

UK Environmental Accounts, 2012



Coverage: **UK**

Date: **27 June 2012**

Geographical Area: **UK**

Theme: **Agriculture and Environment**

Theme: **Business and Energy**

Correction

Minor production errors were discovered in Environmental Accounts 2012, published on 27 June 2012.

- Oil & gas text in "changes in key environmental and economic measures" section was affected. All the text referring to oil & gas in the rest of the statistical bulletin was correct, all figures quoted were correct and all tables of data were correct. This text has now been corrected.
- Latest data point of the Total Material Requirement (TMR) line on the Material Flows chart was affected. All the text referring to the TMR was correct, all figures quoted were correct and all tables of data were correct. The line on the chart has now been corrected.

UK Environmental Accounts, 2012

- The upper range of the UK's total oil reserves halved from 5 billion tonnes in 1990 to 2.5 billion tonnes in 2010.
- The total estimated market value of the UK woodlands increased by 69 per cent, from £5.3 billion in 2008 to £9.0 billion in 2011.
- The use of coal halved from 66.2 million tonnes of oil equivalent (Mtoe) in 1990 to 32.5 Mtoe in 2010 and the use of natural gas almost doubled from 51.1 to 92.3 Mtoe during the same period.
- In 2010, total energy consumption increased by 3.0 per cent from 2009. Consumer expenditure was the greatest contributor to the increase, followed by manufacturing.
- Use of energy from renewable & waste sources increased by over five times from 1.3 Mtoe in 1990 to 7.1 Mtoe in 2010. Total energy consumption from renewable & waste sources was 3.2 per cent in 2010.
- Emissions from greenhouse gases increased by 3.0 per cent between 2009 and 2010; however, they fell by 17.2 per cent between 1990 and 2010.
- Emissions intensity of the UK economy excluding consumer expenditure was 0.4 thousand tonnes of CO₂ equivalent per £ million value added in 2010 which was 35.9 per cent lower than in 1997
- The UK's material productivity more than doubled between 1990 and 2010, as the quantity of natural resources used by the UK economy fell in relation to the level of economic activity.
- In 2011, the UK Government received £43.3 billion from environmental taxes, equivalent to 2.9 per cent of Gross Domestic Product (GDP).

Overview

Environmental Accounts are “satellite accounts” to the main National Accounts. Satellite accounts are extensions to National Accounts, which facilitate analysis of the wider impact of economic change. They are compiled in accordance with the System of Integrated Environmental and Economic Accounting (SEEA), which closely follows the UN System of National Accounts (SNA).

Environmental accounts measure what impacts the economy has on the environment (e.g. pollution) and how the environment contributes to the economy (e.g. use of raw materials, resource efficiency, etc.) by using the accounting framework and concepts of the national accounts.

UK environmental accounts are used to inform sustainable development policy, to model impacts of fiscal or monetary measures and to evaluate the environmental impacts of different sectors of the economy. Most data are provided in units of physical measurement (mass or volume), although some are in monetary units, where this is the most relevant or the only data available.

What is included in this release?

Environmental Accounts have been separated into three categories:

Natural resources accounts

- Oil and gas reserves: providing information in physical and monetary terms.
- Forestry: providing information on woodland area, diversity and consumption of wood products in Great Britain.

Physical flow accounts

- Fossil fuel and energy consumption: a breakdown of fossil fuel use and energy consumption by source and industry.
- Atmospheric emissions: a breakdown of greenhouse gas emissions by types of gases and industry.
- Material flows: presents information on the total mass of natural resources and products used by the UK.
- Water use: showing amounts of ground water and non-tidal surface water used by Industrial Sector in England and Wales.

Monetary accounts

- Environmental taxes: information on government revenue from environmental taxes Environmental protection expenditure - a breakdown of environmental protection expenditure by General Government and UK industry.

Changes in key environmental and economic measures, 2009-2010

The UK economy grew by 2.1 per cent in 2010, compared with 2009. Average temperature in Great Britain fell by 11.4 per cent during the same period. This economic growth and cold weather at the beginning and end of 2010 increased both UK energy consumption and greenhouse gas emissions in 2010.

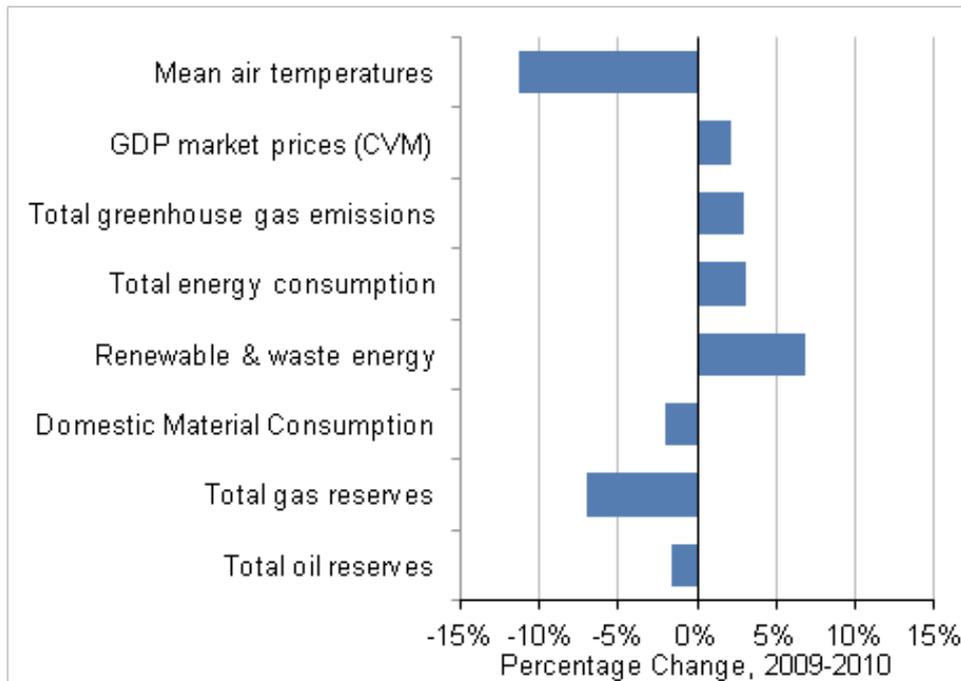
There was a decrease in oil and gas extraction from the UK Continental Shelf in 2010, and a continuous decline suggests remaining reserves are being depleted faster than new discoveries are being made.

However, Domestic Material Consumption in the UK decreased in 2010, compared with 2009, suggesting that UK was able to sustain an increase in economic growth while limiting negative impacts on the environmental conditions. Renewable and waste sources provided more energy in 2010, compared with 2009, contributing to a more sustainable environment.

The relationships between the economy and the environment are further explored in this bulletin.

Changes in key environmental and economic measures, 2009-2010

UK resident basis (Weather Great Britain)



Source: Office for National Statistics

Notes:

1. Weather data from Digest of UK Energy Statistics (DUKES) table 1.1.8
2. Total discovered oil and gas reserves

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(18 Kb)

Oil and Gas reserves

Oil reserves

The upper range of the UK's total oil reserves was estimated to be 2.5 billion tonnes at the end of 2010, 121 million tonnes lower than in 2009. This was due to a fall in the upper range of undiscovered reserves by 103 million tonnes to 1.4 billion tonnes, together with a fall in total discovered reserves by 18 million tonnes to 1.1 billion tonnes.

Discovered oil reserves

The UK's total discovered oil reserves declined in 2010, compared with 2009, due to a fall in all types of reserves – proven, probable and possible¹. Probable oil reserves fell by 13 million tonnes to 0.4 billion tonnes, proven oil reserves fell by 4 million tonnes to 0.4 billion tonnes, and possible oil reserves fell by 1 million tonnes to 0.3 billion tonnes.

In 2010, there was extraction of 63 million tonnes. Given a fall in proven oil reserves of 4 million tonnes, there has been a net transfer of 59 million tonnes from probable to proven oil reserves. This can be attributed to the reallocation of probable reserves into the proven category at certain producing oil fields. Additionally, development approval in 2010 of several new oil fields is likely to have also contributed to the movement of reserves into the proven category.

