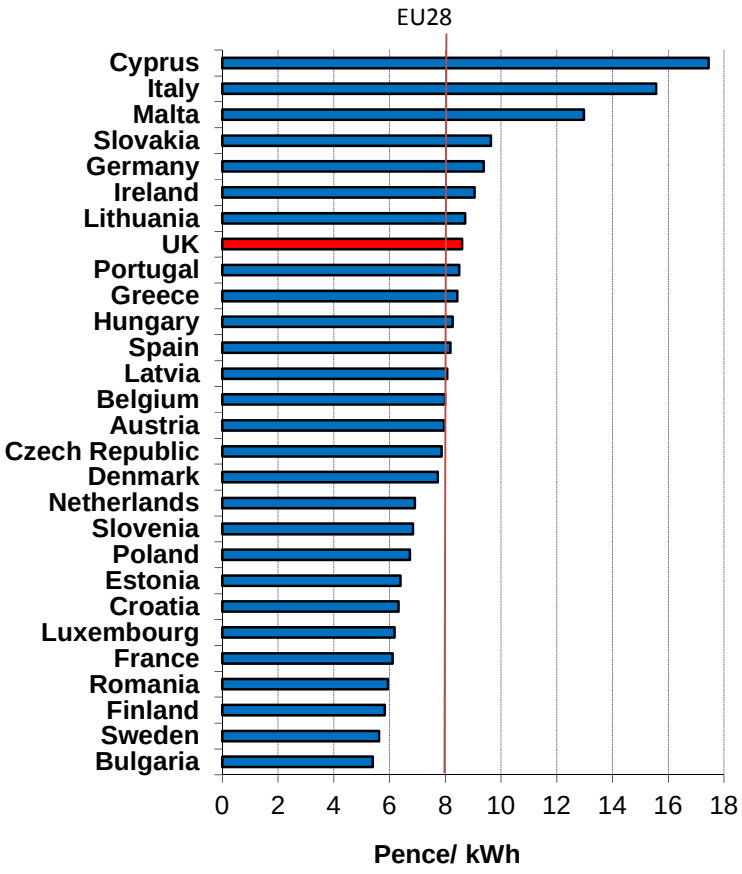

- Between 2011 and 2012, average UK industrial gas prices for medium consumers, including tax, rose by 17 per cent, compared to an EU median increase of 3 per cent.
- The greatest decrease was in Germany, where prices fell by 6 per cent.
- The greatest increase was in Hungary, where prices rose by 27 per cent.
- Since 2008, the first full year with data under the new methodology, the UK price has increased by 13 per cent, compared to a median increase of 14 per cent in the EU28.

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 2011 and 2012 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 6.8a:**
**Industrial electricity prices for medium consumers within the EU28 in 2012: converted to UK pence per kWh[(1)(2)]**



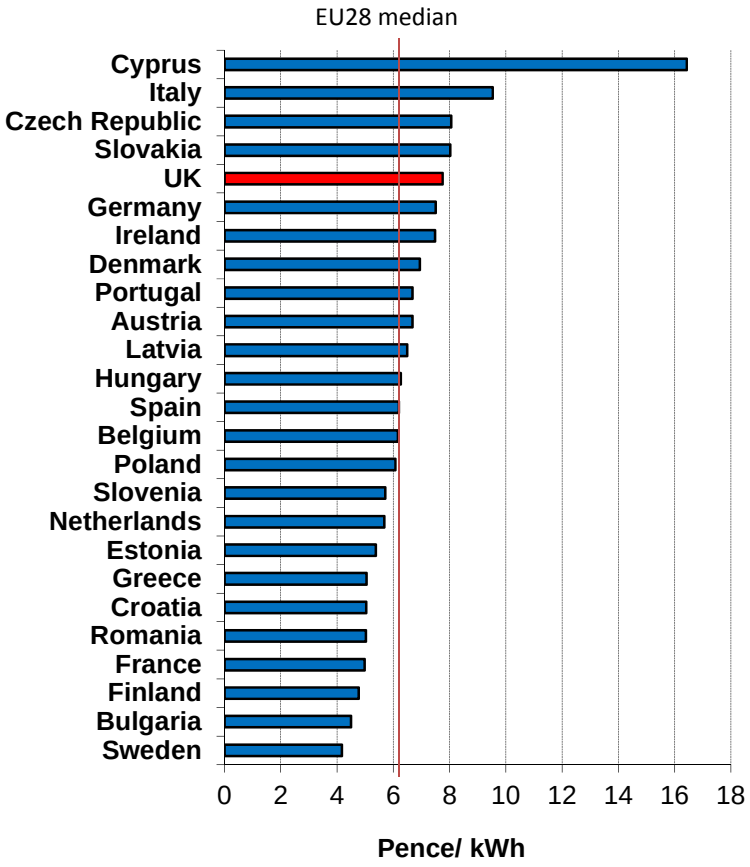

- In 2012, UK average industrial electricity prices for medium consumers, including tax, were 8 per cent above the EU28 median on a common pounds sterling currency basis.
- Since 1998, when the series began, the UK price for medium electricity consumers has generally been above the EU median, although prices dipped below the EU median in 2011.
- In 2012, 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 2012 exchange rates.
(2) The prices for 2012 are averages of prices for the periods January - June 2012 and July - December 2012.

*Source: Derived from Eurostat data.*

**Chart 6.8b:**
**Industrial electricity prices for extra-large consumers within the EU28 in 2012: converted to UK pence per kWh[(1)(2)(3)]**



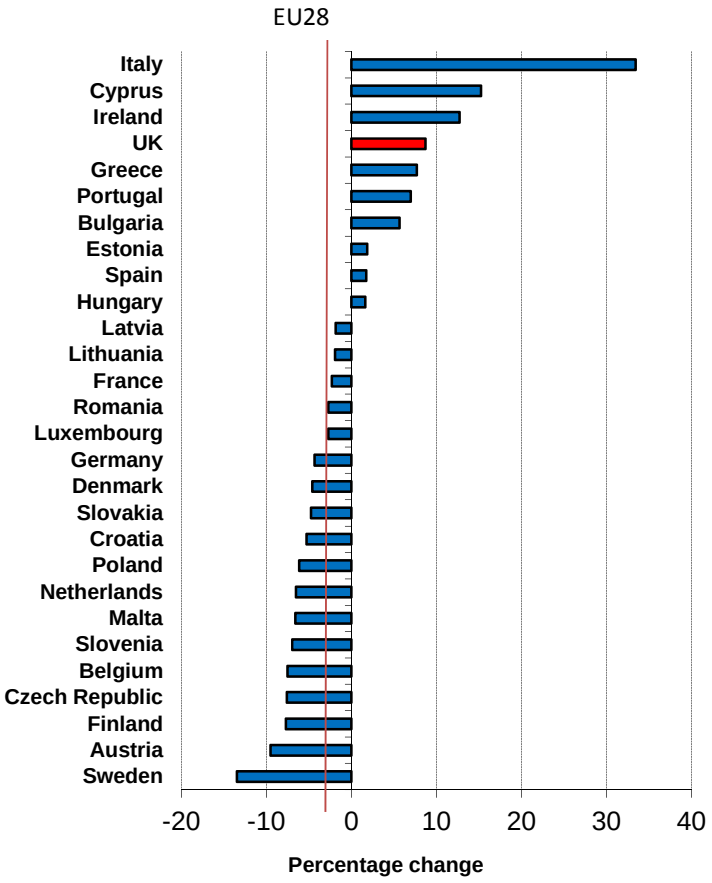

- In 2012, UK average industrial electricity prices for extra-large consumers, including tax, were the fifth highest on a common pounds sterling currency basis, and were 25 per cent above the EU28 median.
- For small consumers, the UK price including tax was 10 per cent above the EU median.

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

(1) Converted using average 2012 exchange rates.
(2) Data not available for Malta, Luxembourg and Lithuania.
(3) The prices for 2012 are averages of prices for the periods January - June 2012 and July - December 2012.

*Source: Derived from Eurostat data*

**Chart 6.9a:**
**Percentage change in industrial electricity prices for medium consumers within the EU28, 2011 to 2012[(1)]**



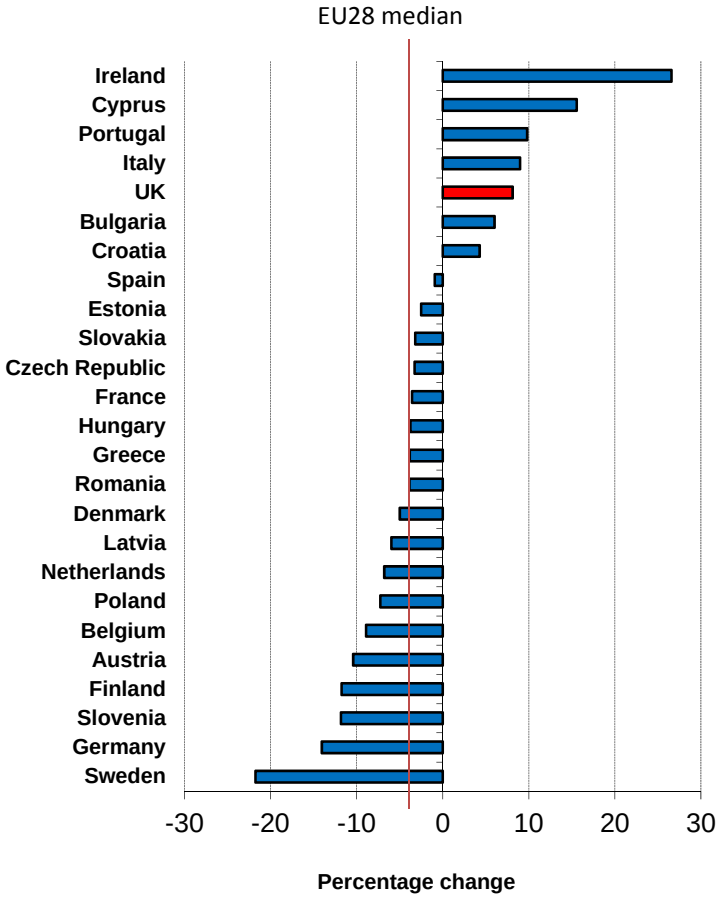

- Between 2011 and 2012, average UK industrial electricity prices for medium consumers, including taxes, rose by 9 per cent compared to an EU median decrease of 3 per cent.
- The largest fall was in Sweden, where prices fell by 13 per cent.
- The largest increase was in Italy, where prices rose by 33 per cent.
- Since 2008, the first full year with data under the new methodology, the UK price has increased by 14 per cent, which was the median increase in the EU28.

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

(1) The prices for 2011 and 2012 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 6.9b:**
**Percentage change in industrial electricity prices for extra-large consumers within the EU28, 2011 to 2012 [1][2]**



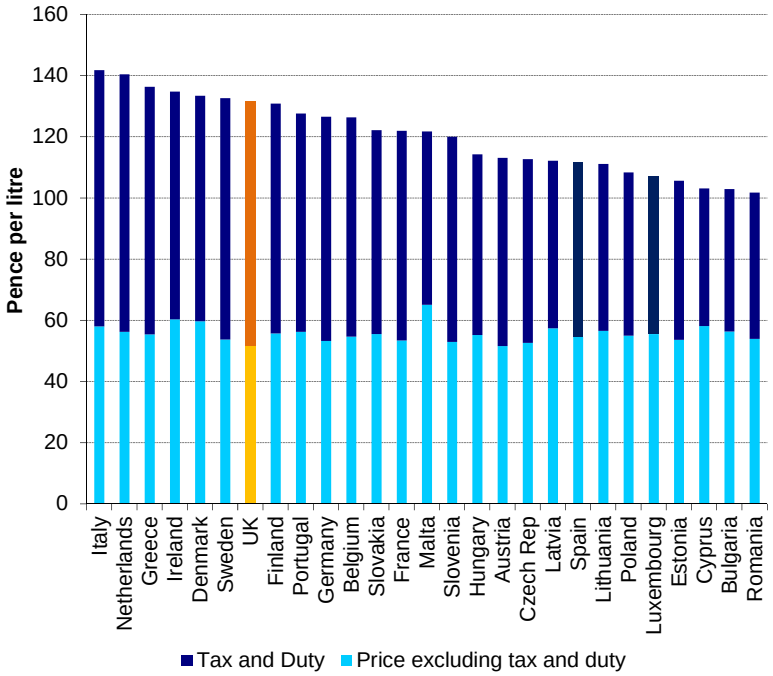

- Between 2011 and 2012, average UK industrial electricity prices for extra-large consumers, including taxes, rose by 8 per cent compared to an EU median decrease of 4 per cent.
- The largest decrease was in Sweden, where prices fell by 22 per cent.
- The largest increase was in Ireland, where prices rose by 27 per cent.
- Since 2008, the first full year with data under the new methodology, the UK price has increased by 4 per cent, compared to a median increase of 9 per cent in the EU.
- Prices for small industrial electricity consumers in the UK, including tax, rose by 6 per cent between 2011 and 2012, compared to a median EU decrease of 4 per cent.
- Between 2008 and 2012, UK prices to small industrial electricity consumers including tax rose by 19 per cent compared to an EU median increase of 20 per cent.

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

(1) Data not available for Lithuania, Luxemburg or Malta.
(2) The prices for 2011 and 2012 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.*

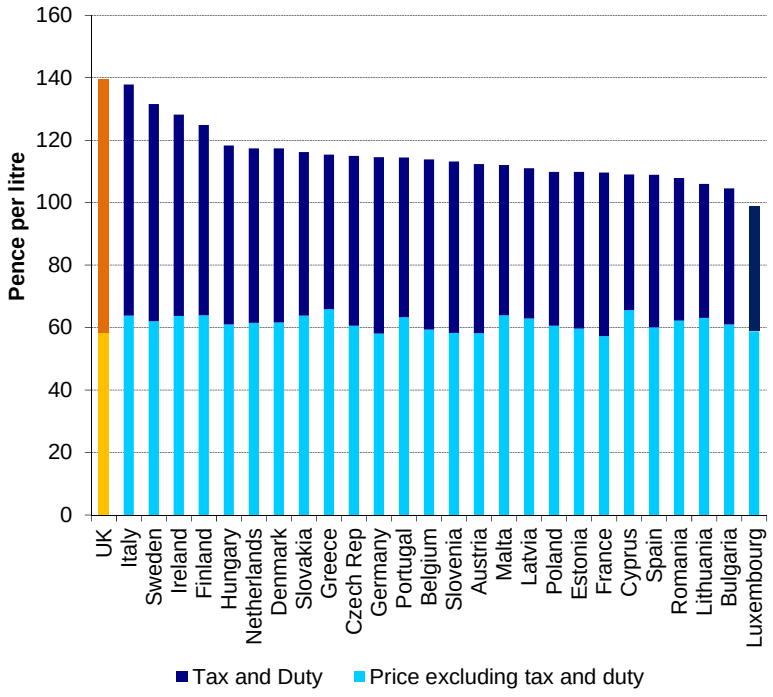
**Chart 6.10:**
**European unleaded petrol/ULSP prices in pence/litre at December 2012**




*Source: European Commission Oil Bulletin.*

- In December 2012, unleaded petrol prices in the EU, excluding tax and duty, were on average 55.6 pence per litre. This compares to an average price in the UK for Ultra Low Sulphur Petrol (ULSP) of 51.7 pence per litre.
- Tax and duty on unleaded petrol, in December 2012, was the lowest in Cyprus, at 45.0 pence per litre. The highest was in the Netherlands, at 84.2 pence per litre. In the UK, tax and duty was 79.9 pence per litre.
- In December 2012, UK unleaded petrol prices, including tax and duty, were the seventh highest in the EU, at 131.6 pence per litre. The highest price was in Italy, at 141.7 pence per litre. The lowest price was in Romania, at 101.7 pence per litre.

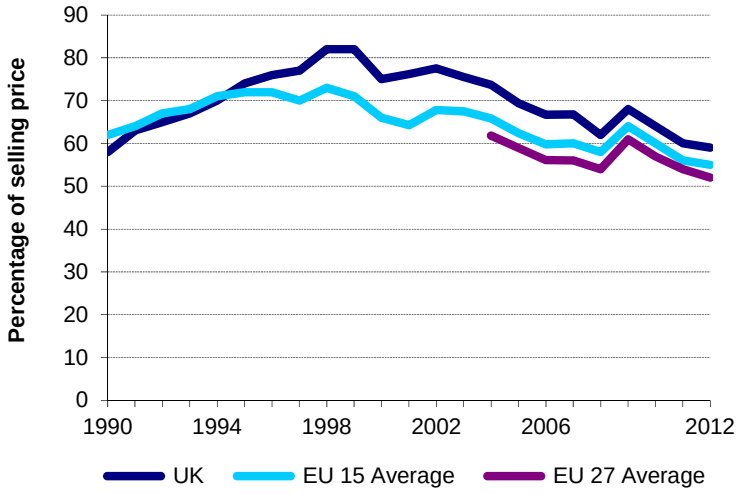
**Chart 6.11:**
**European diesel prices in pence/litre at December 2012**




*Source: European Commission Oil Bulletin.*

- In December 2012, diesel prices in the EU, excluding tax and duty, were lowest in France, at 57.3 pence per litre, whereas Greece's price was the highest at 65.9 pence per litre.
- In December 2012, tax and duty on diesel within the EU was lowest in Luxembourg at 40.1 pence per litre. The UK had the highest level of tax and duty at 81.2 pence per litre, compared to an average level of 54.0 pence per litre in the EU27.
- In December 2012, UK diesel prices were the highest in the EU at 139.7 pence per litre. The lowest price was in Luxembourg, at 98.9 pence per litre.