Undiscovered oil reserves

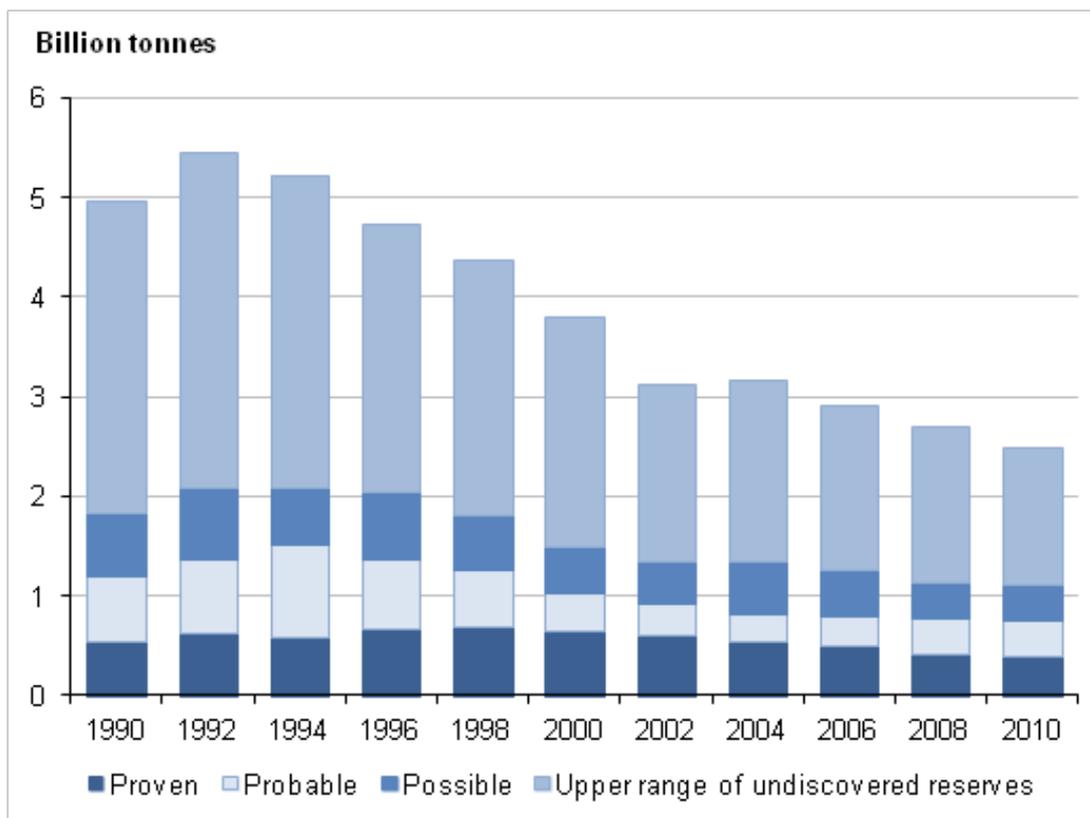
The UK's undiscovered oil reserves, which may exist in the areas of the UK Continental Shelf, were between 0.5 billion tonnes and 1.4 billion tonnes at the end of 2010. The upper range of undiscovered oil reserves, which has displayed a general downward trend since 1991, fell approximately 60 per cent between 1991 and 2010; whereas the lower range has shown a mixed trend during the same period.

Expected level of reserves

Estimates of remaining UK oil reserves are uncertain, but reserves do show an overall decline between 1990 and 2010, suggesting that remaining reserves are being depleted faster than new discoveries are being made. In 2010, the level of oil extraction amounted to 63 million tonnes – the lowest since records began in 1989, approximately 5 million tonnes lower than in 2009.

Estimated remaining recoverable oil reserves

UK



Source: Energy and Climate Change

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Gas reserves

The upper range of the UK's total gas reserves was estimated to be 1,802 billion cubic metres at the end of 2010, 13 billion cubic metres higher than in 2009. This was primarily due to an increase in the upper range of undiscovered reserves of 72 billion cubic metres to 1,021 billion cubic metres, partly offset by a fall in total discovered reserves by 59 billion cubic metres to 781 billion cubic metres.

Discovered & undiscovered gas reserves

The UK's total discovered gas reserves decreased in 2010, compared with 2009, due to a fall across all types of reserves – proven, probable and possible. Probable gas reserves fell by 41 billion cubic metres to 267 billion cubic metres, possible gas reserves fell by 15 billion cubic metres to 261 billion cubic metres, and proven gas reserves fell by 3 billion cubic metres to 253 billion cubic metres. The UK's undiscovered gas reserves were between 363 billion cubic metres and 1,021 billion cubic metres at the end of 2010.

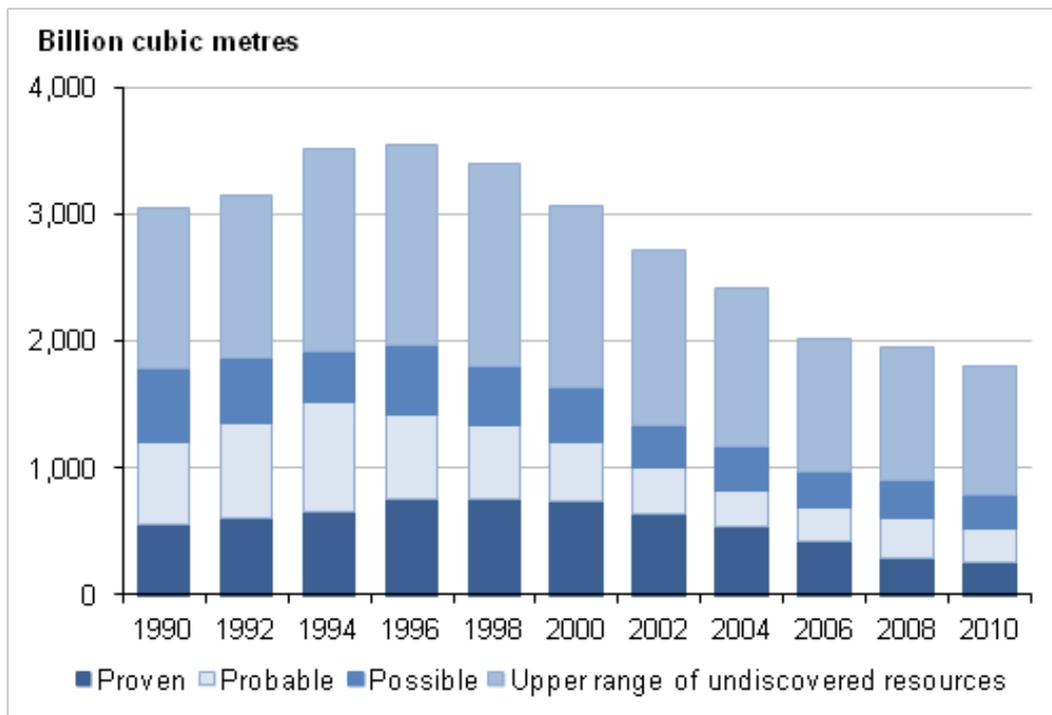
In 2010, there was extraction of 55 billion cubic metres. Given a fall in proven gas reserves of 3 billion cubic metres, there has been a net transfer of 51 billion cubic metres from probable reserves to proven reserves, accredited to the development approval of six offshore gas fields in 2010.

Expected level of reserves

Estimates of the remaining UK gas reserves are uncertain, but reserves do show an overall decline between 1995 and 2010, suggesting that remaining reserves are being depleted faster than new discoveries are being made. In 2010, level of gas extraction amounted to 55 billion cubic tonnes – the lowest since 1992, approximately 2 billion cubic metres lower than in 2009.

Estimated remaining recoverable gas reserves

UK



Source: Energy and Climate Change

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Monetary balance²

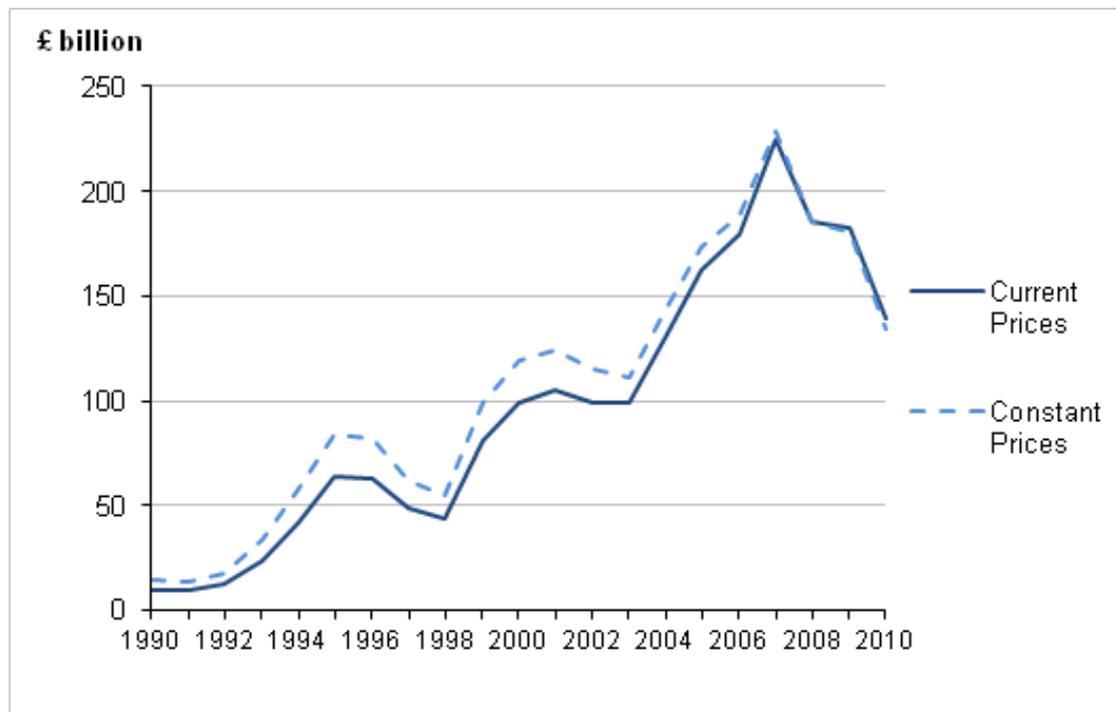
The total value of the UK's oil & gas reserves at the end of 2010 was £139.7 billion; £43.2 billion lower than in 2009. This sharp decrease, 23.6 per cent, could be attributed to a rise in unit costs lowering resource rents for producers, offsetting the rise in expected level of reserves in 2010, compared with 2009.

Though the UK's oil & gas reserves are generally declining between 1990 and 2010, the value of these reserves shows an upward trend until 2007 when there is a decline. The value of these reserves has grown by £130.6 billion between 1990 and 2010.

Expressing UK oil & gas reserves in monetary terms allows these subsoil assets to be compared with other economic entities. This provides a means for the commercial depletion of subsoil assets to be set against national income.

Value of Oil & Gas reserves

UK



Source: Office for National Statistics

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(59 Kb)

Notes for Oil and Gas reserves

- The categories; 'proven', 'probable' and 'possible' are based on confidence levels as follows:
 - Proven reserves are known reserves which have a better than 90 per cent chance of being produced.
 - Probable reserves are known reserves which are not yet proven but which are estimated to have a greater than 50 per cent chance of being technically and commercially producible.
 - Possible reserves are those reserves which at present cannot be regarded as 'probable' but are estimated to have a significant but less than 50 per cent chance of being technically and commercially producible.
- The methodological article (available at: [Monetary valuation of oil and gas reserves \(34.5 Kb Pdf\)](#)) provides more information on the monetary oil & gas valuation, including the oil & gas prices used (further information on [Oil & Gas reserves](#)).

Forestry

Woodland area in the United Kingdom

The total area of the UK covered by woodland increased by 0.3 per cent in 2011, compared with 2010, to 3.08 million hectares - the highest since 1924. Of the total woodland cover:

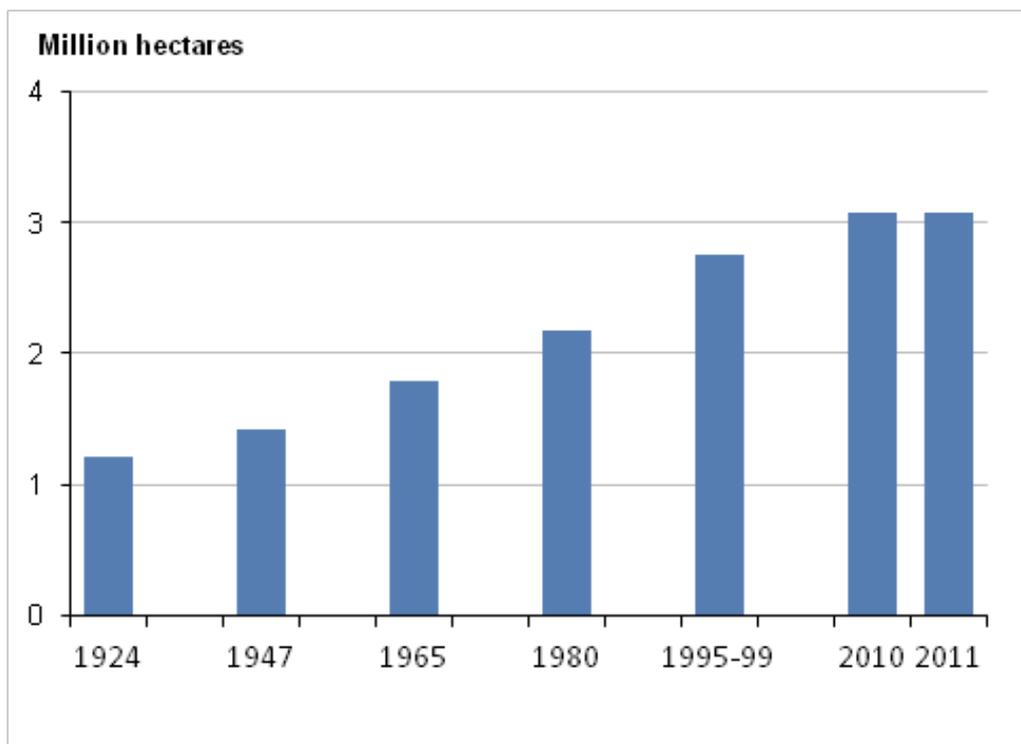
- 1.4 million hectares were within Scotland.
- 1.3 million hectares were within England.
- 0.3 million hectares were within Wales.
- 0.1 million hectares were within Northern Ireland.

The area covered by woodland as at 31 March 2011, 12.7 per cent of the UK land area, is greater than two-and-a-half times the area covered in 1924. Much of the increase between 1924 and 1999 could be explained by new commercial conifer plantations created between the 1950s and 1980s.

The apparent increase in 2010, compared with 1995-99, can be attributed to the use of data from the National Forestry Inventory¹, which includes a greater coverage than the previous inventory, the National Inventory of Woodland and Trees².

Woodland Area

UK



Source: Forestry Commission

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(40 Kb)

Market value of woodland area

The total estimated market value³ of UK woodland increased by £3.7 billion (69 per cent) to £9.0 billion in 2011, compared with £5.3 billion in 2008, the last available estimate. This marked rise appears to be entirely due to market movements. Economic uncertainty between 2008 and 2011 appears to have lowered returns on traditional investments such as bank deposits and bonds, making forestry an attractive investment for investors such as pension funds to take advantage of consistent returns. Forestry is also an attractive investment for investors seeking a tangible asset providing long term benefits such as: resources of timber, the ability to offset carbon emissions, and sporting rights for recreational activities.

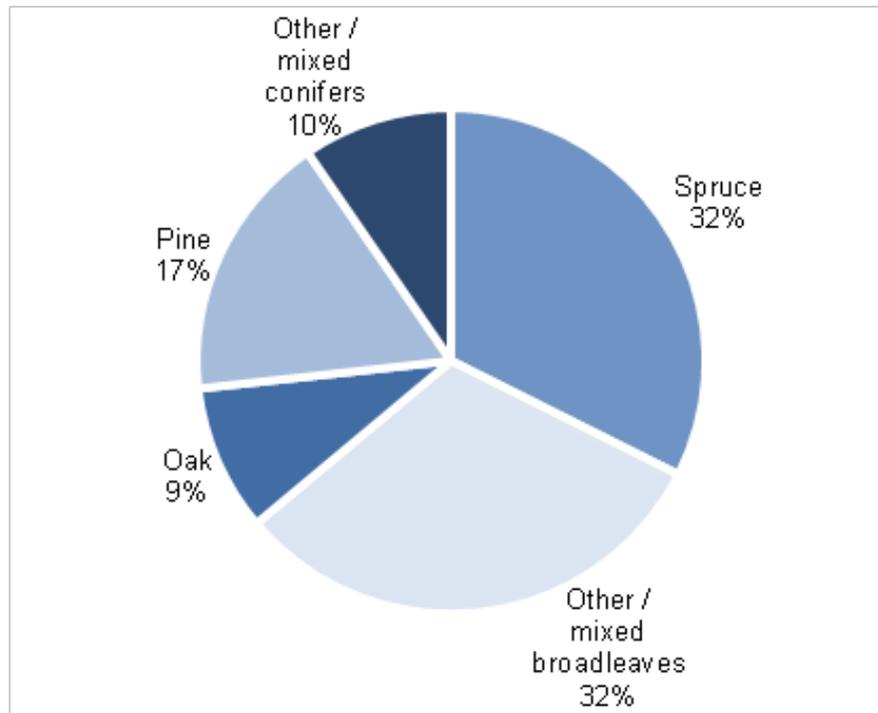
Woodland area of Great Britain by main tree species⁴

Coniferous trees: Spruce, Pine, and other / mixed conifers⁵ accounted for 59 per cent of total tree species and 53 per cent of total woodland area of Great Britain in 2011. The proportion of total woodland area covered by coniferous trees was 72 per cent in Scotland, 31 per cent in England, and 52 per cent in Wales. Sitka spruce and Scots Pine covered 49 per cent and 16 per cent respectively of the coniferous area within Great Britain.