**Chart 6.12:**
**Taxes and duties as a percentage of selling price for unleaded petrol, 1990 to 2012**

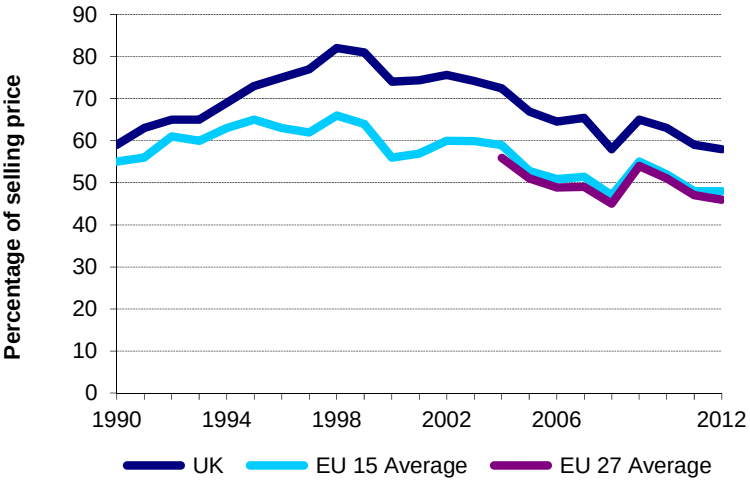



Note: Data for EU 27 as Croatia was not an EU Member State at the time of collection and has not provided data for previous years.

*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 2012 accounted for 59 per cent of the selling price on average, the highest in the EU compared to 42 per cent in Cyprus, the lowest in the EU.

**Chart 6.13:**
**Taxes and duties as a percentage of selling price for diesel, 1990 to 2012**




Note: Data for EU 27 as Croatia was not an EU Member State at the time of collection and has not provided data for previous years.

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

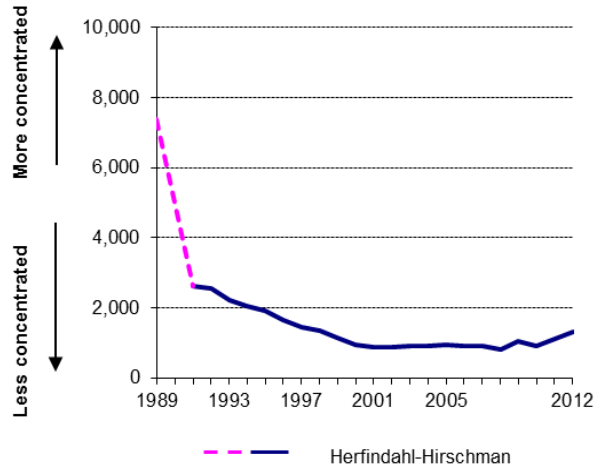
- Taxes and duties on diesel in the UK have shown a correlation with the EU average, however since the mid nineties the gap has widened due to UK fiscal policy, with taxes make up a larger proportion of the cost of diesel in the UK.
- In 2012, tax and duties on diesel as a percentage of the selling price varied from 58 per cent in the UK, which was the highest in the EU, to 39 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 2012, 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 2012**




*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 2012, 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 fell to 38% in 2008, before rising 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 in 2011 and again in 2012 to 52%. The share of the next three largest in generation terms had been on a falling trend to 2009, but increased in 2010 before continuing it's fall to 24% in 2012. The share of those outside the top nine has fluctuated between 18 and 21 per cent over the last five years. However, this has fallen dramatically in 2012 to 13%.

**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 |

(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] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Aggregated share of top 3 companies | 37.7 | 43.5 | 39.7 | 45.6 | 51.7 | 44.1 | 43.4 | 43.7 | 43.7 | 46.8 |
| Aggregated share of next 3 companies | 23.8 | 22.8 | 25.4 | 24.4 | 23.8 | 26.8 | 26.5 | 24.4 | 25.4 | 22.4 |
| Aggregated share of next 3 companies | 18.1 | 14.0 | 13.6 | 11.1 | 11.1 | 12.0 | 12.1 | 12.3 | 12.6 | 13.1 |
| **Aggregated share of top 9 companies** | **79.6** | **80.3** | **78.7** | **81.1** | **86.6** | **82.9** | **81.9** | **80.4** | **81.7** | **82.3** |
| Other major power producers | 20.4 | 19.8 | 21.3 | 18.9 | 13.4 | 17.1 | 18.1 | 19.6 | 18.3 | 17.7 |

(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 49.1% in 2012. The market share of the top nine suppliers peaked in 2009 and 2010 and fell to 91.8% in 2012, whereas the share of those outside of the top nine rose from 4.4% in 2007 to 8.2% in 2012, in part due to the addition of new suppliers.
- The total number of companies in the UK counted as sellers of electricity in 2012 is 30 (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 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Domestic sector | 0 | 0 | 11 | 7 | 11 | 10 | 10 | 9 | 10 | 15 | 16 |
| Commercial sector | 17 | 16 | 14 | 14 | 18 | 17 | 14 | 12 | 14 | 21 | 22 |
| Industrial sector | 18 | 22 | 20 | 18 | 27 | 22 | 18 | 19 | 20 | 25 | 26 |

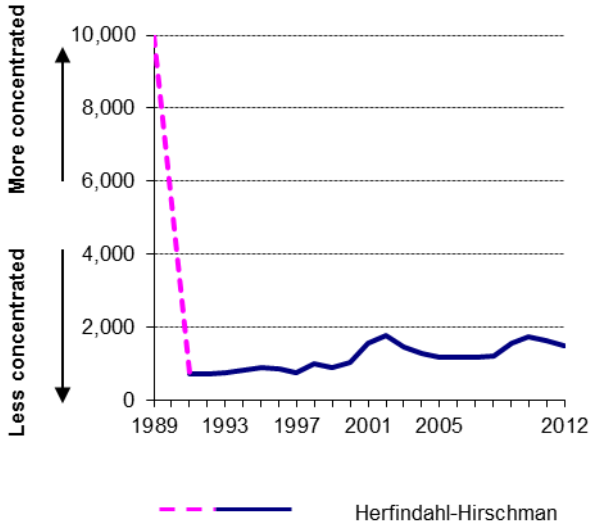
*Source: DECC*

**Table 7.4: Percentage of total electricity supplied to all consumers**

| | Market share (%) | | | | |
|---|---|---|---|---|---|
| Electricity suppliers | 2008 | 2009 | 2010 | 2011 | 2012 |
| Aggregated share of top 3 suppliers | 50.1 | 55.7 | 54.2 | 51.2 | 49.1 |
| Aggregated share of next 3 suppliers | 34.9 | 35.8 | 37.1 | 36.4 | 36.7 |
| Aggregated share of next 3 suppliers | 10.6 | 5.8 | 6.1 | 6.4 | 6.0 |
| **Aggregated share of top 9 suppliers** | **95.6** | **97.3** | **97.3** | **93.9** | **91.8** |
| Other suppliers | 4.4 | 2.7 | 2.7 | 6.1 | 8.2 |

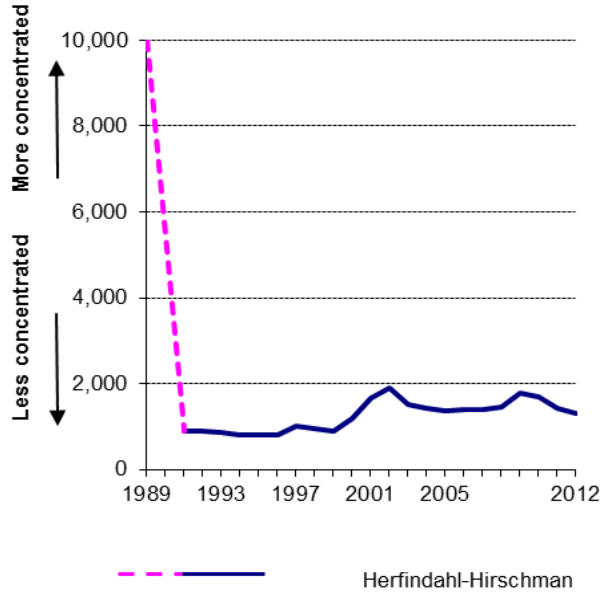
*Source: DECC*

**Chart 7.2:**
**Competition in electricity sales to the industrial sector, 1989 to 2012**




*Source: DECC*

**Chart 7.3:**
**Competition in electricity sales to the commercial sector, 1989 to 2012**



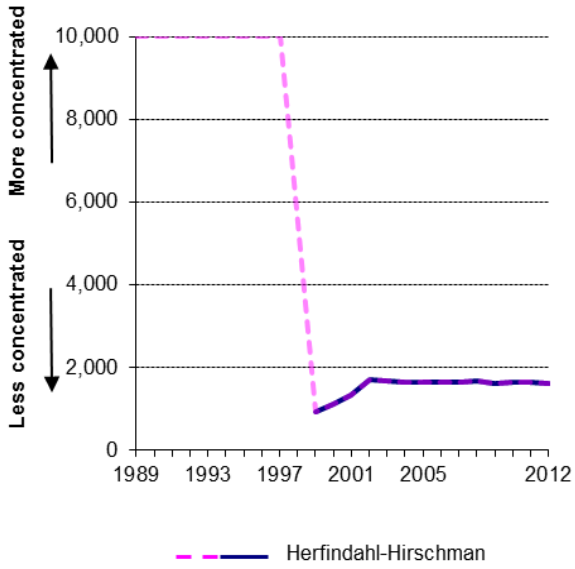

*Source: DECC*

- 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 21 in 2010. The number increased by five in 2011 and again by one in 2012. The number supplying commercial customers reached 19 during 2004/05 but fell to 15 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 by five 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 2012**




*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 2012 there was one entrant to the market, though the low level of customers acquired has had little impact on the index.

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 accounts for about a third of gas supply. The South West pilot area was opened for competition in April 1996, with consumers of less than 2,500 therms a year in the remaining areas given the freedom to choose their supplier in stages between February 1997 and May 1998.

The number of companies supplying gas increased markedly between 1991 and 1994 and again after 1996 (see Table 7.5), but by the end of 2009 the number had fallen by 36% from its 2000 peak because of mergers. There are effectively four competitive sectors - sales to the electricity generators, the industrial sector, the commercial sector and the domestic sector.

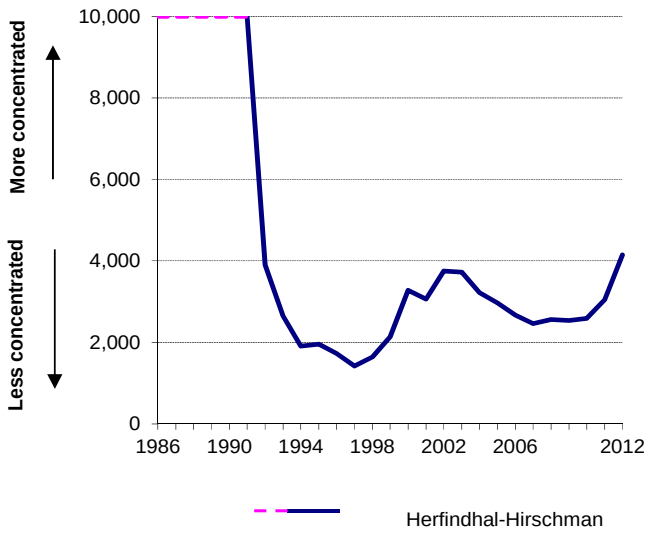
**Table 7.5:**
**Number of companies supplying gas**(1)

| | 1996 | 1998 | 2000 | 2002 | 2004 | 2006 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Domestic sector | 1 | 12 | 15 | 12 | 6 | 7 | 7 | 7 | 7 | 7 | 9 |
| Commercial sector | 21 | 23 | 25 | 17 | 14 | 10 | 11 | 11 | 11 | 11 | 10 |
| Industrial sector | 17 | 20 | 22 | 16 | 11 | 10 | 10 | 9 | 10 | 9 | 9 |

(1) Companies with less than ¼% share of the total market are excluded (less than ½% before 1996); In October 2012, 46 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*

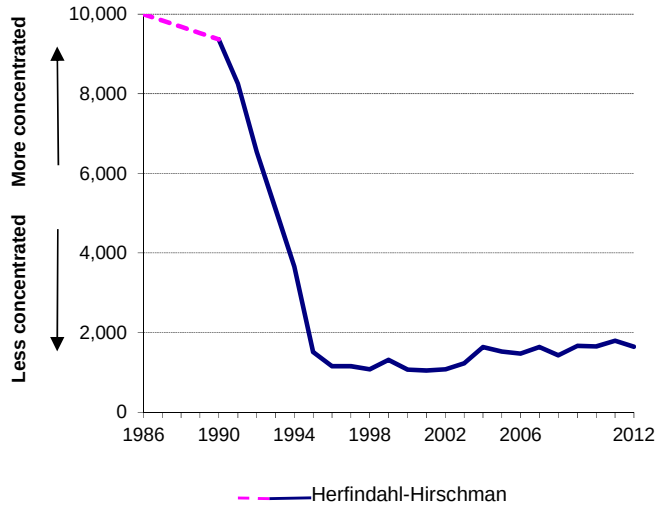
**Chart 7.5:**
**Competition in gas sales to electricity generators, 1986 to 2012**




- Gas sales to generators effectively began in 1992; before then, gas use for electricity generation was small.
- From 1997 to 2002, existing suppliers of gas to the generators tended to obtain further contracts (e.g. from new generators) and so boost their share of the market, increasing concentration. From 2002 to 2010, switching of contracts by electricity generators led to the Herfindhal-Hirschman measure showing a reduction in concentration.
- Beyond 2010, a reduction in gas demand from generators was associated with a sharp reduction in supplies from specific companies, rather than a proportionate reduction across all companies. This resulted in a small number of companies supplying the majority of gas to electricity generators, and thus an increase in concentration.

*Source: DECC*

**Chart 7.6:**
**Competition in gas sales to the industrial sector, 1986 to 2012**

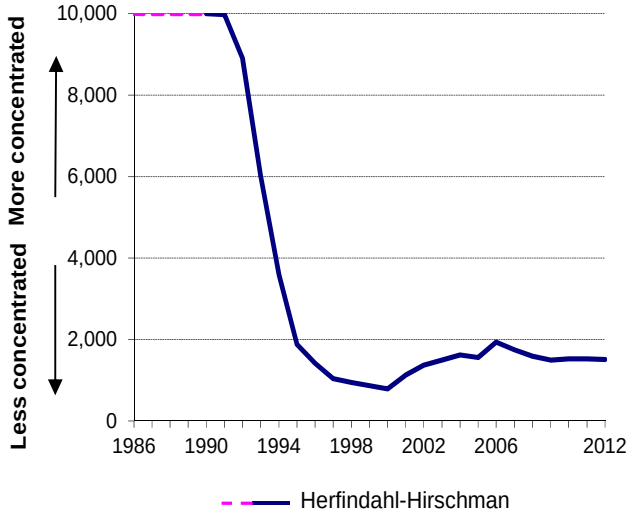



- The number of companies supplying gas to industry increased from 7 in 1990 to 24 in 1999. The number has since fallen back to 9 in 2012 due to mergers between existing suppliers, although new suppliers have also emerged.

- Substantial changes to market shares occurred between 1991 and 1995 with British Gas losing market share to competitors. The situation has since stabilised but mergers between existing suppliers have increased concentration slightly in the years since 2001.

*Source: DECC*

**Chart 7.7:**
**Competition in gas sales to the commercial sector, 1986 to 2012**

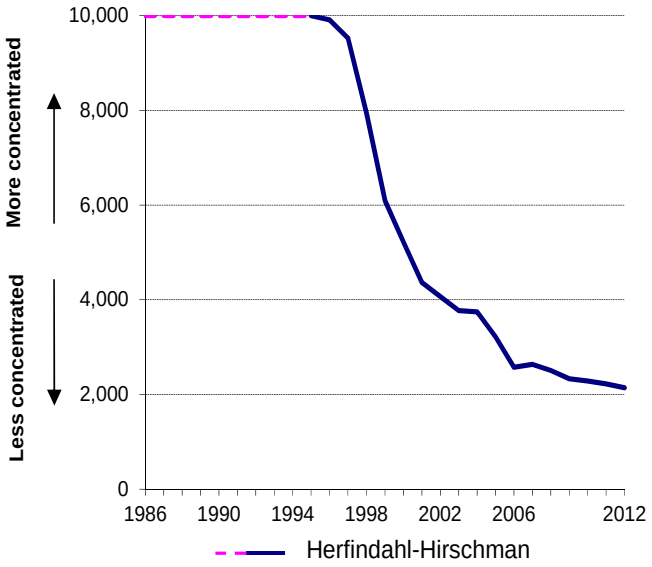



- In 2012 there were 10 companies supplying gas to the commercial sector compared with 26 at the highest in 1999. In 1991 there were 4.

- The opening of all consumption bands in this sector to competition in 1998 attracted some further new entrants, but mergers between existing suppliers has generally increased concentration slightly in the years since 2000. In years 2010 to 2012 concentration has been more stable.

*Source: DECC*

**Chart 7.8:**
**Competition in gas sales to the domestic sector, 1986 to 2012**




- In 2000 there were 15 companies supplying gas to the domestic sector (greater than ¼% supply). Most companies were new, as the domestic sector was opened up to competition in stages, mainly between February 1997 and May 1998.
- Mergers between companies reduced the number supplying gas to the domestic sector to 7 by 2011. In 2012, this number increased to 9, reflecting increasing competition for customers from smaller gas suppliers.
- The market power of British Gas in the domestic sector is declining and with it the sector is becoming less concentrated.