Broadleaved trees: Oak, and other / mixed broadleaves⁶ accounted for 41 per cent of total tree species and 36 per cent of total woodland area within Great Britain in 2011. The proportion of total woodland area covered by broadleaved trees was 16 per cent in Scotland, 59 per cent in England, and 41 per cent in Wales. Oak and mixed broadleaves covered 23 per cent and 16 per cent respectively of the broadleaves species within Great Britain.

Woodland diversity

Great Britain



Source: Forestry Commission

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Wood Products

UK apparent consumption⁷: production and imports minus exports of wood products decreased in 2011 after increasing in 2010⁸. The breakdown of wood production is as follows:

Sawnwood

Apparent consumption of sawnwood decreased by 6.6 per cent to 8,040 thousand cubic meters in 2011, compared with 2010. This was mainly due to a fall in imports by 776 thousand cubic metres to 4,923 thousand cubic metres, partly offset by an increase in UK production by 178 thousand cubic metres to 3,279 thousand cubic metres, combined with a fall in exports by 33 thousand cubic metres to 162 thousand cubic metres.

Paper

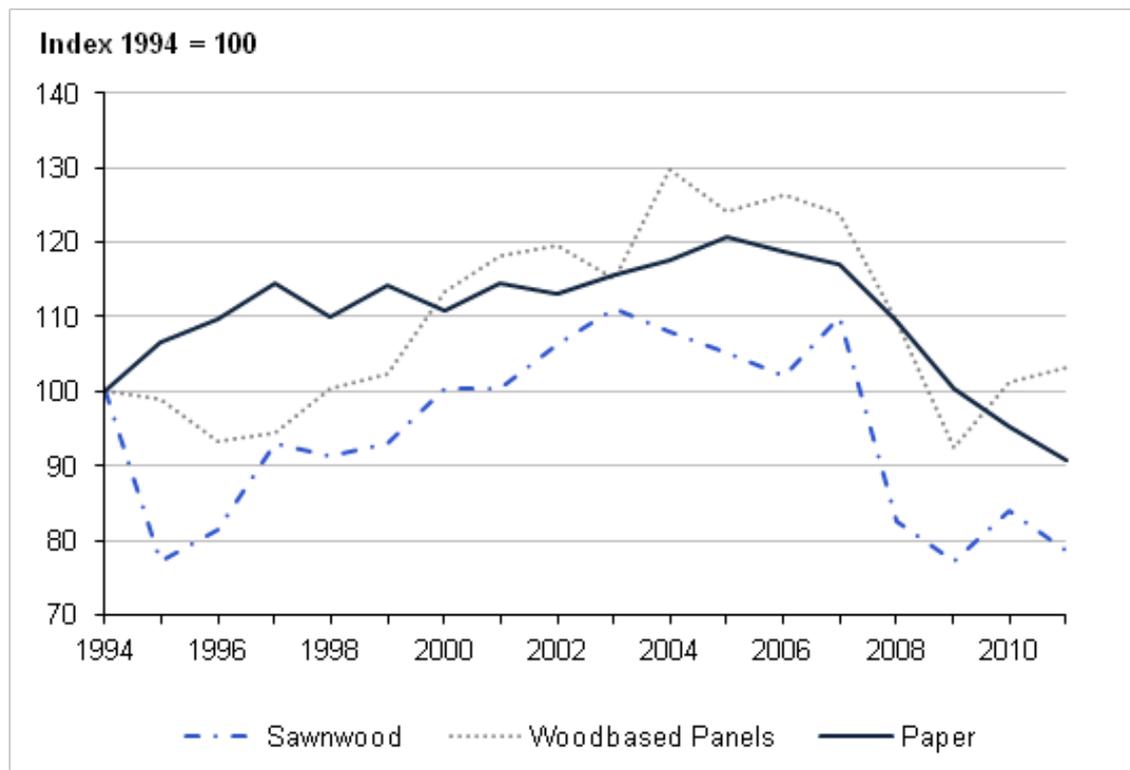
Apparent consumption of paper decreased by 4.9 per cent to 9,419 thousand tonnes in 2011, compared with 2010. This was mainly due to a fall in imports by 532 thousand tonnes to 6,293 thousand tonnes, partly offset by an increase in UK production by 41 thousand tonnes to 4,341 thousand tonnes, combined with a fall in exports by 5 thousand tonnes to 1,215 thousand tonnes.

Wood based panels

Apparent consumption of wood based panels increased by 1.9 per cent to 5,665 thousand tonnes in 2011, compared with 2010. This was due to an increase in imports by 126 thousand cubic metres to 2,827 thousand cubic metres, together with an increase in UK production by 14 thousand cubic metres to 3,384 thousand cubic metres, partly offset by an increase in exports by 37 thousand cubic metres to 546 thousand cubic metres.

Apparent consumption

UK



Source: Forestry Commission

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Notes for Forestry

1. National Forest Inventory (NFI) began in 2009 and will be completed in 2014. This will run on a continuous five year cycle and will provide a record of key information about Great Britain forests and woodlands (further information regarding the surveys from [Forestry Commission: NFI method statement](#)).
2. National Inventory of Woodland and Trees was last carried out between 1995–99.

3. Values are based on Forestry Commission's land use valuation estimates.
4. Data from [Forestry Commission Forestry Statistics 2011](#).
5. The category 'Other / mixed conifers' includes Japanese or hybrid larch, Douglas fir and other / mixed conifers.
6. The category 'Other / mixed broadleaves' includes beech, sycamore, ash, birch, poplar, sweet chestnut, elm, other / mixed broadleaves.
7. Apparent consumption is the amount of timber, used as wood and wood products by people and industries in the UK. It is calculated as total UK production plus imports, minus exports. Apparent consumption also differs from actual consumption by the extent of changes in the level of stocks. It is not practical to collect information on actual consumption.
8. Data from [Forestry Commission UK Wood production and trade: 2011 provisional figures](#).
9. Sawnwood is timber that has been cut into planks from logs and includes both softwood and hardwood.
10. Wood-based panels include particle board, fibreboard, plywood and veneer sheets and can be made from softwood or hardwood.

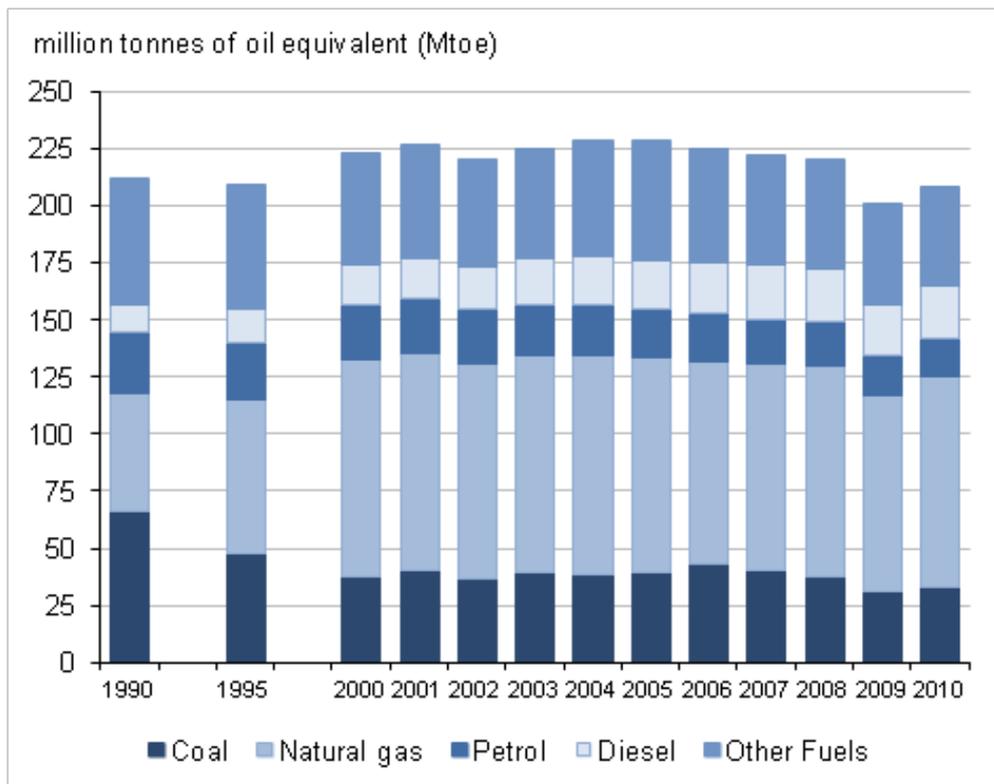
Fuel use

Between 1990 and 2010, the use of coal halved from 66.2 Mtoe to 32.5 Mtoe and use of natural gas almost doubled from 51.1 to 92.3 Mtoe. There was a similar switch between petrol and diesel from 27.3 Mtoe and 11.8 Mtoe to 16.8 Mtoe and 23.1 Mtoe respectively.

Other fuels fell by 20.8 per cent driven by decreases in fuel oil, gas oil and coke despite an increase in aviation fuel. Total fuel use differs from energy consumption as some fuels are transformed, for example production of coke, solid smokeless fuel (SSF), benzoles, tars, coke oven gas and blast furnace gas and some energy is from other sources such as nuclear, imports, renewables and waste.

Fuel Use by Type

UK resident basis



Download chart

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Source: AEA Energy & Environment, Office for National Statistics.

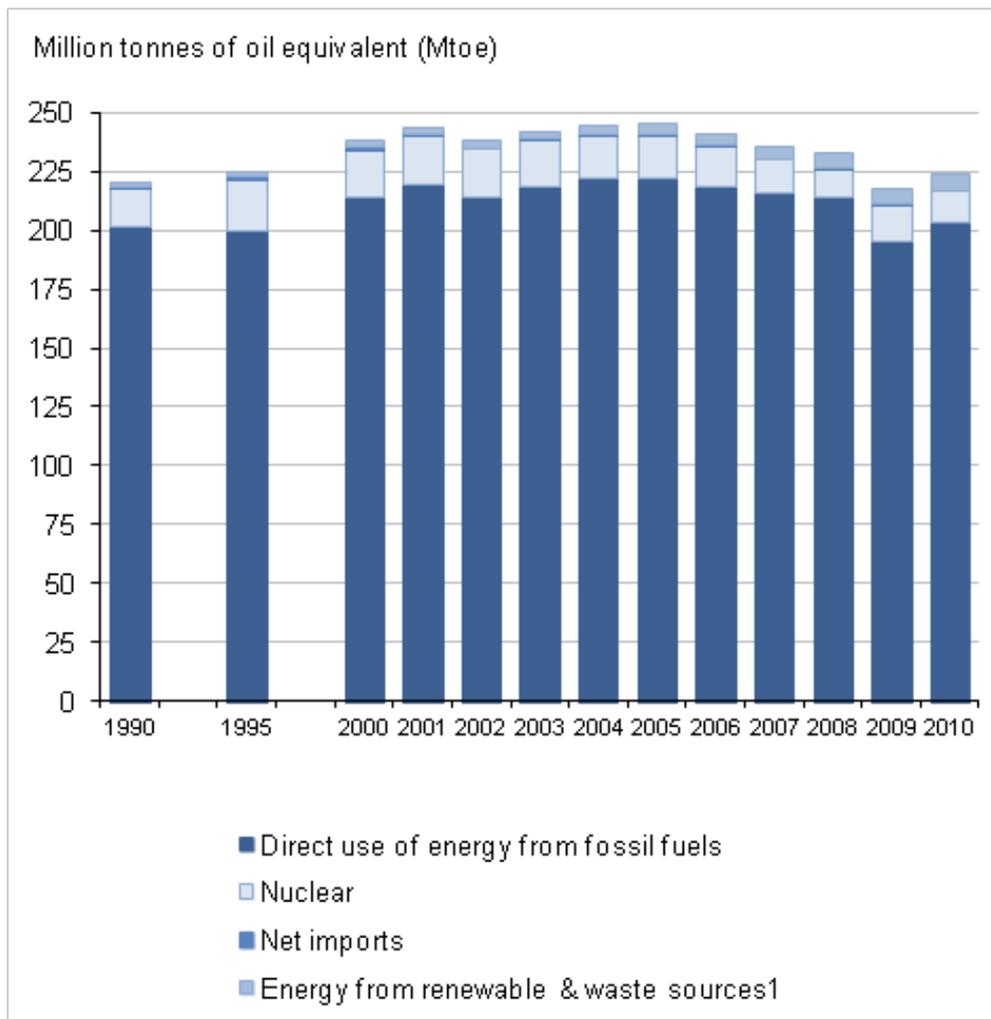
Energy consumption

Total energy consumption¹ of primary fuels and equivalents increased by 3.0 per cent compared with 2009 to 223.9 million tonnes of oil equivalent (Mtoe) in 2010. This was below the level of consumption between 1995 and 2008 but an increase of 1.9 per cent or 4.2 Mtoe compared with 1990.

There was a 3.8 per cent or 7.4 Mtoe increase in direct use of energy from fossil fuels between 2009 and 2010. Direct use of fossil fuels increased in 14 of the 16 industry groups. In particular, consumer expenditure increased by 8.5 per cent or 4.6 Mtoe due to a rise in natural gas energy use. Also electricity, water & waste² increased by 2.0 Mtoe or 3.6 per cent due to a rise in use of coal and natural gas in power stations. There was a decrease of 3.8 per cent or 0.8 Mtoe in energy from other sources³ driven by a fall in nuclear energy in the latest year.

Energy Consumption by Source

UK resident basis



Notes:

1. Renewable sources include solar photovoltaic, geothermal and energy from wind, wave and tide, hydroelectricity, wood, straw, liquid biofuels and sewage gas. Landfill gas, poultry litter and municipal solid waste combustion have also been included within this definition.

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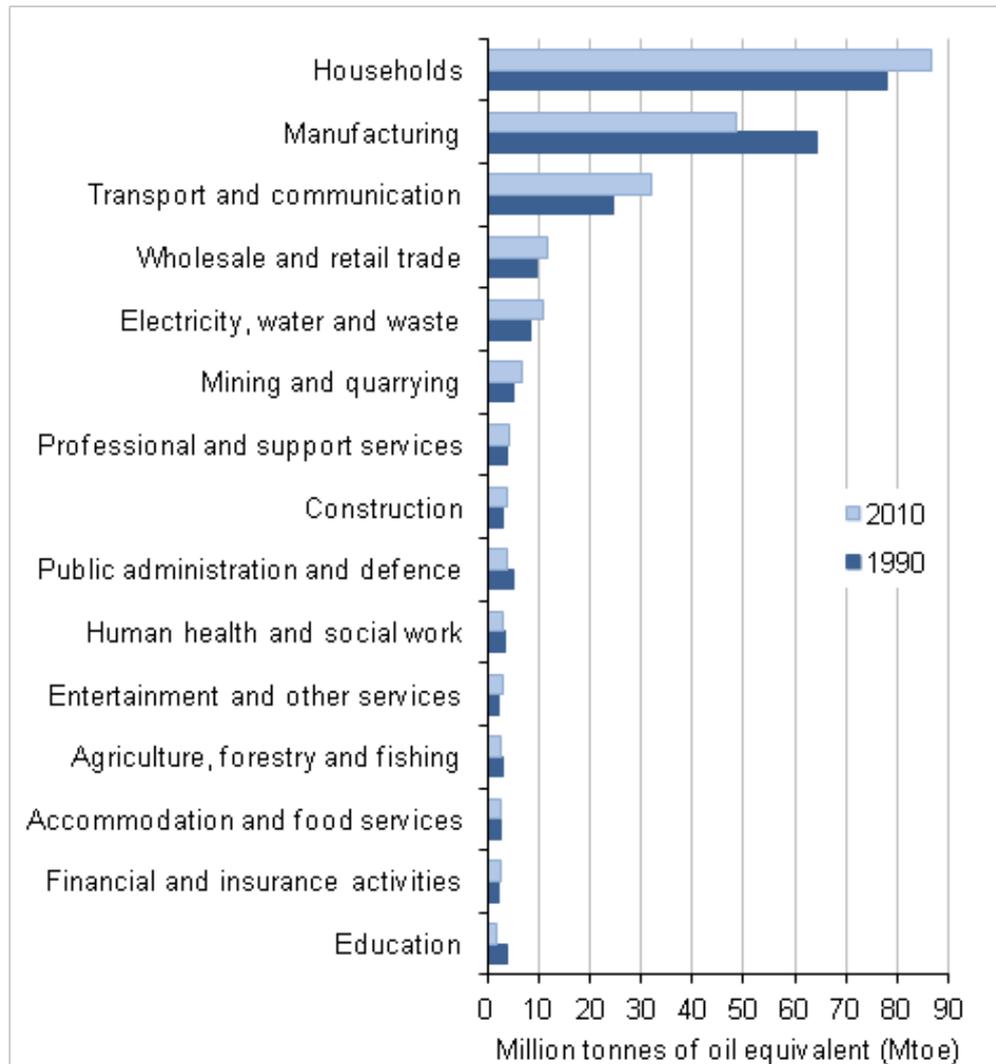
Source: AEA Energy & Environment, Office for National Statistics

Energy from other sources³ is combined with fossil fuel use and electricity transformation & distribution losses are reallocated to final consumer industry group. The greatest contributor to the increase in reallocated energy between 2009 and 2010 is the increase in consumer expenditure of 5.7 per cent or 4.6 Mtoe as it was for direct use of fossil fuels. There was an increase of 1.9 per cent or 0.9 Mtoe in manufacturing energy consumption due to increases in coke production, chemicals and food, drink & tobacco. There was also an increase of 1.2 per cent or 0.4 Mtoe in transport &

communication⁴ due to a rise in shipping and a 3.1 per cent or 0.3 Mtoe increase in wholesale & retail trade⁵. Contributions from other industry groups are minor, each providing less than two per cent of the overall increase in energy consumption.