*Source: DECC*

**Table 7.6: Percentage of total gas supplied to all consumers**

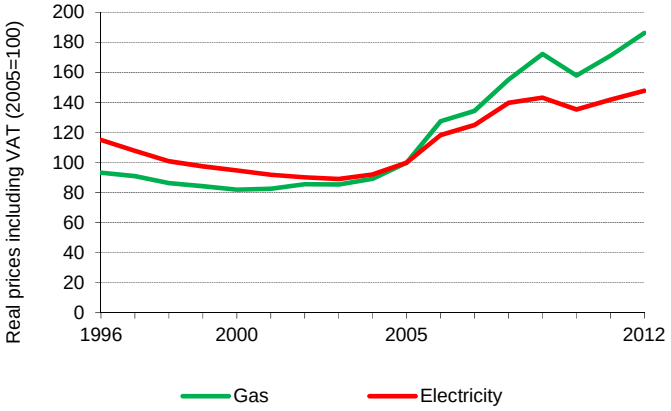
| | Market share (%) | | | | |
|---|---|---|---|---|---|
| Gas suppliers | 2008 | 2009 | 2010 | 2011 | 2012 |
| Aggregated share of top 3 suppliers | 56.0 | 56.0 | 54.7 | 50.9 | 51.2 |
| Aggregated share of next 3 suppliers | 14.6 | 16.9 | 17.6 | 18.6 | 18.0 |
| Aggregated share of next 3 suppliers | 12.9 | 12.2 | 12.4 | 12.6 | 12.7 |
| **Aggregated share of top 9 suppliers** | **83.6** | **85.2** | **84.6** | **82.0** | **81.8** |
| Other suppliers | 16.4 | 14.8 | 15.4 | 17.9 | 18.2 |

*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 8.1a:
### Fuel price indices(1) for the domestic sector, 1996 to 2012

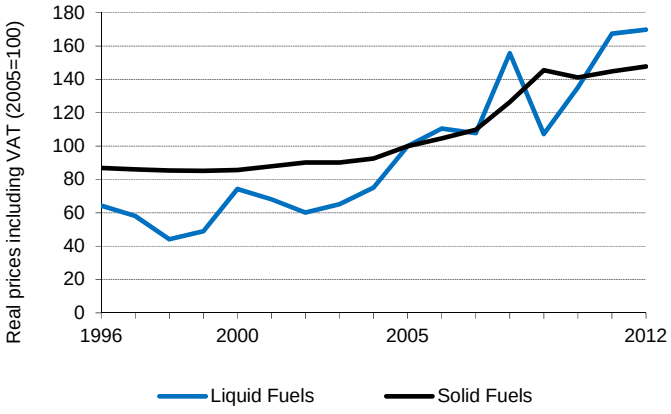



- Between 2011 and 2012, domestic electricity prices increased by 4 per cent in real terms, while gas increased by 9 per cent.
- Prices for both gas and electricity generally fell between 1996 and 2000. However, gas prices have more than doubled since 2002 and electricity prices are up by 64 per cent over the same ten year period.

Notes:
(1) Consume price indices deflated using the GDP (market prices) deflator (2005=100)

*Source: Office for National Statistics.*

### Chart 8.1b:
### Fuel price indices(1) for the domestic sector, 1996 to 2012

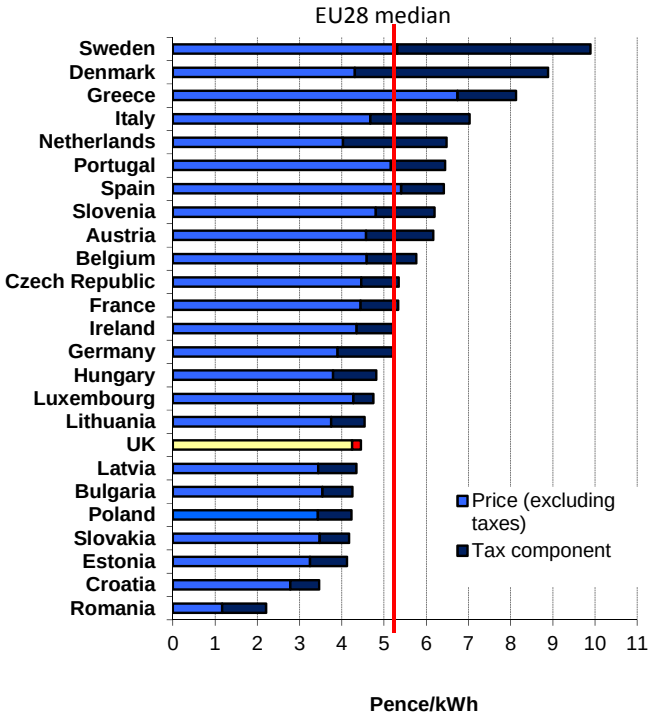



- Between 2011 and 2012, prices for domestic solid fuels rose by 2 per cent in real terms, and the price of liquid oils rose by 1.5 per cent.
- Prices for solid fuels remained broadly unchanged in the 1990s before climbing slowly between 2000 and 2007. Prices then rose by 32 per cent between 2007 and 2011, with the only year-on-year fall being in 2010.
- 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 have since risen to 9 per cent above the 2008 level.

Notes:
(1) Consumer price indices deflated using the GDP (market prices) deflator (2005=100)

*Source: Office for National Statistics.*

**Chart 8.2a:**
**Domestic gas prices for medium consumers within the EU28 in 2012: converted to UK pence per kWh[(1)(2)(3)]**




- In 2012, UK average domestic gas prices for medium consumers, including taxes, were the eighth lowest in the EU28 on a common pounds sterling currency basis, and were 14.5 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.

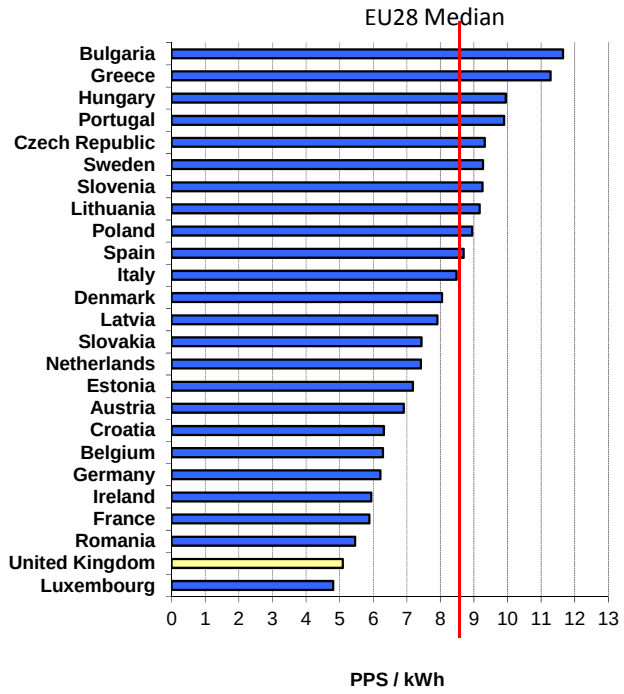
- In 2012, average UK domestic gas prices, including taxes, were the third lowest in the G7 after the USA and Canada (from IEA data).

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

(1) Converted using average 2012 exchange rates.
(2) Data not available for Cyprus, Finland and Malta.
(3) The prices for 2012 are averages of prices for the periods January - June 2012 and July - December 2012.

*Source: Derived from Eurostat data.*

**Chart 8.2b:**
**Domestic gas prices for medium consumers within the EU28 in 2012: PPS[(1)(2)(3)]**

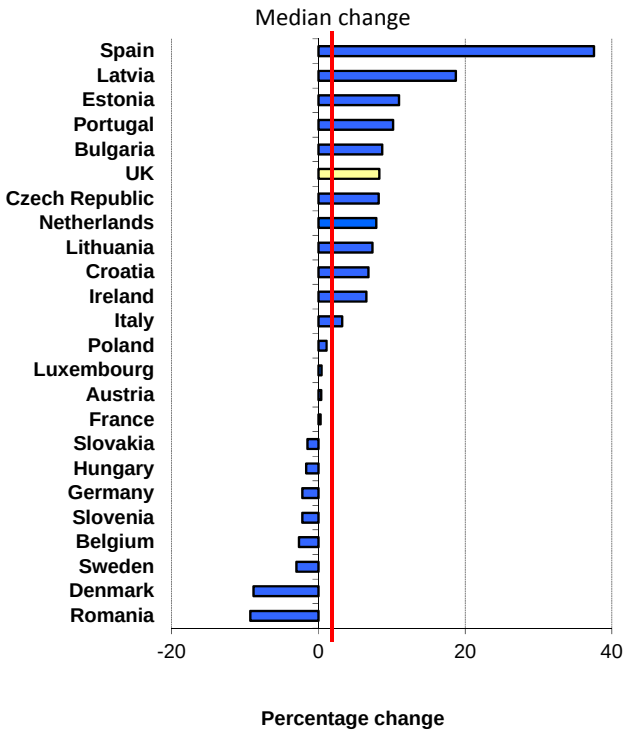



- In 2012, UK average domestic gas prices for medium consumers, including taxes, were the second lowest in the EU28 on a Purchasing Power Standards (PPS) basis.
- Data is shown using PPS exchange rates which takes account of the relative purchasing power of the currency and generally reduces the ranking 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 2012 are averages of prices for the periods January - June 2012 and July - December 2012.

*Source: Derived from Eurostat data.*

**Chart 8.2c:**
**Percentage change in domestic gas prices for medium consumers within the EU28, 2011 to 2012[(1)(2)(3)]**




- Between 2011 and 2012, UK average domestic gas prices for medium consumers, including taxes, rose by 8 per cent.

- Prices rose in 16 EU28 countries in 2012 in contrast to 2011 when prices rose in all EU28 countries.

- The largest increase was in Spain, with prices up by 38 per cent whilst the greatest decrease was in Romania where prices fell by 9 per cent.

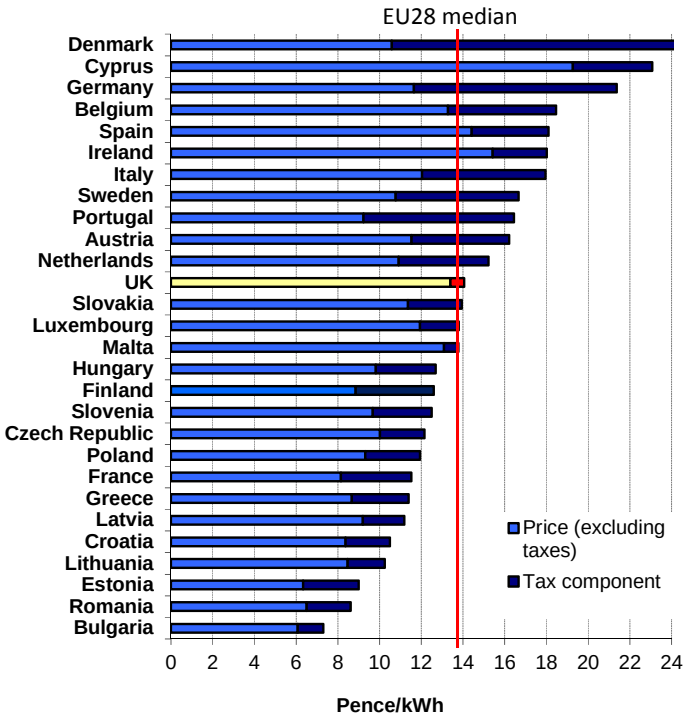
- UK domestic gas prices were generally steady between the start of 2009 and the middle of 2011, but rose sharply in the second half of 2011. Prices first decreased in 2012 before increasing again after June 2012. This pattern was broadly consistent across the EU28.

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 2011 and 2012 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 8.3a:**
**Domestic electricity prices for medium consumers within the EU28 in 2012: converted to UK pence per kWh[(1)(2)]**



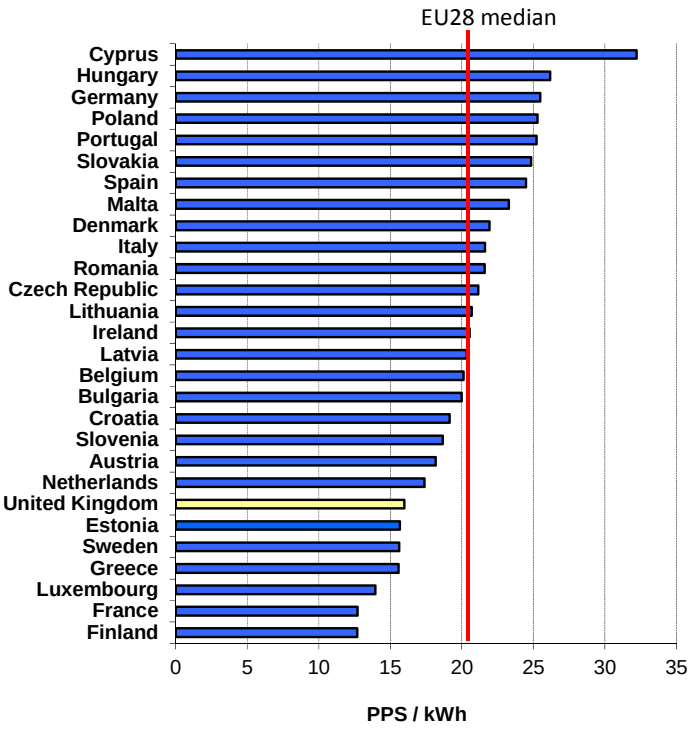

- In 2012, average UK domestic electricity prices for medium consumers, including taxes, were the twelfth highest within the EU28 on a common pounds sterling currency basis, and were 2 per cent above the EU28 median.
- UK domestic prices for medium consumers including tax were below the EU28 median from 2009 until 2012.
- In 2012, average UK domestic electricity prices, including taxes, were the fourth highest in the G7 above Canada, USA and France (from IEA data).

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

(1) Converted using average 2012 exchange rates.
(2) The prices for 2012 are averages of prices for the periods January - June 2012 and July - December 2012

*Source: Derived from Eurostat data.*

**Chart 8.3b:**
**Domestic electricity prices for medium consumers within the EU28 in 2012: PPS[(1)(2)]**




- In 2012, UK average domestic electricity prices for medium consumers, including taxes, were the seventh lowest in the EU28 on a Purchasing Power Standards (PPS) basis.

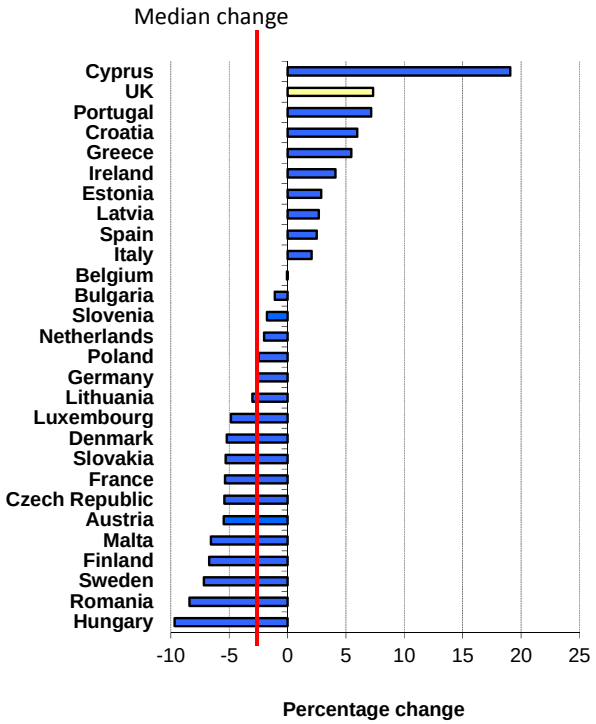
- Data is shown using PPS exchange rates which takes account of the relative purchasing power of the currency and generally reduces the ranking of Western European countries.

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

(2) The prices for 2012 are averages of prices for the periods January – June 2012 and July - December 2012

*Source: Derived from Eurostat data*.

**Chart 8.3c:**
**Percentage change in domestic electricity prices for medium consumers within the EU28, 2011 to 2012 (1)**



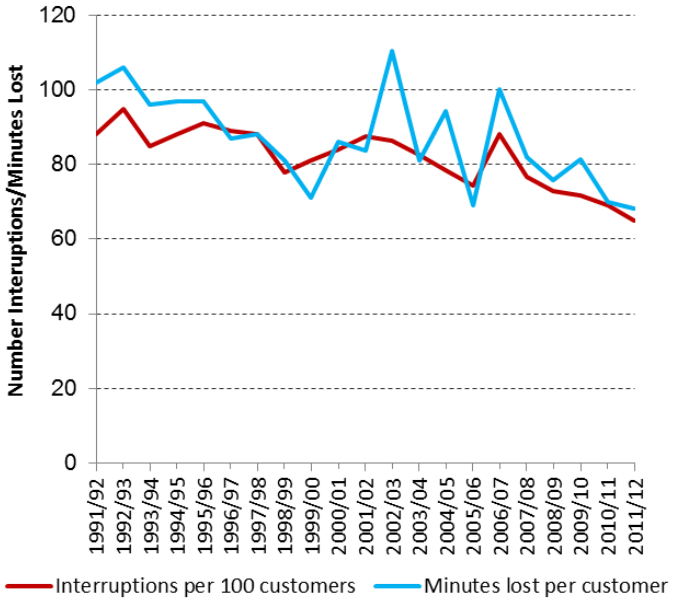

Notes:
Percentage changes in prices include all taxes where not refunded.

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

*Source: Derived from Eurostat data.*

- Between 2011 and 2012, average UK domestic electricity prices for medium consumers, including tax, rose by 7.3 per cent.
- The largest increase was in Cyprus, where prices rose by 19 per cent.
- Domestic electricity prices fell in eighteen EU28 countries over this period; the greatest in Hungary with prices decreasing by 9.7 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.

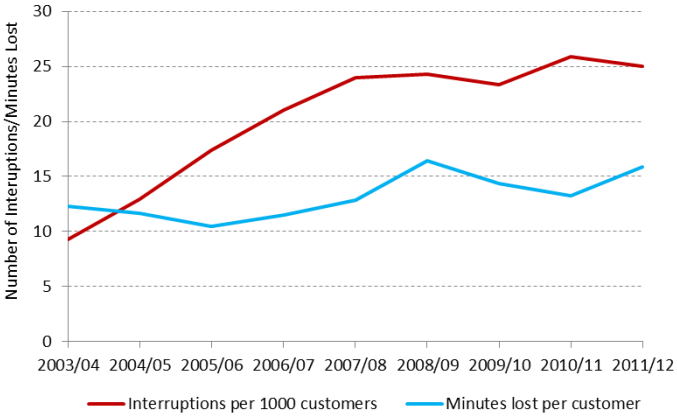
**Chart 8.4:**
**Security and availability of electricity supply for the average customer, 1991/92 to 2011/12**




- During 2011/12 there were 65 interruptions per 100 customers. This was 6 per cent lower than the 2010/11 figure of 72 interruptions per 100 customers.
- The average length of time without supply in 2011/12 was 68 minutes per customer. This was 3 per cent lower than the 2010/11 figure of 70 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.

*Source: Ofgem.*

**Chart 8.5:**
**Security and availability of gas supply for the average customer, 2003/04 to 2011/12**

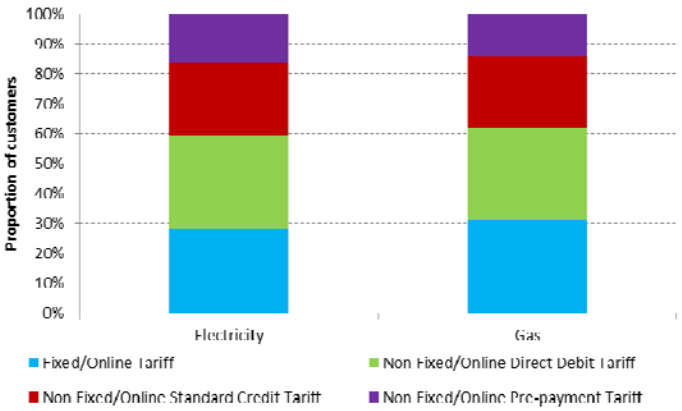



- During 2011/12 there were 25 interruptions per 1,000 customers, slightly lower than the 2010/11 figure of 26 interruptions per 1,000 customers.
- The average length of time without supply in 2011/12 was 16 minutes per customer. This was slightly higher than the 2010/11 figure of 13 minutes per customer.

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 8.6:**
**Proportion of customers on fixed[(1)] or online[(2)] tariffs in Q2 2013**

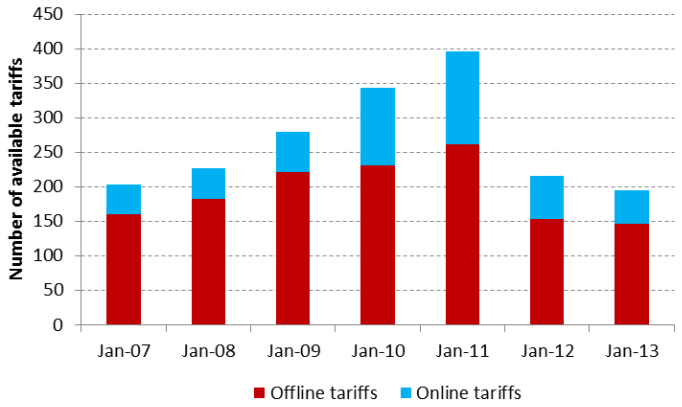



- In Q2 2013, around 28 per cent of electricity and 31 per cent of gas customers were on a fixed or online tariff (or both). This equates to approximately 7.5 million electricity and 6.6 million gas customers.
- In Q2 2007, around 5 per cent of electricity customers and 9 per cent of gas customers were 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 8.7:**
**Number of online and offline tariffs available to domestic consumers, January 2007 to January 2013**

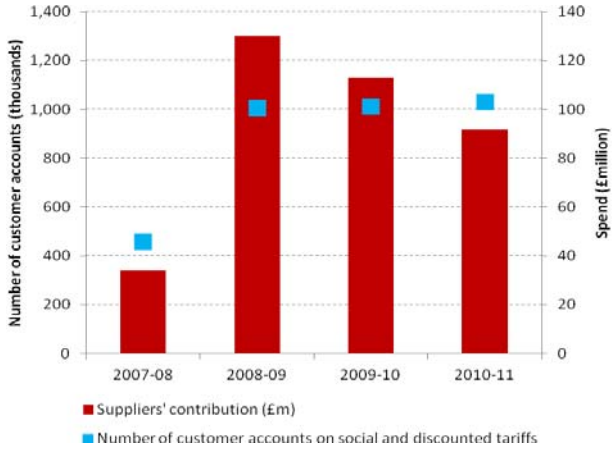



- Between January 2011 and January 2013, the number of different tariffs available to domestic customers almost halved.
- This is due to changes following OFGEM's Retail Market Review, aiming for a simpler, clearer and fairer domestic energy market and therefore reducing the number of tariffs available to customers.
- Over the same period, the number of online tariffs available decreased from 135 to 48.

Notes:
Duel 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 8.8:**
**Number of customer accounts on social and discounted tariffs[(1)] and suppliers' total annual spend on these tariffs, 2007/08 to 2010/11**

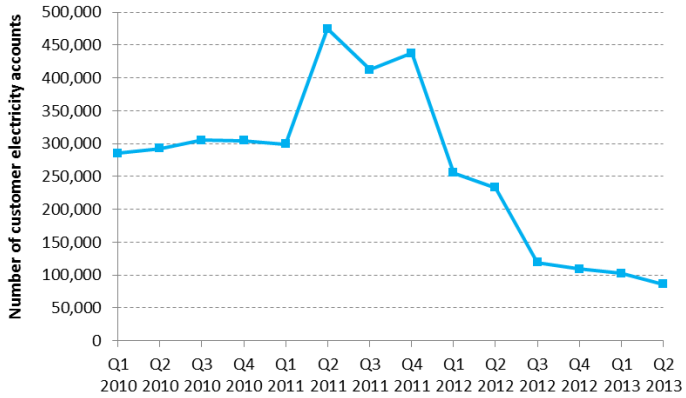



Notes:
(1) A social tariff must be equal to the supplier's cheapest deal. A discounted tariff is one which does not meet the stricter definition of a social tariff, but is at least as good as a supplier's cheapest standard direct debit rate.
(2) This data does not include the Warm Home Discount scheme, which began in April 2011, or the Energy Rebate Scheme, which spent approximately £8m to help 100,000 customers in 2010-11.

*Source: Monitoring Suppliers' Social Spend reports, Ofgem.*

- Ofgem collected data on social and discounted tariffs on a consistent basis for the years between 2007 to 2011, and this is shown in chart 8.8.
- In 2010/11 there were 1.0 million consumers on social and discounted tariffs and supplier total annual spend on these tariffs accumulated to £92 million.
- Since the introduction of the Warm Home Discount scheme, Ofgem has ceased to collate this data on social and discounted tariffs.
- Ofgem's annual reports on the Warm Home Discount scheme, which features a component that includes social tariffs, found that it had provided support valued at £238m to persons in or at risk of fuel poverty in 2011/12, and this level rose to £283m in 2012/13. Under the scheme social tariffs are being phased out by the end of 2013/14 scheme year and replaced by bill discounts.

**Chart 8.9:**
**Number of electricity customer accounts on accredited 'green'[(1)] tariffs, 2010 to Q2 2013**

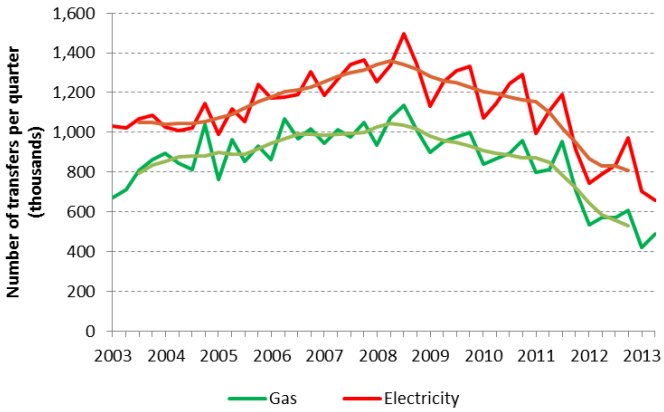



Notes:
(1) A 'green' tariff involves an energy provider adding extra units of electricity from renewable sources to the grid, or supporting a broad range of environmental projects that may or may not reduce carbon. A subset of these are accredited green tariffs, which have a 'Green label' (like a kite 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.*

- In Q2 2013, just over 85,000 electricity customers were on 'green' tariffs.
- The large fluctuations in the number of customers on these tariffs between Q1 2011 and Q3 2012 are due to the introduction and 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 8.10:**
**Total number of energy supplier transfers[(1)] per quarter, 2003 to Q2 2013**




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.

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

*Source: Ofgem.*

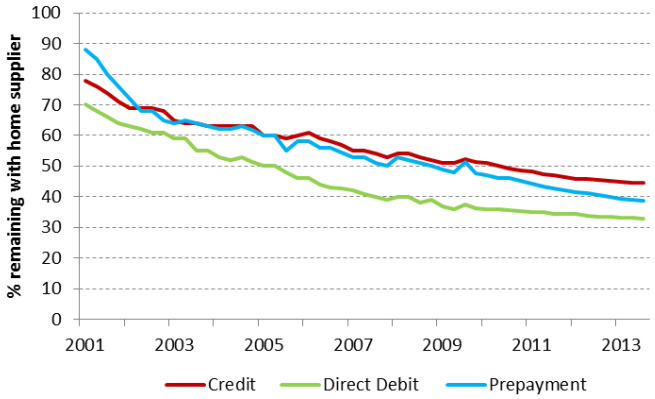
- Between Q1 2003 and Q3 2008, the number of gas and electricity transfers per quarter increased by 69 per cent and 45 per cent respectively.

- At its peak in Q3 2008, there were around 1.14 million gas transfers and 1.49 million electricity transfers during the quarter. Since this peak, the number of gas and electricity transfers has fallen by 57 per cent and 56 per cent respectively, with a particularly sharp drop since Q3 2011. In Q2 2013 there were 490,000 gas transfers and 658,000 electricity transfers.

- The chart also shows the five-point moving average for each fuel. Both trends show that the number of quarterly transfers were increasing until 2008, when they began to fall.

- 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.

**Chart 8.11a:**
**Percentage of electricity customers serviced by their home supplier[(1)], Great Britain, 2001 to Q2 2013**




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.

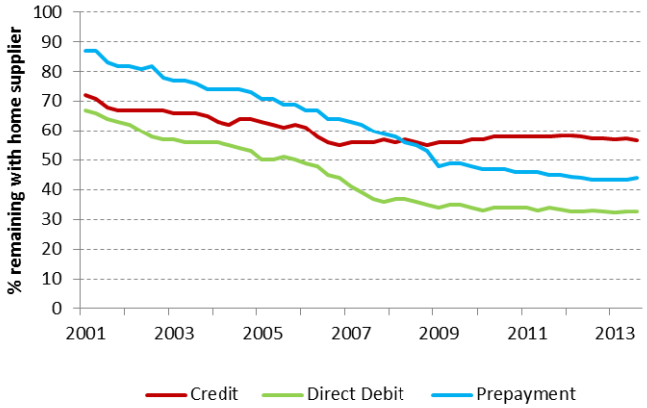
*Source: Table 2.4.1, Quarterly Energy Prices, DECC.*

- 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 2013, 33 per cent of direct debit customers, 39 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 8.11b:**
**Percentage of gas customers serviced by their home supplier(1), Great Britain, 2001 to Q2 2013**




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

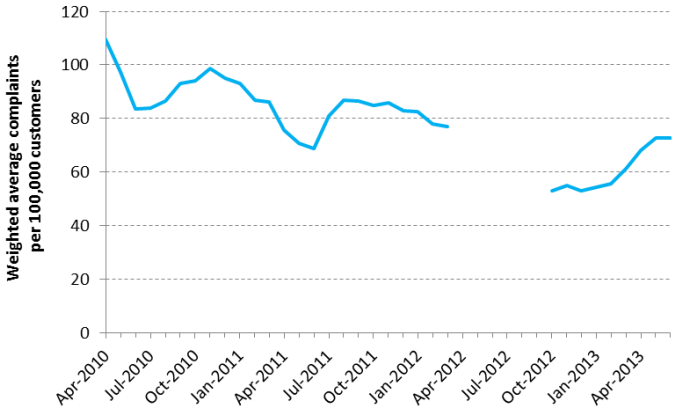
*Source: Table 2.5.1, Quarterly Energy Prices, DECC.*

- 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 2012, 33 per cent of direct debit customers, 44 per cent of pre-payment customers and 57 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 8.12:**
**Energy supplier performance regarding complaints handling, 3 month rolling average, April 2010 to June 2013**




Notes:
Consumer Futures 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.

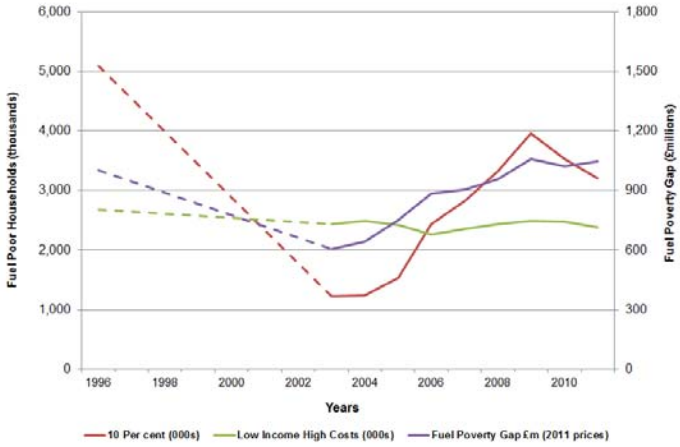
- In June 2013, the weighted average number of complaints was 73 per 100,000 customers. This was a 38% per cent increase from October 2012.

- The latest data suggests that since October 2012 the number of complaints has been trending slightly 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 now rebranded as Consumer Futures. This model was continued by Consumer Futures under new methodology from October 2012.

*Source: Consumer Focus until March 2012, Consumer Futures from October 2012*

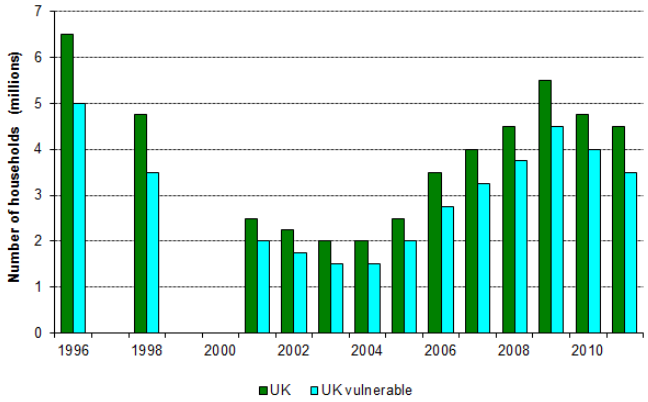
**Chart 8.13:**
**Fuel poverty trends in England: the 10 per cent, Low Income High Cost and Fuel Poverty Gap measures, 1996-2011**




Note:
Figures have not been calculated for the years 1997 to 2002. For further details on fuel poverty see: www.gov.uk/government/organisations/department-of-energy-climate-change/series/fuel-poverty-statistics

*Source: Fuel Poverty datasets, DECC*

**Chart 8.14:**
**Number of households and vulnerable (1) households in Fuel Poverty under the 10 per cent measure, UK, 1996 to 2011**




Note:
Figures have not been calculated for 1997, 1999 and 2000. For further details on fuel poverty see: www.gov.uk/government/organisations/department-of-energy-climate-change/series/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*

- In July the Government announced its intention to adopt a new indicator of fuel poverty. Under the new Low Income High Cost (LIHC) indicator a household is considered fuel poor if they have above average fuel costs and were they to spend that amount on fuel, 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 £14m up to 2011.

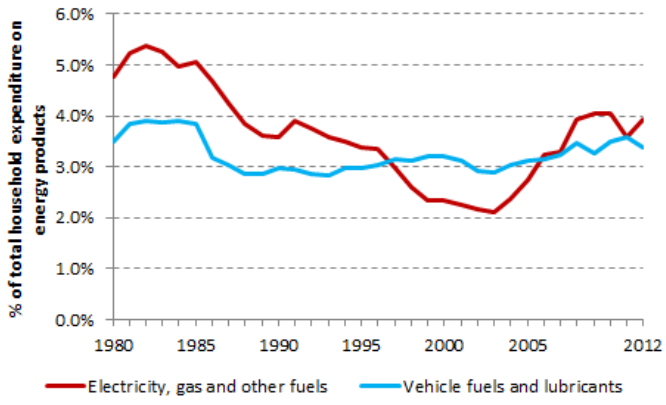
- Under the old 10 per cent definition, a household was said to be fuel poor if it needs to spend more than 10 per cent of its income on fuel to maintain an adequate level of warmth.