Reallocated Energy Consumption by Industry Group

UK resident basis



Notes:

1. Household category includes Consumer expenditure and Activities of households as employers; undifferentiated goods and services-producing activities of households for own use

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Source: AEA Energy & Environment, Office for National Statistics

Longer term trends in reallocated energy between 1990 and 2010 were driven by a decrease in manufacturing of 15.6 Mtoe or 24.3 per cent due to a reduction in coke production; an increase in transport & communication⁴ of 7.6 Mtoe or 30.8 per cent due to a rise in aviation turbine fuel energy consumption and an increase in consumer expenditure of 8.4 Mtoe or 10.8 per cent.

Environmental Accounts estimates are not on the same basis as published by the [Department for Energy and Climate Change \(DECC\)](#) in the [Digest of UK Energy Statistics \(DUKES\)](#). The National Accounts measure includes energy consumed by UK companies and households abroad and excludes emissions by foreign residents in the UK as well as further differences in definition. As a result the DUKES measure for UK energy consumption is 3.6 Mtoe (1.6 per cent) higher than the environmental accounts measure in 2010. Get further detail of the relationship between environmental accounts measures and those released by DECC from the [energy bridging table \(91.5 Kb Excel sheet\)](#) and [methodology article \(223.2 Kb Pdf\)](#).

ONS is seeking user feedback on the classification of renewable sources used to generate heat. Please see background notes and respond by 8 August.

Notes for Energy consumption

1. Energy from wood, straw, biofuels and waste is included in total energy consumption and in industry group totals for direct use of energy and reallocated use of energy throughout 1990 to 2010 for the first time in this year's publication.
2. Electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management activities and remediation services.
3. Energy from other sources includes nuclear, net imports and energy from renewables & waste sources. For the first time in this year's publication this includes energy from wood, straw, biofuels and waste.
4. Transport and storage; information and communication.
5. Includes repair of motor vehicles and motorcycles.

Renewable and waste sources

Use of energy from renewable & waste sources increased by over five times between 1990 and 2010 from 1.3 Mtoe to 7.1 Mtoe. This was due to an increase in road transport biofuels and wood energy consumption. This was driven by increases in direct energy use in the electricity, water & waste¹ and consumer expenditure industry groups.

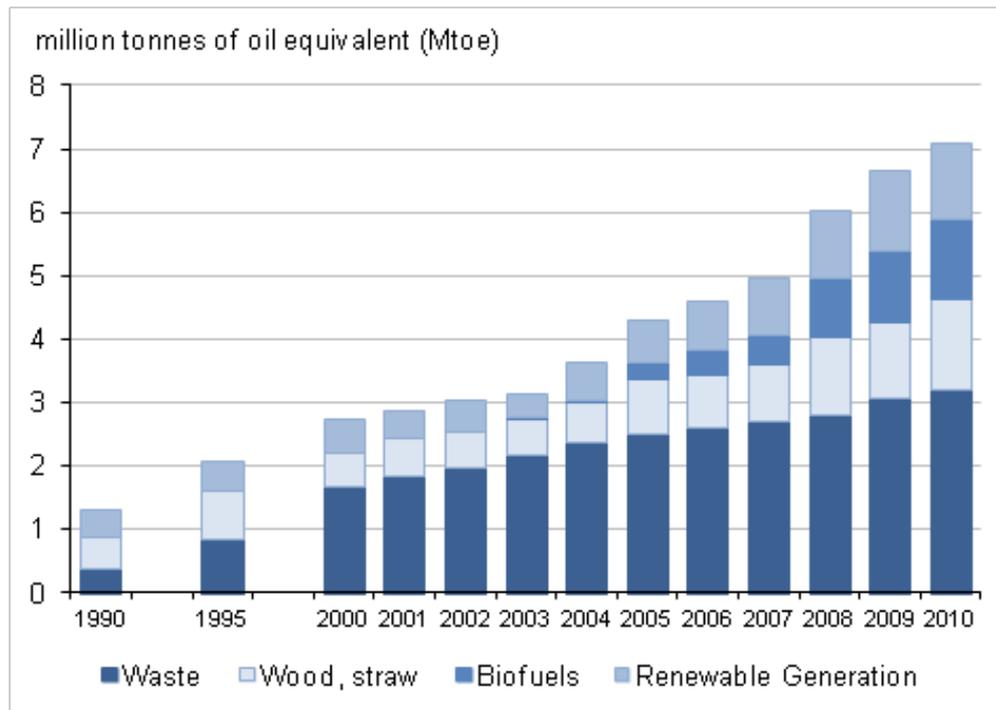
In 2010, use of renewable & waste energy increased by 0.5 Mtoe or 6.8 per cent compared with 2009. As a result, 3.2 per cent of total energy consumption was from renewable sources in 2010.

Of the renewable & waste energy used in 2010, 45 per cent was from waste sources such as landfill gas, sewage gas, municipal solid waste (MSW) & poultry litter, 20 per cent from wood & straw, 18

per cent from liquid bio-fuels, bioethanol & biodiesel² and 17 per cent from renewable generation from hydroelectric power, solar photovoltaic, geothermal aquifers & energy from wind, wave & tide.

Renewable & Waste Sources

UK resident basis



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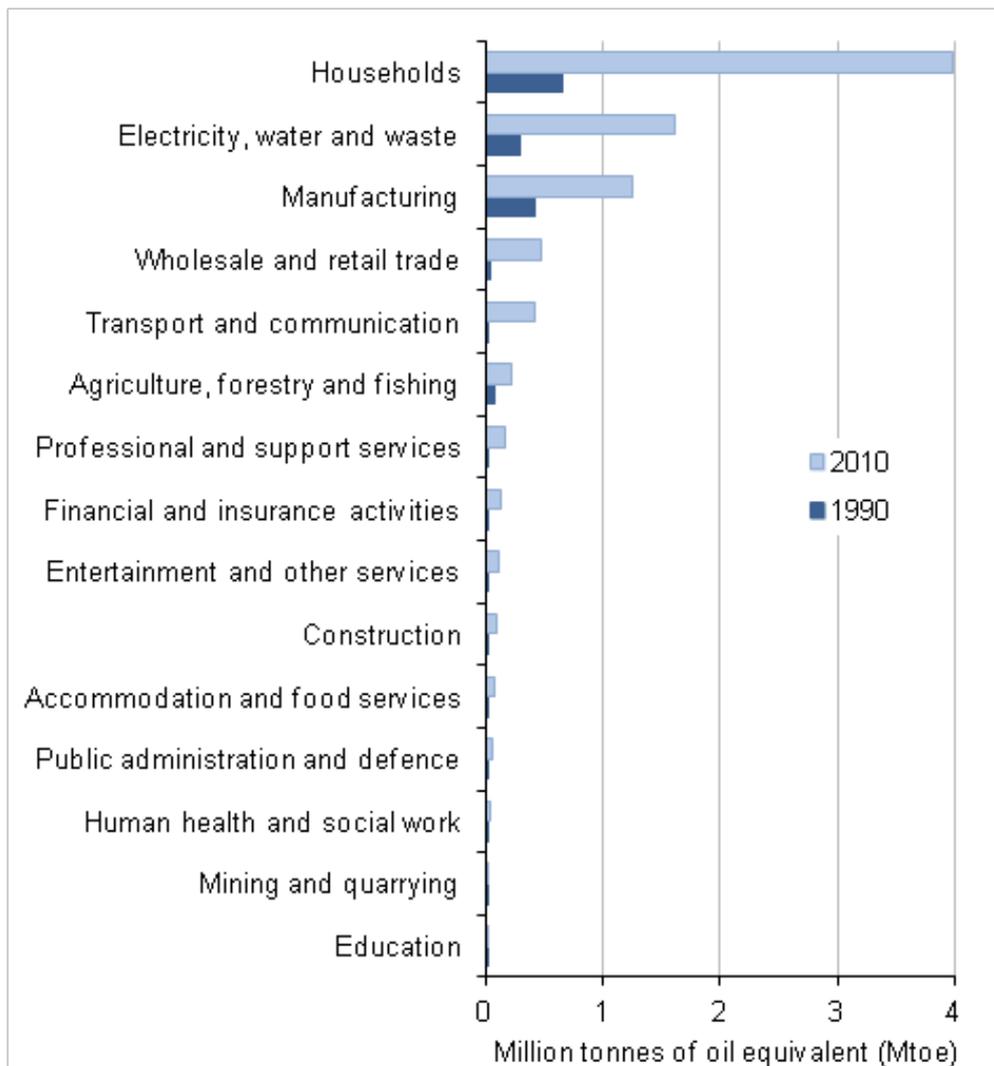
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Source: AEA Energy & Environment, Office for National Statistics

Electricity transformation & distribution losses from renewable & waste energy are reallocated to final consumer industry group. Households, electricity, water & waste¹ and manufacturing were the industry groups which made most use of reallocated renewable & waste energy.