- 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 2011.

- 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 2011.

**Chart 8.15:**
**Proportion of total household expenditure on energy products, 1980 to 2012**




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*

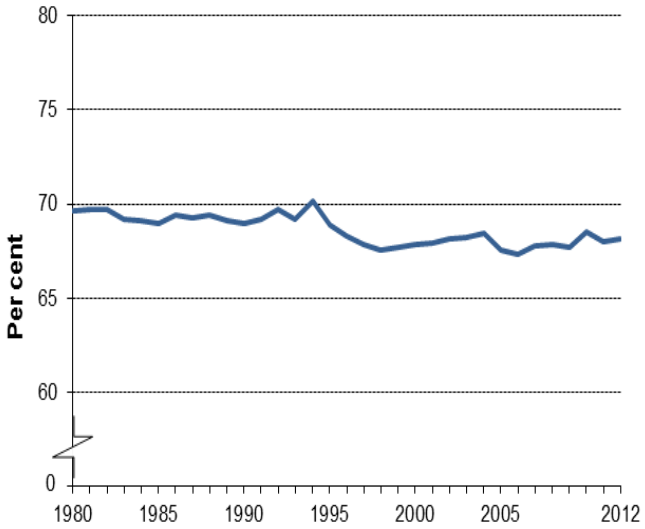
- In 2012, 3.9 per cent of household expenditure was spent on electricity, gas and other fuels, whilst a further 3.4 per cent was spent on vehicle fuels and lubricants.

- 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

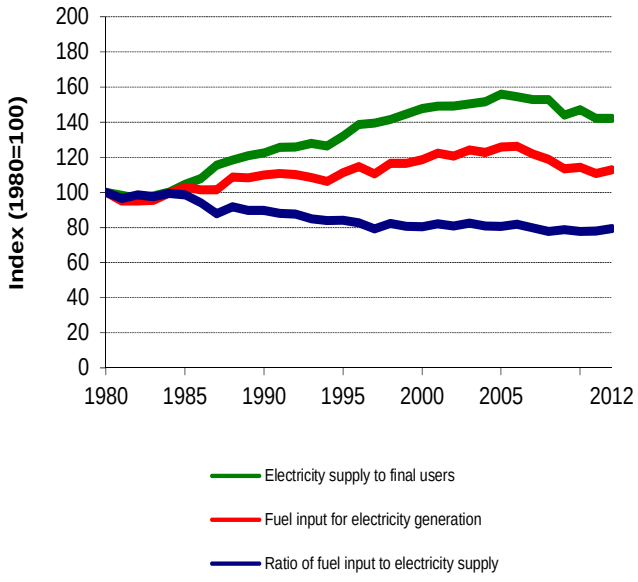
### Chart 9.1:
### Ratio of final to primary energy consumption, 1980 to 2012




*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, the difference has remained at around an average of 31% of primary consumption.

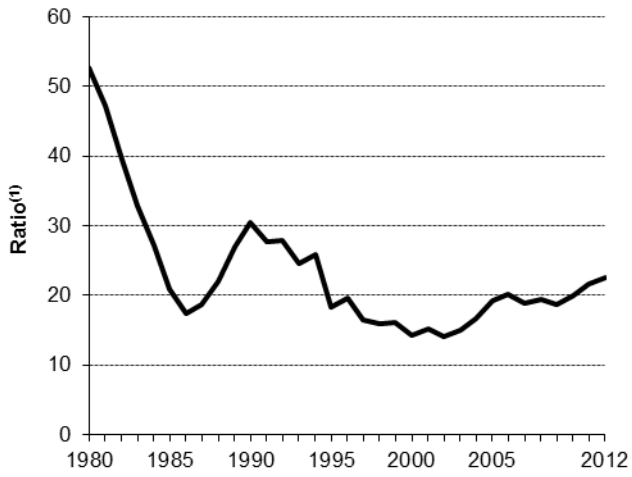
### Chart 9.2:
### Ratio of fuel use for electricity generation to electricity used by final users 1980 to 2012




*Source: DECC*

- Final users consumed 42% more electricity in 2012 than in 1980. Over the same period, total fuel use for electricity generation has risen by 13%. As a result the overall conversion ratio has fallen by 21% 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. In 2012 supply increased slightly after a fall in 2011. 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 2012**




- 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 risen slightly since the turn of the century.

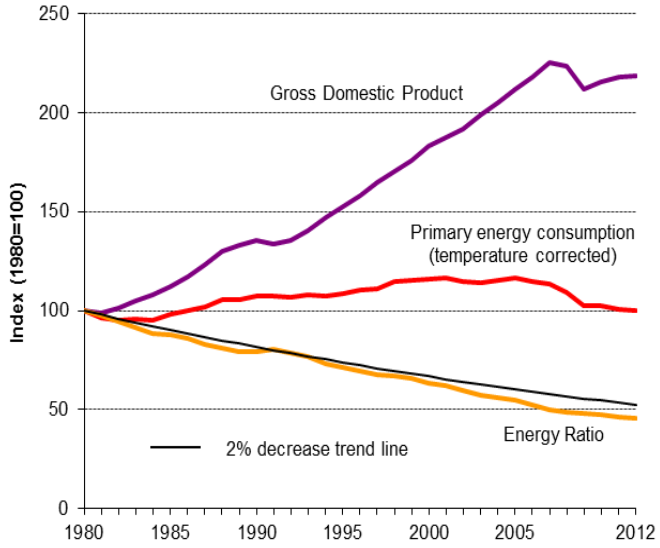
- Whilst the amount of gas flared in 2012 was lower than in 2011, the extensive oil production problems in 2012 (closure of Coryton refinery, unplanned maintenance etc.) resulted in the proportion of gas flared to oil production increasing.

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

*Source: DECC*

## Environmental Objectives
## 10 Energy Use Indicators

### Chart 10.1:
### The energy ratio since 1980




*Source: DECC; Office for National Statistics*

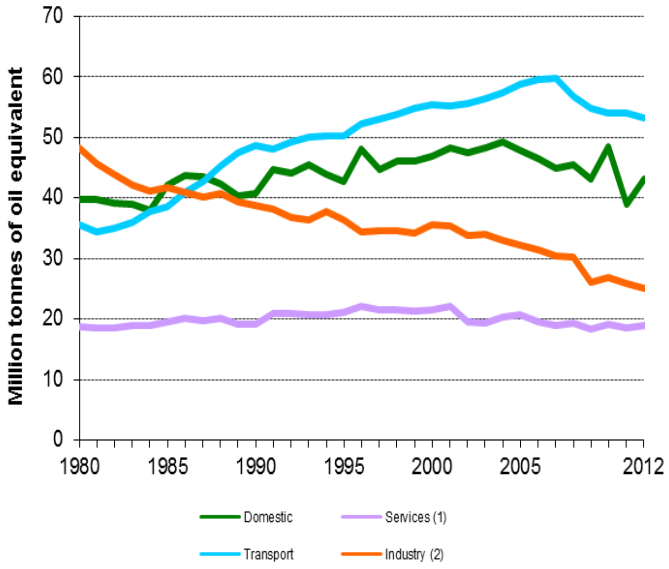
- The energy ratio is calculated by dividing temperature corrected primary energy consumption by GDP at constant (2010) prices.

- The energy ratio has fallen steadily, at around 2.4% per year since 1980, though since 2005 the rate has fallen at 2.6% 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 (from gas to coal);
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 2012




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

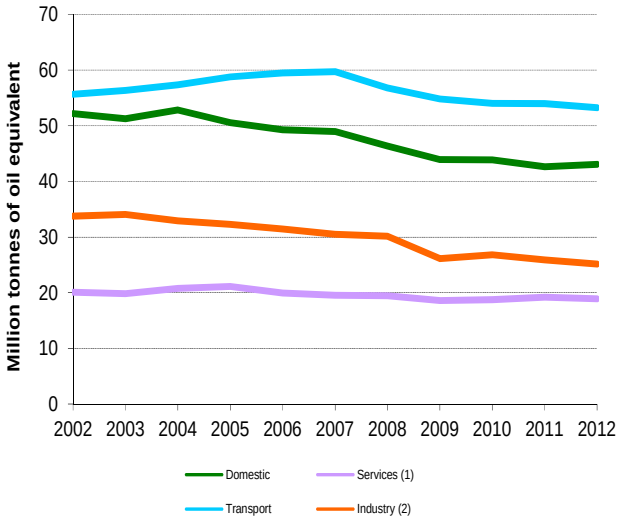
*Source: DECC*

- Transport has been the biggest single energy user in the UK for more than two decades accounting for 38% of final energy use in 2012. Generally transport consumption has been growing year-on-year, but in recent years it has declined due to the economic slowdown amongst other factors.

- Domestic consumption accounted for 31% of final energy use, whilst industrial consumption accounted for 18%. The remaining final energy was used by services including agriculture.

- Total final energy consumption was 2% higher in 2012 compared to 2011. In 2012, final energy consumption decreased by 1.4% in the transport sector and 2.9% in the industry sector. However in the service sector it increased by 2.7%, whilst domestic consumption increased by 11% as a result of the cold weather which was on average 1.0 degrees colder than in 2011.

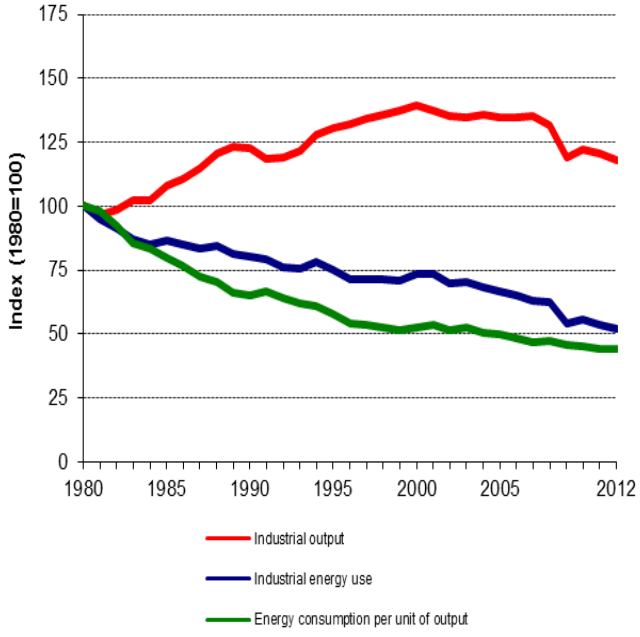
**Chart 10.2a:**
**Temperature corrected final energy consumption by sector, 2002 to 2012**




*Source: DECC*

- On a temperature corrected basis, total final energy consumption has been on a downward trend since 2004.
- In 2012 consumption was 0.9% lower than in 2011 at 140.4 mtoe.
- By sector in 2012 industrial consumption fell by 2.8%, service consumption fell by 1.5%, transport consumption fell by 1.4%, whilst domestic consumption rose by 1.1%.
- A new quarterly series on seasonally adjusted and temperature corrected final energy consumption is now published in Energy Trends, table 1.3c.

**Chart 10.3:**
**Industrial energy consumption and output, 1980 to 2012**




*Source: DECC; Office for National Statistics*

- Total industrial energy consumption has fallen by 48% 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 56% since 1980.
- There have been overall increases in energy efficiency over this period, but there has also been a decline in the importance 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, averaging 1.4% since 2000.

**Table 10.1:**
**Industrial energy use by sector in 2012**

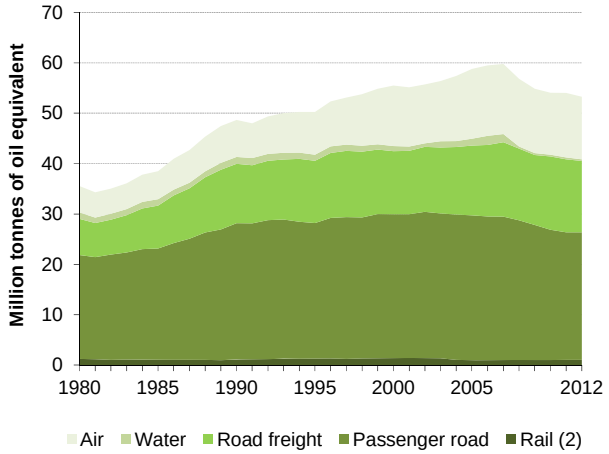
| | Energy use (thousand tonnes of oil equivalent) |
|---|---|
| Engineering and metals | 3,853 |
| of which | |
| Iron and Steel[1] | 1,196 |
| Chemicals | 4,102 |
| Food, beverages and tobacco | 3,292 |
| Mineral products | 2,612 |
| Paper, printing and publishing | 2,126 |
| Textiles | 821 |
| Other industry[2] | 8,356 |
| All industrial energy use | 25,164 |

(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 decreased by 3% in 2012, compared to 2011.
- In 2012, the chemicals industry was the single biggest industrial consumer of energy, accounting for 16% of industrial consumption, similar to the previous year.
- Other major sectors include food, beverages and tobacco combined (13%), minerals (10%), paper, printing and publishing (8%) and the iron and steel industry (5%) of industrial consumption.

**Chart 10.4:**
**Transport energy consumption[1] by type of transport, 1980 to 2012**

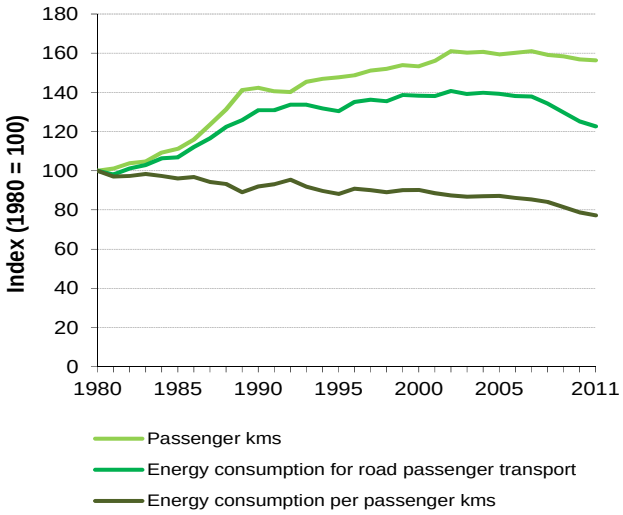



(1) Includes liquid biofuels.
(2) For rail transport, electricity consumed at transport premises is included from 1990 onwards.

*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 2013 Table 2.01.*

- Overall energy consumption in the transport sector has increased by 50% from 1980 to 2012. Sustained growth in consumption occurred up until 2007 after which there has been a decrease by 11% due to the impact of the economic slowdown.
- Fuel consumption by road transport, the largest energy use within the transport sector, increased by 84% between 1980 and 2012.
- In 2012, fuel consumption in the air transport sector was more than double the 1980 level, but has fallen by 11% since its high in 2006, reflecting improved efficiency in the airline sector.

**Chart 10.5:**
**Energy consumption[(1)] and distance travelled by road passengers, 1980 to 2011**

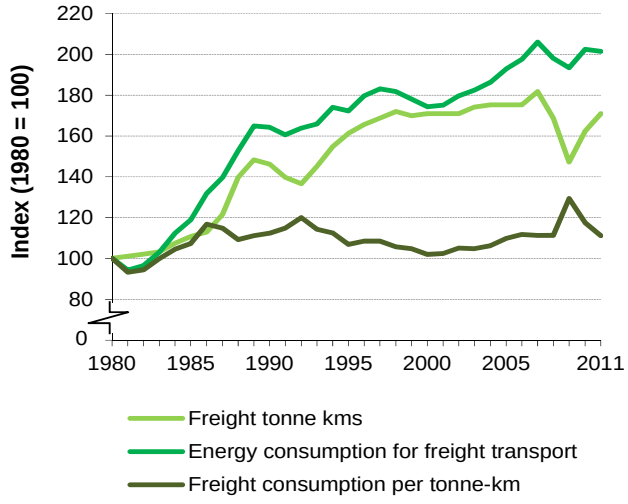



(1) Includes liquid biofuels.

*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 Department for Transport - Transport Statistics GB.*
*ECUK 2013 Tables 2.01, 2.04 and 2.11*

- Fuel use by road passenger vehicles has increased by 23% between 1980 and 2011.
- Road use and consumption grew together to 1990 then consumption flattened while distance travelled continued to increase, hence leading to a reduction in consumption per passenger km, which was 23% lower in 2011 compared with 1980.

**Chart 10.6:**
**Energy consumption[(1)] and distance travelled by road freight, 1980 to 2011**

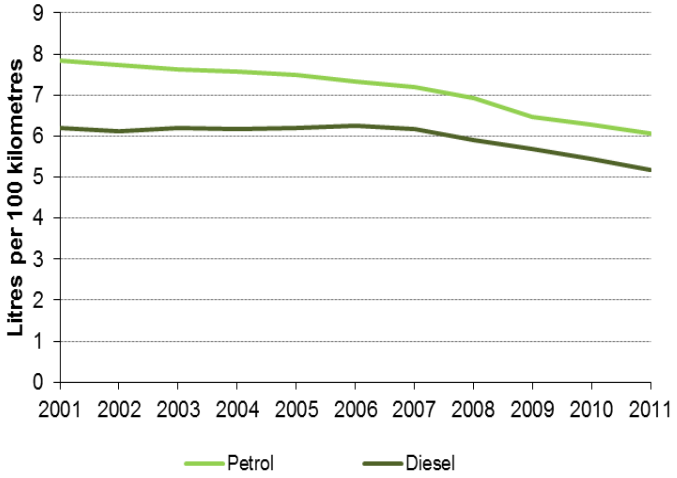



(1) Includes liquid biofuels.

*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 2013 Tables 2.01, 2.06 & 2.11*

- Fuel use for road freight transport has doubled since 1980, reflecting the number of freight tonne kilometres, which increased by 71% over the same period.
- Energy consumption per tonne-km of goods transported increased relatively uniformly after a slight decrease in 1981 to 1982, until its peak in 1992, when it was 20% higher than in 1980. Having fallen slightly until 2000 where the figure was just 2% higher than in 1980, it then rose again to 2009, before falling back to a figure of 11% higher than in 1980 in 2011. The fall in freight consumption per tonne km is due to the larger increase in distance travelled than energy consumption for freight transport.
- 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.

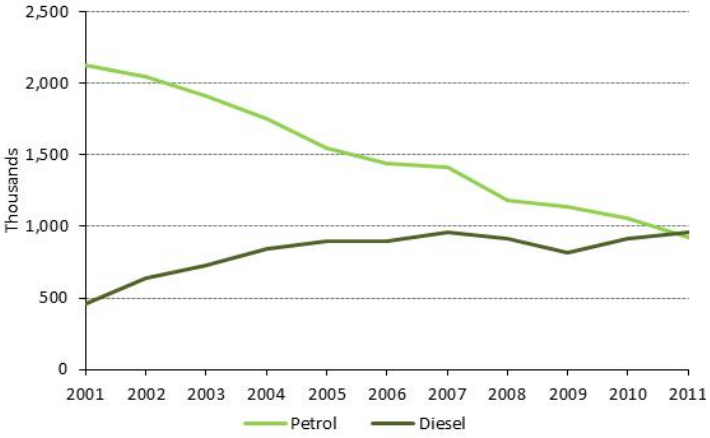
**Chart 10.7:**
**Average fuel consumption per new car, 2001 to 2011**




*Source: DVLA / Department for Transport. Consumption data are not designated National Statistics.*

- Average fuel consumption for new cars has fallen between 2001 and 2011. Consumption for new petrol cars has fallen by more than new diesel cars, with petrol consumption reducing by 23% compared with a 16% reduction for diesel.
- This has narrowed the gap between the two engine types from 1.6 litres per 100 kilometres in 2001 to 0.9 litre per 100 kilometres in 2011.

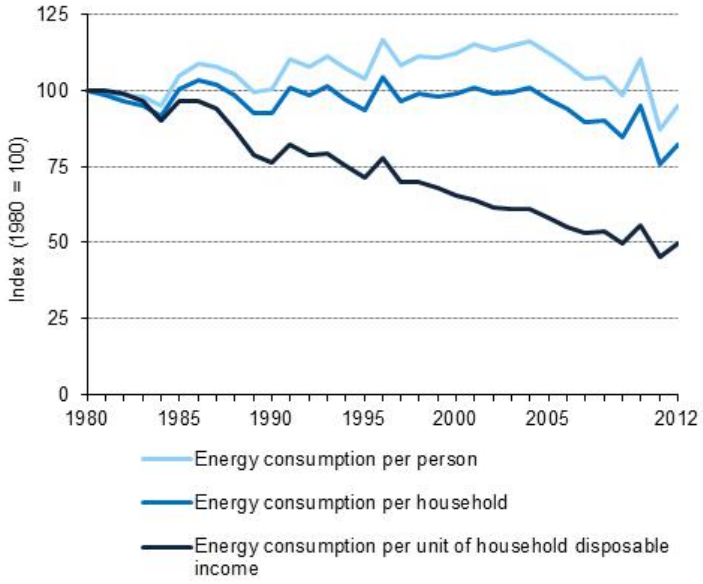
**Chart 10.8:**
**Cars registered for the first time, 2001 to 2011**




*Source: DVLA / Department for Transport. Consumption data are not designated National Statistics.*

- The number of new diesel cars registered annually has more than doubled since 2001 whilst the number of new petrol cars has decreased by 56%.
- In 2011 more new diesel cars were registered than petrol for the first time.

**Chart 10.9:**
**Domestic energy consumption, 1980 to 2012**




*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 2013, Table 3.35.*

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

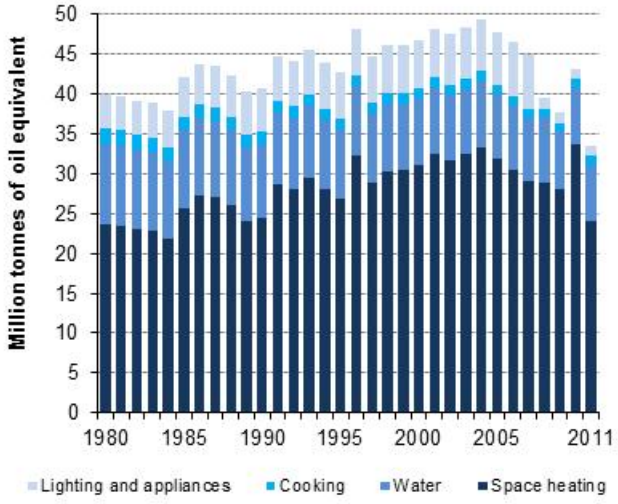
- Between 2005 and 2011, there has been a fall in household and personal energy consumption due to a combination of prices, weather and energy efficiency.

- Colder temperatures largely explain the sharp upturn in 2010.

- Domestic energy consumption per unit of disposable income has fallen and in 2012 reached 50% below its 1980 level. This was lower than 2011, which reached 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. On a temperature corrected basis domestic consumption has fallen by an average of 2% per annum since 2005.

**Chart 10.10:**
**Domestic energy consumption by end use, 1980 to 2011**

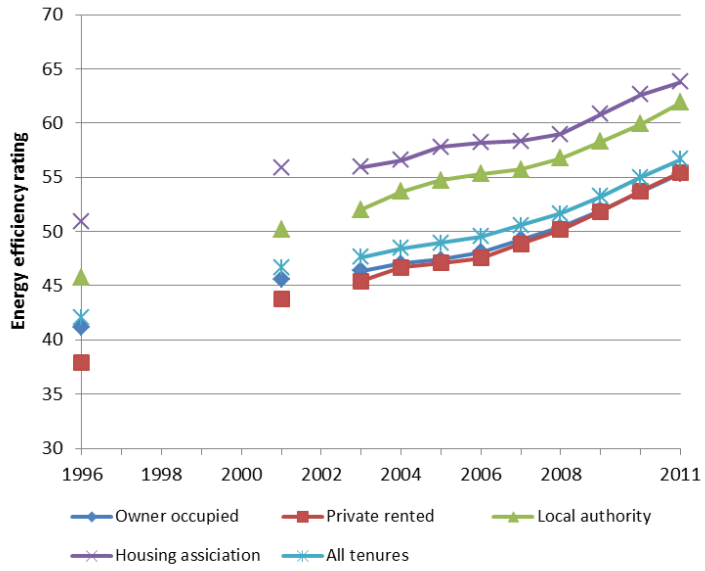



*Source: Department of Energy and Climate Change - secondary analysis of data from the Building Research Establishment and Cambridge Architectural Research*
*ECUK 2013, Table 3.04*

- In 2011, space and water heating accounted for 80% 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 2%, but fell by 29% between 2010 and 2011 due to the milder weather conditions. Energy use for lighting and appliances fell by 71%, for water heating reduced by 29% and cooking by 44%.

**Chart 10.11:**
**SAP rating of housing stock, 1996 to 2011**

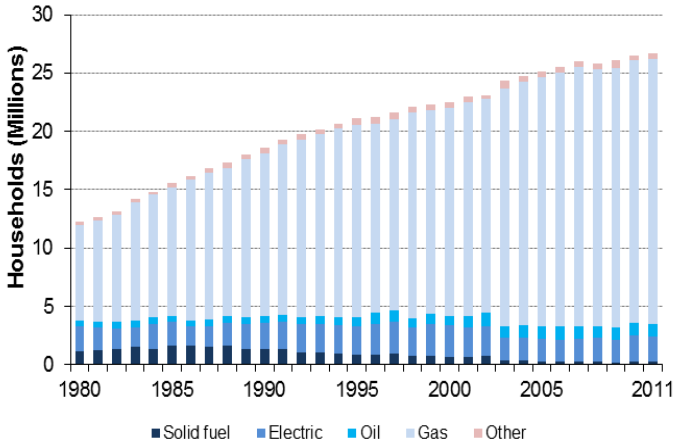



*SAP ratings were calculated using SAP 2005*

*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 57 in 2011. Improvement has been made in all tenures. Housing association stock continues to be the most energy efficient with a SAP rating of 64 but privately rented homes have made the greatest improvement, from a rating of 38 in 1996 to 55 in 2011.
- The increases 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.

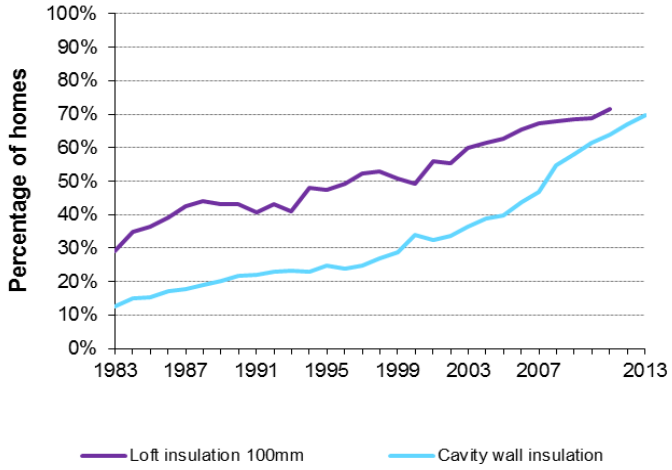
**Chart 10.12:**
**Ownership of central heating in Great Britain by type, 1980 to 2011**




*Source: Domestic Energy Fact File and bespoke analysis of data supplied by the Building Research Establishment*
*ECUK 2013 Table 3.16.*

- In 1980, 12.2 million homes in Great Britain were centrally heated. This had risen to 26.7 million homes in 2011. This represents an increase from 58% of the housing stock in 1980 to 97% in 2011.
- Of all the houses that owned central heating in 2011, 83% had gas-fired systems.

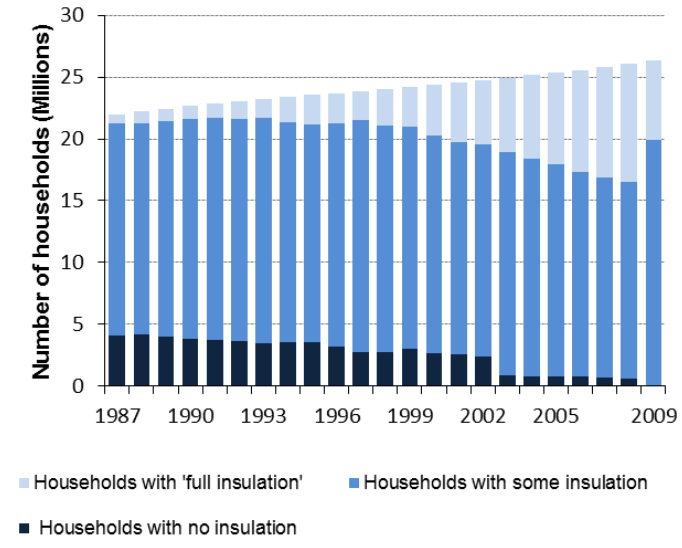
**Chart 10.13:**
**Insulation levels in Great Britain homes, 1983[1] to 2013**




*Source: DECC - ECUK 2013 Table 3.19, 3.20.*

- At the start of July 2013, 68% of homes with lofts had insulation of at least 125mm and cavity wall insulation was installed in 70% of homes with cavities, compared to 13% in 1983.
- In July 2013, 3% of homes with solid walls had solid wall insulation.
- In 2011, 92% of houses had some double glazing, compared with 28% in 1983.
- The number of households with loft insulation of any depth has increased by 8% between 2003 and 2011.
- Analysis shows that for most households with less than 125mm of insulation it is cost effective to top up. In 2011, 17 million homes had 100mm or more of loft insulation but only 12 million had 125mm or more. By 2013 14 million homes had 125mm or more of loft insulation.

**Chart 10.14:**
**Thermal efficiency of housing stock in Great Britain, 1987 to 2009**

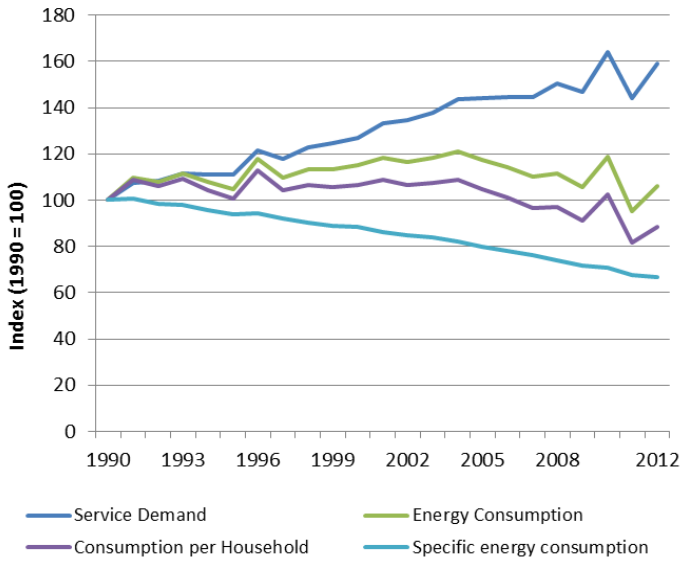



*Source: DCLG: English Housing Condition Survey, English Housing Survey*

- Levels of home insulation in Great Britain have improved over the last twenty years. Approximately 750,000 homes (3%) had full insulation in 1987, compared with 6.4 million (24%) by 2009.
  *(Please note that there is a discontinuity in the data between 2008 and 2009, due to a change in methodology.)*
- 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.
- 2010 data was not available at the time of publication.

[1] Data pre-2003 are based on a different data source and this has led to a discontinuity in the series for loft insulation and glazing

**Chart 10.15:**
**Specific energy consumption for households, 1990 to 2012**



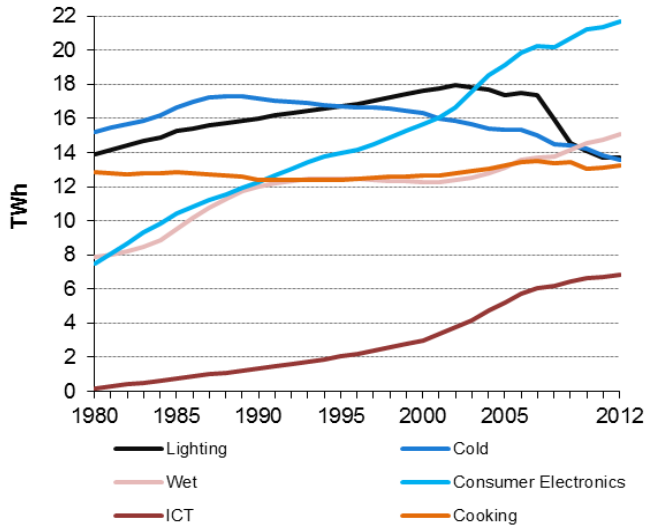

*Source: Department of Energy and Climate Change - secondary analysis of data from the Digest of UK Energy Statistics*
*ECUK 2013, Table 3.36.*

- 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 59% higher in 2012 than the 1990 level after falling from the 2010 figure (which was 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 2012 figure 33% below the 1990 level.

**Chart 10.16:**
**Electricity consumption by household domestic appliance by broad type, 1980 to 2012**




*Source: Market Transformation Programme, DEFRA. Department of Energy and Climate Change ECUK 2013, Table 3.10.*

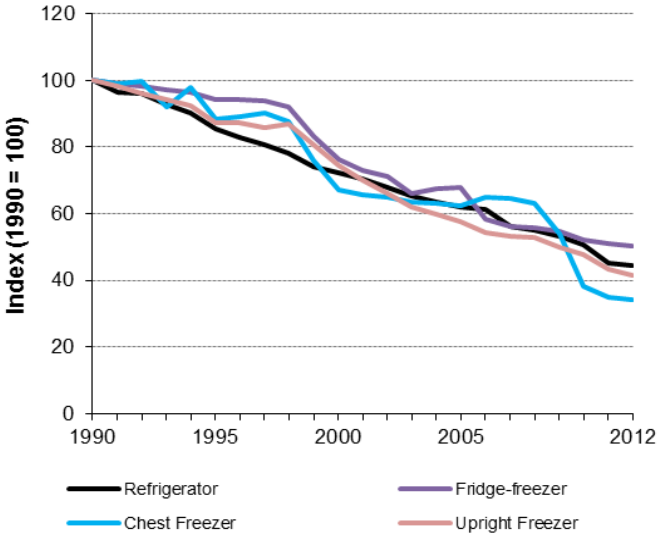
- The total amount of electricity consumed by domestic household appliances increased by 46% between 1980 and 2012. Since 1980, electricity consumption by ICT appliances has risen considerably from 0.18 TWh to 6.8 TWh, with an annualised increase of 13%, the largest of all domestic appliances.