Reallocated Energy from Renewable & Waste Sources by Industry Group

UK resident basis



Notes:

1. Household category includes Consumer expenditure and Activities of households as employers; undifferentiated goods and services-producing activities of households for own use

Download chart

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(125.5 Kb)

Source: AEA Energy & Environment, Office for National Statistics.

ONS is seeking user feedback on the classification of renewable sources used to generate heat. Please see background notes and respond by 8 August.

Notes for Renewable and waste sources

1. Electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management activities and remediation services.
2. Includes a cross-boundary adjustment of 0.02 Mtoe or less than one per cent to include use of bioethanol and biodiesel by UK residents abroad and exclude use by foreign residents in UK territory.

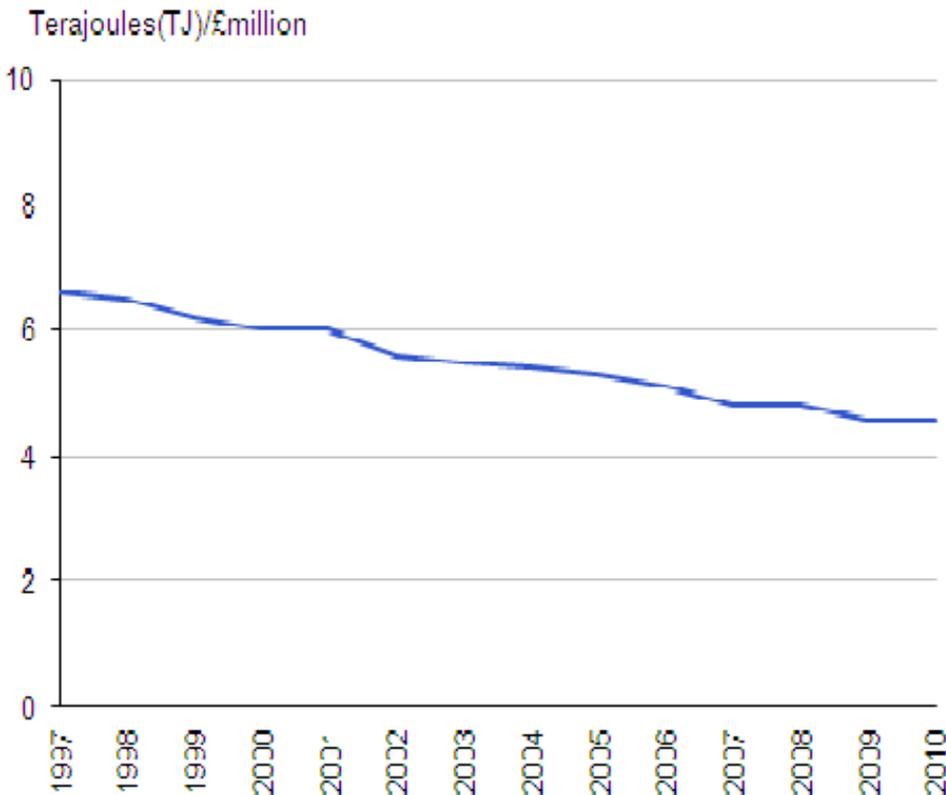
Energy intensity

Energy intensity¹ (energy use per unit of value added²) is an indicator for the energy efficiency of industry groups. Decreases in energy intensity might be explained by more efficient use of energy in production processes or by changes to the structure of the economy.

Energy consumption by industry used here is after reallocating electricity distribution & transformation losses to the final consumer of the electricity; if the direct use of energy were used, the intensity of electricity, water & waste³ would be around five times larger.

Energy Intensity

UK resident basis



Source: Office for National Statistics

Download chart

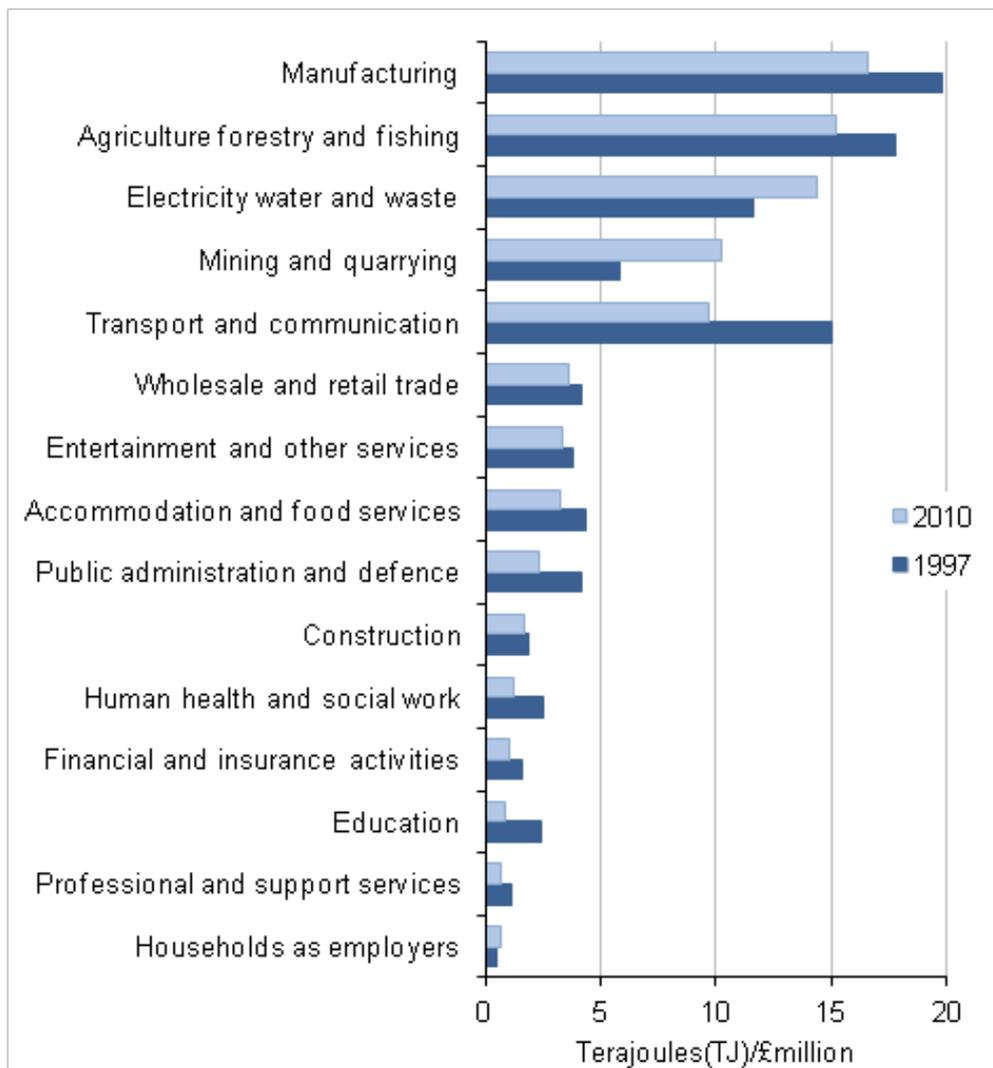
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- Between 2009 and 2010 energy intensity of the UK economy excluding consumer expenditure remained the same. The level of energy intensity remains below the level seen in 1997.
- Energy intensity decreased by 30.4 per cent per cent between 1997 and 2010. This means that a greater amount of output is being produced for each unit of electricity consumed.

Energy Intensity by Industry Group

UK resident basis



Source: Office for National Statistics

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(33 Kb)

Between 1997 and 2010 there have been decreases in energy intensity across most industry groups although there were increases in energy intensity for mining & quarrying and electricity, water & waste³ of 75.8 per cent and 23.9 per cent. Larger falls in energy consumption per unit of output came in service industry groups particularly those associated with government activity such as education, human health & social work and public administration & defence⁴ with decreases of 64.5 per cent, 51.6 per cent and 45.3 per cent respectively. However the intensity of these industry groups was already relatively low and despite reductions of 16.6 per cent and 14.4 per cent manufacturing and agriculture, forestry & fishing remain the most energy intensive at 16.5 TJ per £ million and 15.2 TJ per £ million. The greatest contribution to reduction in energy intensity came from transport & communication⁵ which reduced by 35.7 per cent to 9.7 TJ per £ million.