- Although the consumption by lighting and cold appliances remain high, their consumption 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.

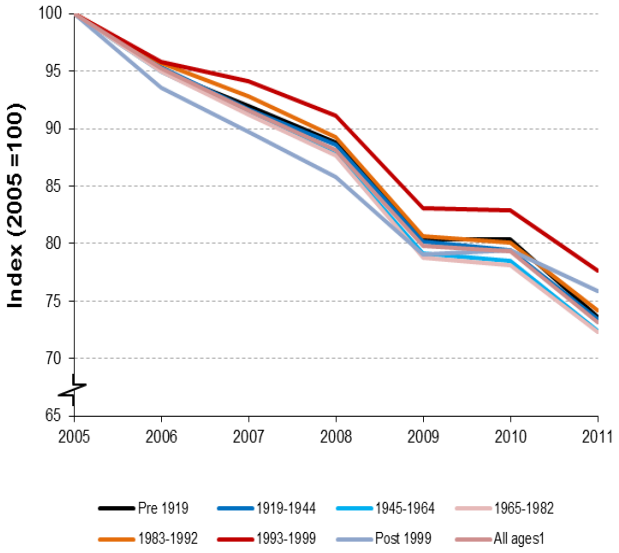
**Chart 10.17:**
**Energy consumption of new cold appliances in the United Kingdom, 1990 to 2012**




*Source: Market Transformation Programme, DEFRA. Department of Energy and Climate Change ECUK 2013 Table 3.15*

- Cold appliances accounted for over one fifth of all domestic lights and appliance electricity consumption in 2012.
- 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 66% and 59% less electricity respectively in 2012 than they did in 1990.

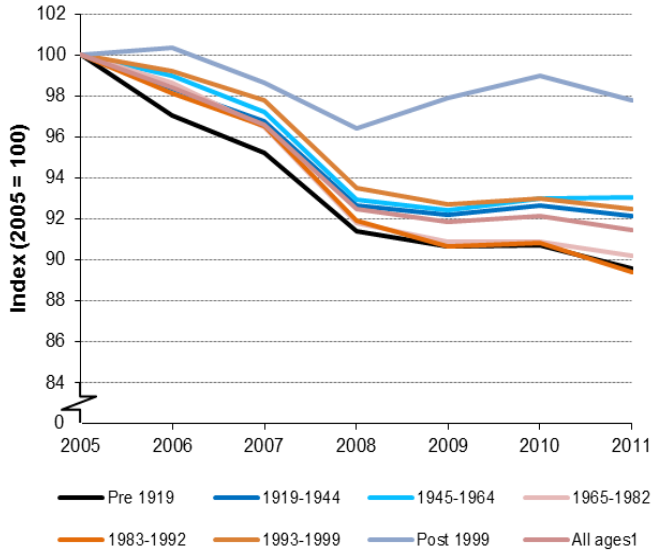
**Chart 10.18:**
**Median domestic gas consumption (temperature corrected) in England, 2005 to 2011, by age of property**




*Source: DECC - National Energy Efficiency Data-framework (NEED) 2013, Table 7.*

- Temperature corrected median domestic gas consumption has reduced between 2005 and 2011 in homes of all ages.
- The change in median annual gas consumption between 2005 and 2011 for each group was between 22 and 28 per cent. Homes built between 1945-1964 and 1965-1982 had the greatest percentage decrease over the period.
- Homes built after 1999, had the lowest median gas consumption in 2011 of 11,500 kWh.

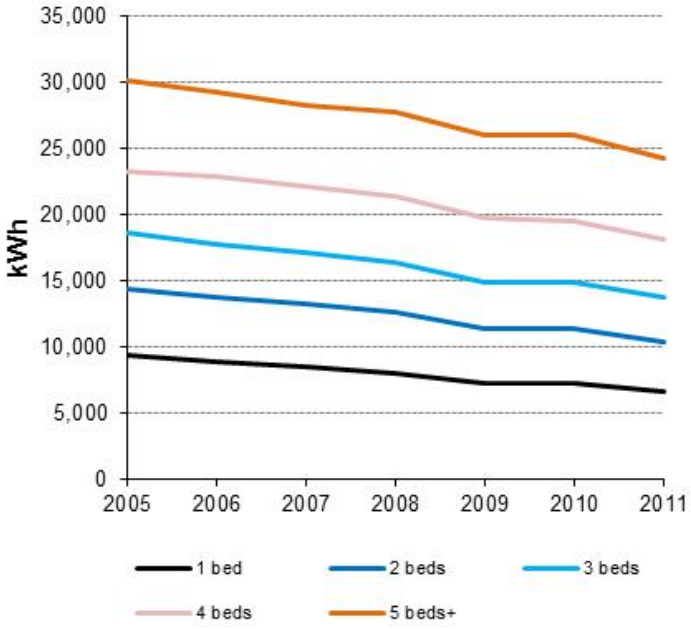
**Chart 10.19:**
**Median domestic electricty consumption in England, 2005 to 2011, by age of property**




*Source: DECC - National Energy Efficiency Data-framework (NEED) 2013, Table 8.*

- Median domestic electricity consumption has reduced between 2005 and 2011 in homes of all ages.
- Electricity use is driven more by activities of households than the design of the building.
- Homes built before 1919 have the highest electricity consumption in all years. These are least likely to have gas central heating.
- Overall median electricity consumption reduced by 9% between 2005 and 2011. Most age groups have followed this trend except the post 1999 group where median consumption reduced by 4%.

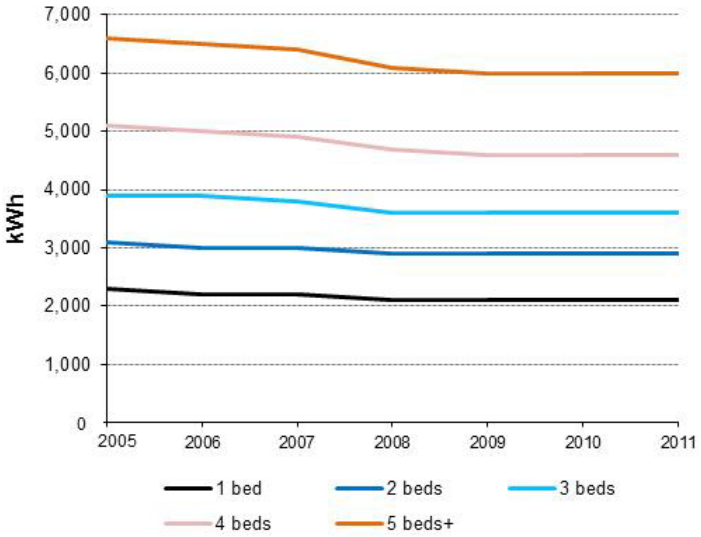
**Chart 10.20:**
**Median domestic gas consumption (temperature corrected) in England, 2005 to 2011, by number of bedrooms**




*Source: DECC - National Energy Efficiency Data-framework (NEED) 2013, Table 3.*

- Temperature corrected median domestic gas consumption has reduced between 2005 and 2011 in homes of all sizes.
- Gas consumption has reduced at a faster rate in smaller homes with a 30% reduction in one bedroom homes compared to a 20% reduction in five or more bedroom homes between 2005 and 2011.
- Beyond three bedrooms, median consumption per additional bedroom is approximately linear with each additional bedroom adding about 6,000 kWh.

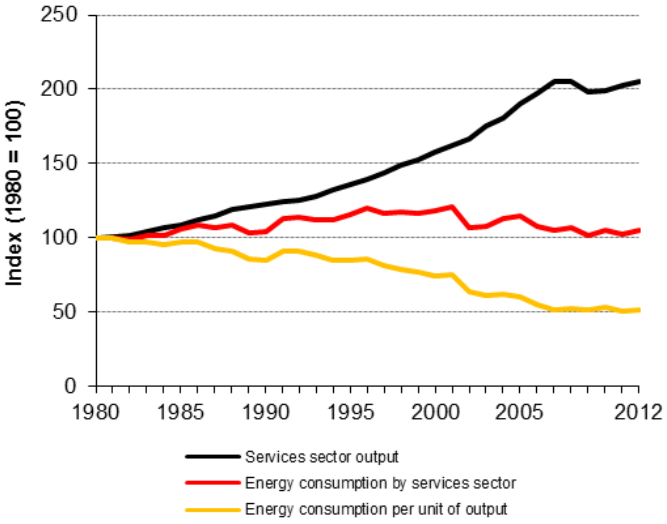
**Chart 10.21:**
**Median domestic electricity consumption in England, 2005 to 2011, by number of bedrooms**




*Source: DECC - National Energy Efficiency Data-framework (NEED) 2013, Table 4.*

- Median domestic electricity consumption has reduced between 2005 and 2011 in homes of all sizes.
- Overall median electricity consumption reduced by 11% between 2005 and 2011. There is little variation in this rate between different property sizes.
- Beyond three bedrooms, average consumption per additional bedroom is approximately linear with each additional bedroom adding about 1,500 kWh.

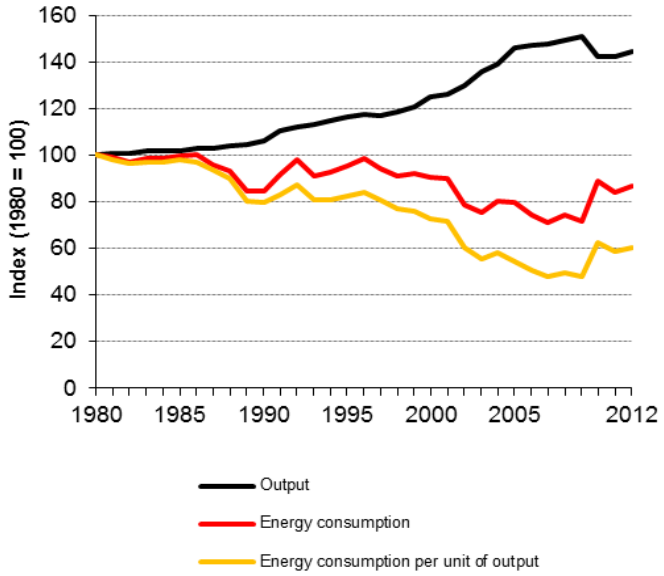
**Chart 10.22:**
**Service sector energy consumption and output, 1980 to 2012**




*Source: DECC - secondary analysis. Office for National Statistics - United Kingdom Economic Accounts. ECUK table 5.19.*

- Overall energy consumption per unit of output in the service sector has fallen by 49% 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 and private.

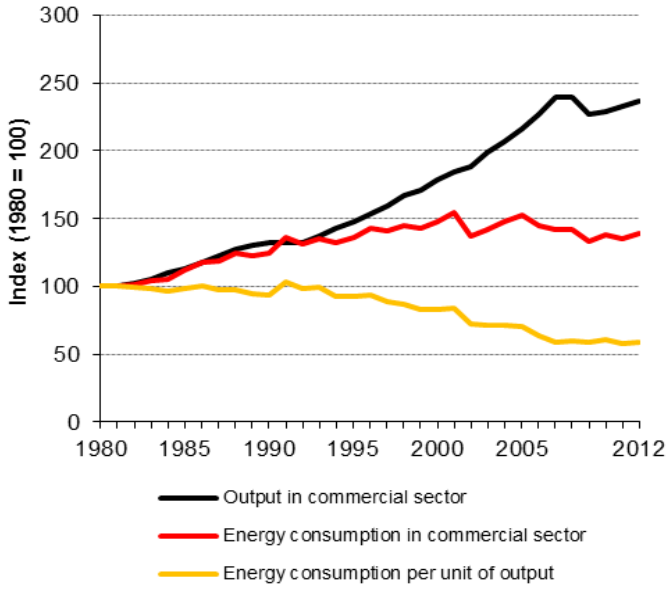
**Chart 10.23:**
**Final energy use and value added by public administration, 1980 to 2012**




- Since 1980 energy use by the public administration sector has fallen by 13%.
- Over the same period, output, has grown by 45% from its 1980 level.
- As a result, the amount of energy used per unit of output was 40% lower in 2012 than in 1980.

*Source: DECC - secondary analysis. Office for National Statistics - United Kingdom Economic Accounts. ECUK table 5.21*

**Chart 10.24:**
**Final energy use by commercial and other services, 1980 to 2012**

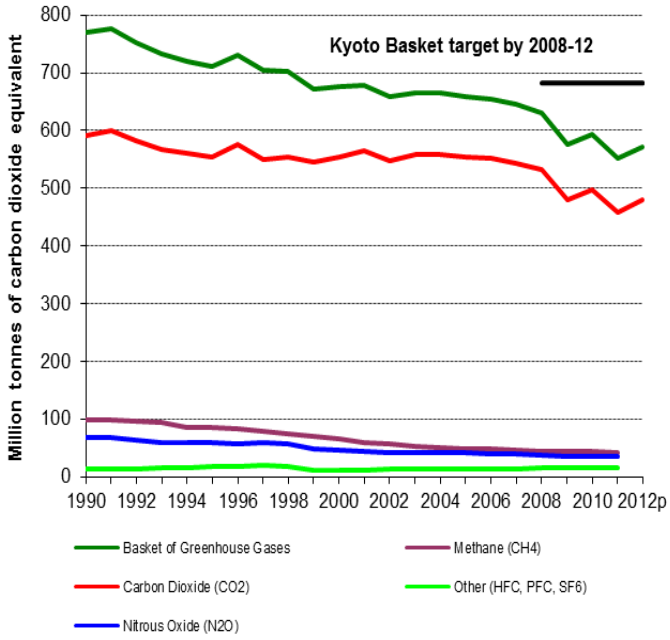



- Energy use by commercial and other services has increased by 39% since 1980.
- However over the same period, the output, by this sector has more than doubled.
- As a result, energy use per unit of output in 2011 was 41% lower than in 1980.

*Source: Office for National Statistics; Department of Energy and Climate Change*
*ECUK Table 5.20*

## Environmental Objectives
## 11 Energy and the Environment

### Chart 11.1:
### Emissions of greenhouse gases, 1990 to 2012p



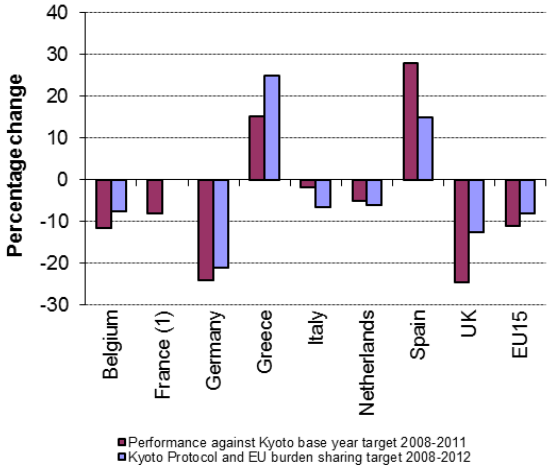

*Source: DECC*

- To meet its commitment to the Kyoto Protocol, the UK has agreed to reduce emissions by 12.5% relative to the 1990 level over the period 2008-2012.

- In 2012, 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 571.6 $MtCO_2$ equivalent, which is 26.7% below the baseline. Between 2011 and 2012 emissions increased by 3.5%, largely due to more coal being used in electricity generation and an increase in residential gas use as a result of the cold weather when the temperature was 1.0 degree Celsius lower compared to 2011.

- In 2011, the latest year for which final results are available, carbon dioxide accounted for about 83% of the total UK greenhouse emissions. Methane and nitrous oxide contributed about 8% and 6% respectively, with the remaining, around 3%, consisting of hydro-fluorocarbon (HFC), per-fluorocarbon (PFC) and sulphur hexafluoride (SF6).

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



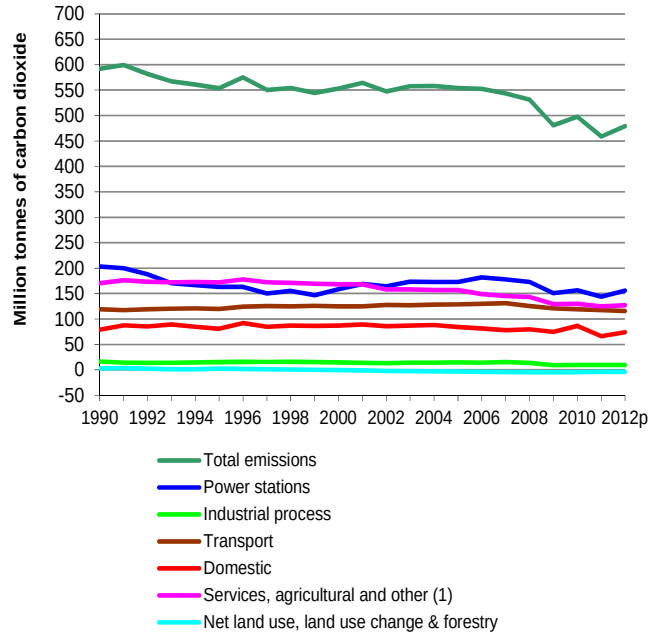

(1) Kyoto Protocol and EU burden sharing target for France is 0%.

*Source: European Environment Agency*

- 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 2011, emissions among the EU15 had fallen by 11.0%. The largest reduction in emissions among the eight largest emitters of greenhouse gases in the EU15 was from the UK where emissions fell by 24.7% from the base year level of 1990. Spain however had the largest increase, up 27.9%.

**Chart 11.3:**
**Carbon dioxide emissions on a National Communication basis, 1990 to 2012p**




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

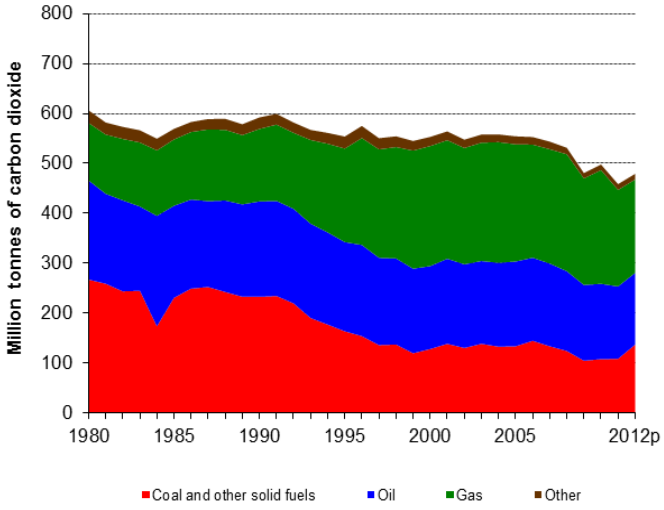
*Source: DECC*

- Carbon dioxide is the main greenhouse gas, accounting for about 83% of the total UK greenhouse gas emissions in 2011.

- It was provisionally estimated that 479.1 million tonnes of carbon dioxide were emitted in the UK in 2012, a rise of 3.5% from the previous year primarily due to an increase in residential gas use, combined with fuel switching as more coal and less gas were used for electricity generation. However since 1990, net carbon dioxide emissions have fallen by around 19%.

- 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 industry use of fossil fuel also fell.

**Chart 11.4:**
**Carbon dioxide emissions by fuel type, 1980 to 2012p**

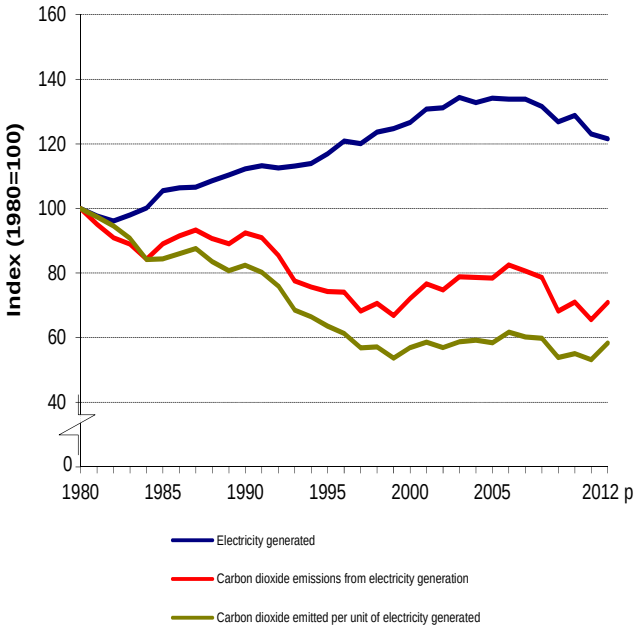



*Source: DECC*

- It is estimated that $CO_2$ emissions from fossil fuels, including fuel used for generating electricity, decreased by 19% to 468 $MtCO_2$ over the period 1980 to 2012.

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

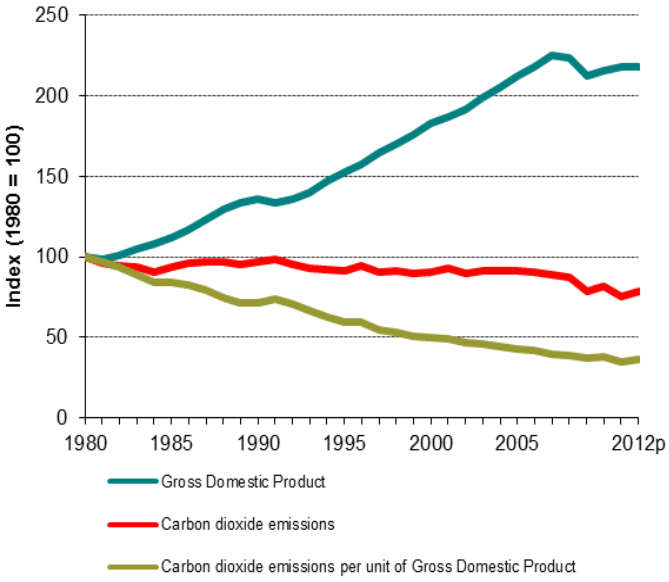
**Chart 11.5:**
**Power station emissions of carbon dioxide, 1980 to 2012p**




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

- Provisional data for 2012 indicates that emissions of carbon dioxide from power stations have fallen by 29% since 1980, whilst electricity generation has risen 22%.
- Carbon dioxide emissions per unit of electricity generated have fallen 42% since 1980. The increase in 2012 was largely due to the switch from gas to coal 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 use. However since 2007, demand for electricity has declined and also 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.

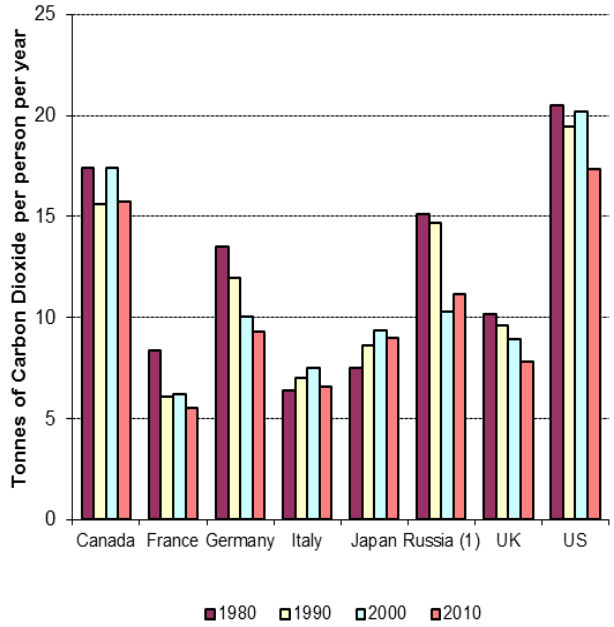
**Chart 11.6:**
**Carbon intensity, Carbon dioxide emissions per unit of GDP 1980 to 2012p**




*Source: DECC; Office for National Statistics*

- Carbon dioxide emissions per unit of GDP decreased by 63% between 1980 and 2012 while GDP (at constant 2010 prices) increased.
- 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 2010**

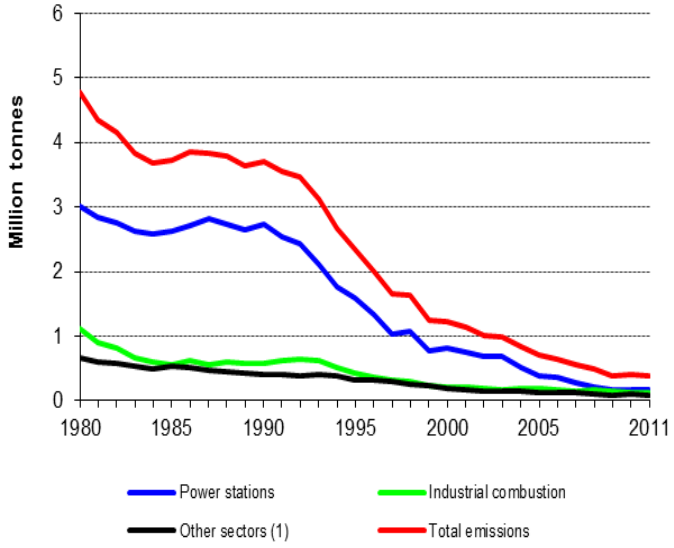



(1) 1980 data for Russia has been estimated using Former USSR data

*Source: International Energy Agency*

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

**Chart 11.8:**
**Sulphur dioxide emissions by sector, 1980 to 2011**

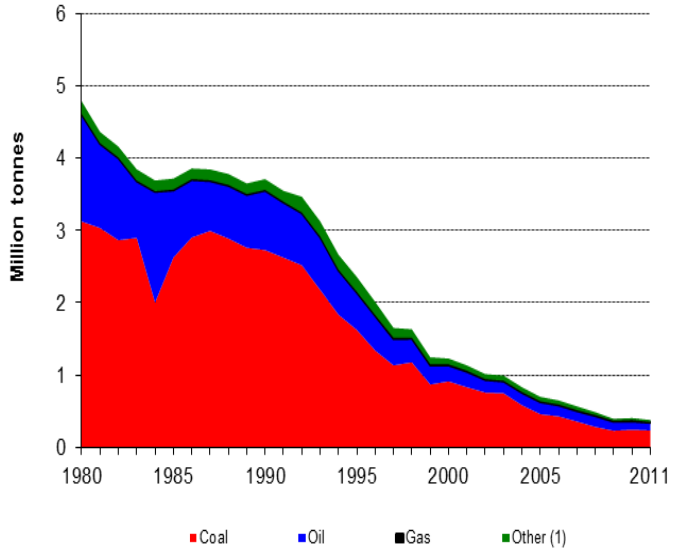



(1) Includes domestic, commercial, public services, transport and agriculture.

*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 44% in 2011.
- Emissions from power stations have fallen by 94% 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 2011**

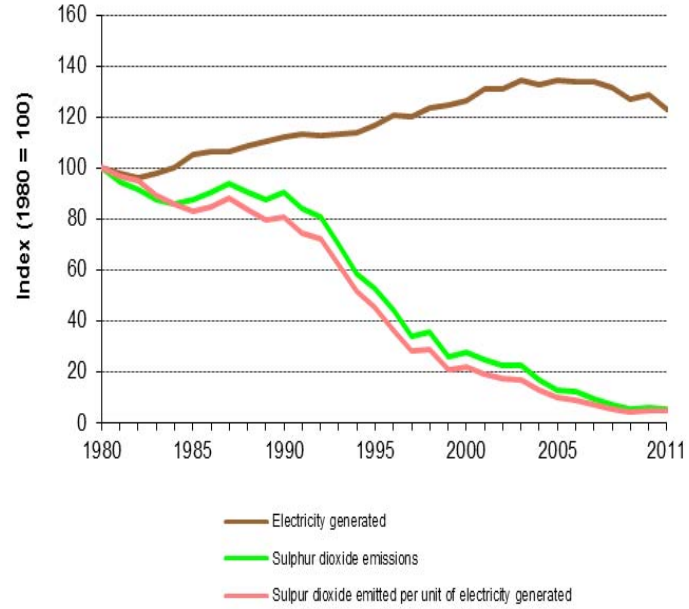



(1) Includes other solid fuels and non-fuel sources.

*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 61% of the total in 2011.
- In 1980, 3.1 million tonnes of sulphur dioxide were produced as a result of coal being burned. By 2011 this had fallen to 0.2 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 2011, just 0.1 million tonnes were produced compared with 1.5 million tonnes in 1980.

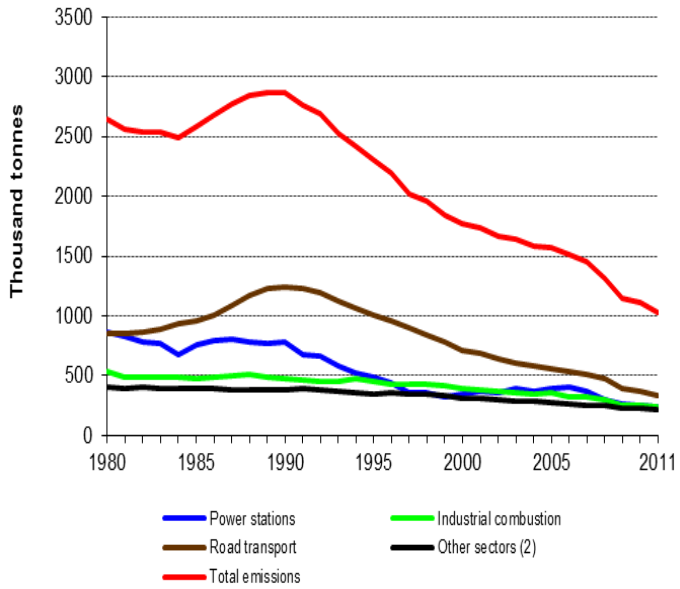
**Chart 11.10:**
**Power station emissions of sulphur dioxide, 1980 to 2011**




*Source: National Atmospheric Emissions Inventory; DECC*

- Power stations accounted for 44% of UK sulphur dioxide emissions in 2011. 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 94% reduction in sulphur dioxide emissions since 1980.
- It is expected that these reductions will continue in the near future due to the impact of the Large Combustion Plant Directive.

**Chart 11.11:**
**Nitrogen oxides emissions by source(1), 1980 to 2011**

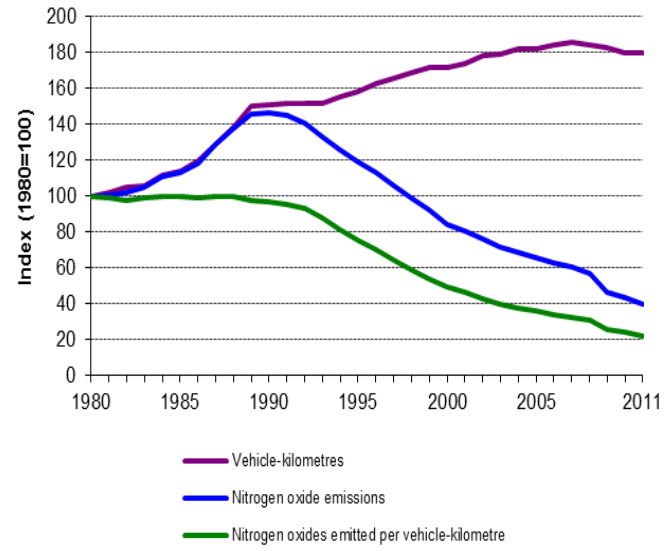



(1) Expressed as nitrogen dioxide equivalent.
(2) Includes domestic, commercial, public services, other transport, petroleum refining, agriculture and waste treatment and disposal.

*Source: National Atmospheric Emissions Inventory*

- Nitrogen oxides add to the natural acidity of rainfall.
- In 2011, 33% of nitrogen oxide emissions were generated by road transport, with a further 23% 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.

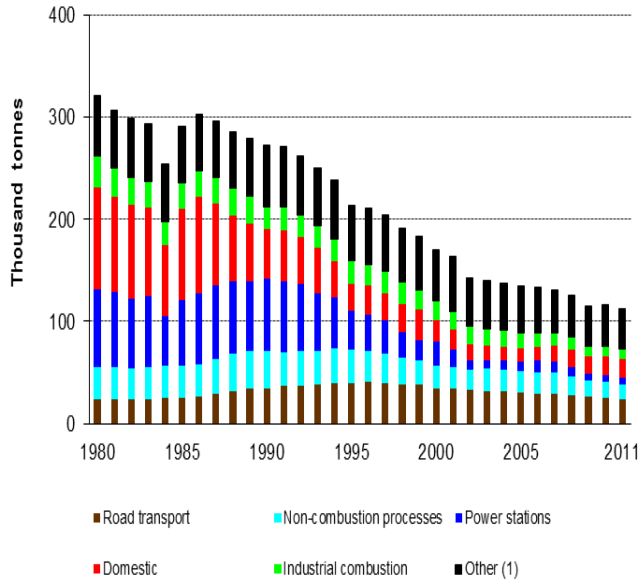
**Chart 11.12:**
**Road transport emissions of nitrogen oxides, 1980 to 2011**




*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 helped to reduce emissions.
- In 2011 emissions per vehicle kilometre travelled were 77% below their 1990 level.

**Chart 11.13:**
**$PM_{10}$ emissions by source, 1980 to 2011**




(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) are estimated to have fallen by 65% since 1980, including an 82% fall in emissions by the domestic sector.

- Road transport accounted for 21% of emissions in 2011. Non-combustion processes (from construction, quarrying and industry) accounted for 13%.

- The domestic sector has seen the largest fall from 99,700 tonnes in 1980 to 18,300 tonnes in 2011 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 6,300 tonnes.

## 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 $\rho_i$ 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 2012 was calculated assuming 44 generating companies, 16 to 26 electricity supply companies, depending on the sector, and 9 to 10 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 10.15, 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 |

**Croatia joined the EU on 1 July 2013.*

## 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/statistical-review-of-world-energy-2013.html |
| BRE (Building Research Establishment) | www.bre.co.uk/ |
| Consumer Futures | www.consumerfutures.org.uk/ |
| 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 | 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 |
| **Petroleum (downstream)** | William Spry | 6988 | William.Spry@decc.gsi.gov.uk |
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| **Combined heat and power** | Alison Judd | 2846 | Alison.Judd@decc.gsi.gov.uk |
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| **Industrial, International & Oil prices** | Jo Marvin | 5049 | Jo.Marvin@decc.gsi.gov.uk |
| **Domestic energy prices** | Sam Trewin | 5162 | Sam.Trewin@decc.gsi.gov.uk |
| **Fuel poverty** | Masuma Ahmed | 5922 | Masuma.Ahmed@decc.gsi.gov.uk |
| **Energy and the environment** | Anwar Annut | 5060 | Anwar.Annut@decc.gsi.gov.uk |
| **Emissions of greenhouse gases** | Nilesh Gorsia | 2948 | Nilesh.Gorsia@decc.gsi.gov.uk |
| **Calorific values and conversion factors** | Iain MacLeay | 5048 | Iain.MacLeay@decc.gsi.gov.uk |
| **Sub-national energy consumption** | Sabena Khan | 6909 | Sabena.Khan@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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