Notes for Energy intensity

1. For this year's publication the energy intensity calculations throughout 1997 to 2010 include reallocated energy from wood, straw, biofuels and waste sources. Energy use per unit of value added is the United Nations (UN) [energy intensity indicator](#) as defined in the [UN sustainable development indicators](#), although consumer expenditure is included by the UN. The [Organisation for Economic Co-operation and Development \(OECD\) Green Growth indicators](#) include the inverse, energy productivity, i.e. GDP per unit of energy supply. Energy supply is explained further in the ONS [World Environment Day](#) article.
2. Output is based on calculations using the constant price measure of Gross Value Added, the contribution of individual industry groups to Gross Domestic Product.
3. Electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management activities and remediation services.
4. Includes compulsory social security.
5. Transport and storage; information and communication.

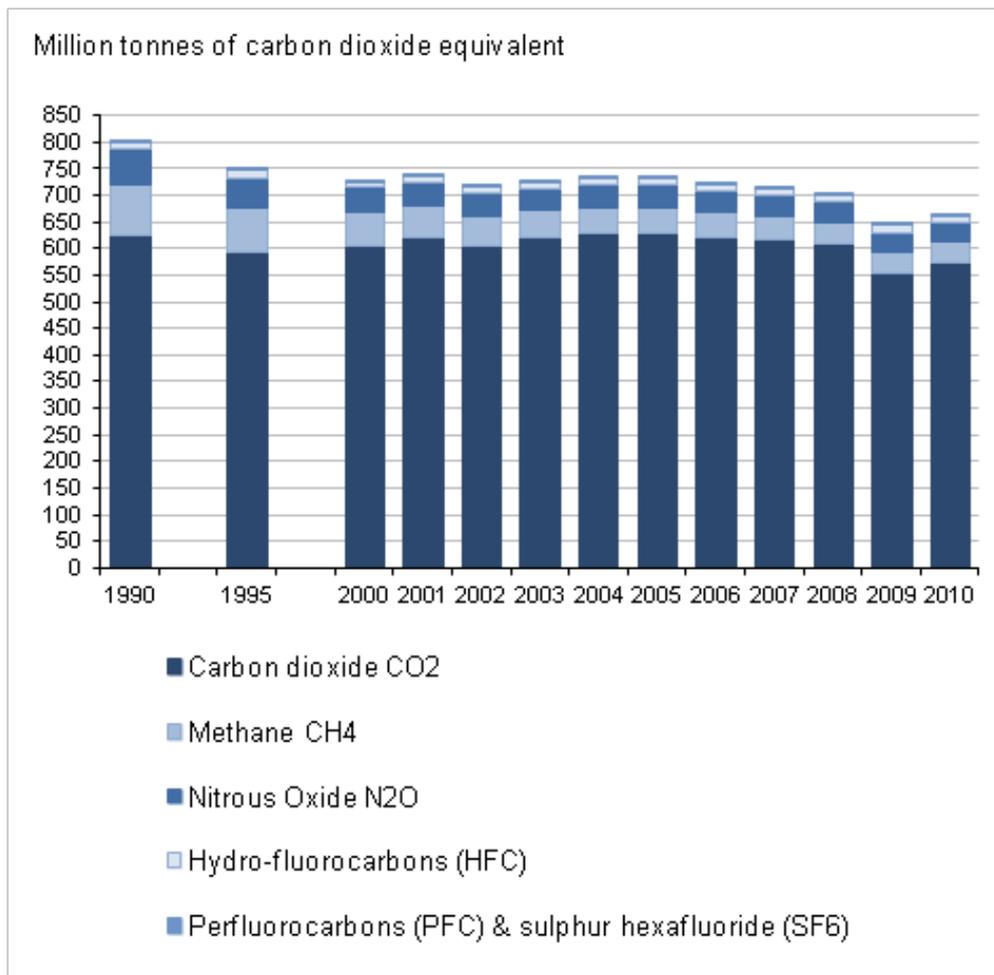
Atmospheric emissions

Explore emissions data using the [Environmental Accounts Interactive Tool](#).

Greenhouse gas emissions in 2010 were 664 million tonnes of CO₂ equivalent. This was composed of carbon dioxide (86.2 per cent), methane (6.2 per cent), nitrous oxide (5.3 per cent) and hydro-fluorocarbons (HFCs), per-fluorocarbons (PFCs) and sulphur hexafluoride (SF₆) (2.2 per cent). This was an increase of 3.0 per cent (19.2 million tonnes) compared to 2009, the same percentage increase as for energy consumption. This was caused by recovery from economic inactivity during the recession and several months of particularly cold weather at the beginning and end of 2010.

Greenhouse Gas Emissions by Type of Gas

UK resident basis



Download chart

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Source: AEA Energy & Environment, Office for National Statistics

The industry groups with the biggest proportional increases in greenhouse gas emissions between 2009 and 2010 were:

- Consumer expenditure emissions increased by 6.9 per cent or 10.1 million tonnes of CO2 equivalent.
- Wholesale & retail trade¹ emissions increased by 5.3 per cent or 0.9 million tonnes of CO2 equivalent.

In 2010 over four fifths of emissions of greenhouse gases were from electricity, water & waste², households³, manufacturing and transport & communication⁴ industry groups. Between 1990 and

2010 emissions of greenhouse gases fell 17.2 per cent or 138.0 million tonnes of CO₂ equivalent with the reduction being driven by:

- Manufacturing, where emissions decreased by 46.5 per cent or 80.9 million tonnes of CO₂ equivalent.
- Electricity, water & waste², where emissions decreased by 26.3 percent or 69.4 million tonnes of CO₂ equivalent, although in the most recent year this industry group increased emissions by 3.3 per cent or 6.2 million tonnes of CO₂ equivalent.

The sector that had the greatest absolute increase in CO₂ equivalent emissions between 1990 and 2010 was transport & communication⁴, which increased by 23.2 million tonnes of CO₂ equivalent or 35.9 per cent. Road transport emissions⁵ from all sectors increased from 110.7 million tonnes of CO₂ equivalent in 1990 to 123.6 million tonnes in 2007 and then fell sharply to 115.8 million tonnes in 2009 before increasing to 116.4 million tonnes in 2010, an overall increase of 0.6 million tonnes or 0.5 per cent. In 2010 road transport emissions were 17.5 per cent of total greenhouse gas emissions.

Get data for [greenhouse gas emissions \(547.5 Kb Excel sheet\)](#) and [road transport emissions \(35.5 Kb Excel sheet\)](#).

These comparisons are made with 1990 because this is the base year used for the Kyoto protocol targets. Environmental Accounts estimates are not on the same basis as estimates used to assess progress towards Kyoto targets. The National Accounts measure includes emissions by UK companies and households abroad and excludes emissions by foreign residents in the UK as well as further differences in definition.

As a result the Kyoto protocol measure for greenhouse gas emissions is 74 million tonnes of CO₂ equivalent (11.1 per cent) lower than the environmental accounts measure in 2010.

Get further details of the relationship between environmental accounts measures and those released by [Department for Energy and Climate Change \(DECC\)](#) for the Kyoto protocol of the [United Nations Framework Convention for Climate Change \(UNFCCC\)](#) and the [UK submission](#) for the [United Nations Economic Commission for Europe \(UNECE\) Convention on Long-range Transboundary Air Pollution \(LRTAP\)](#) from the [emissions bridging table \(143 Kb Excel sheet\)](#) and [methodology article \(339.6 Kb Pdf\)](#).

Between 1990 and 2010, emissions that cause acid rain (excluding those from the natural world) fell by 67.8 per cent or 4.7 million tonnes of SO₂ equivalent. In 2010 this was composed of sulphur dioxide (29.1 per cent), nitrous oxides (47.0 per cent) and ammonia (23.9 per cent).

There were decreases for all industry groups. In particular emissions generated by electricity, water & waste² decreased by 88.7 per cent or 2.9 million tonnes of SO₂ equivalent. This accounted for 62.8 per cent of the total decline. There were also large decreases in acid rain precursor emissions from manufacturing and consumer expenditure of 70.0 per cent to 287 million tonnes of SO₂ equivalent and 70.3 per cent to 216 million tonnes of SO₂ equivalent respectively.

The decrease of 16.0 per cent in transport & communication⁴ has been less rapid than other industry groups and since 2004 this industry group has been the biggest emitter of acid rain precursor gases with 658 million tonnes of SO₂ equivalent in 2010.

Get data for [acid rain precursors \(371 Kb Excel sheet\)](#).

In 2010, air quality was also affected by the emission of 144.2 thousand tonnes of PM₁₀ particulates, 2,181.2 thousand tonnes of carbon monoxide, 895.5 thousand tonnes of non-methane volatile organic compounds (NMVOC) including benzene and 1,3-butadiene, 61.9 thousand tonnes of lead, 3.6 thousand tonnes of cadmium and 6.4 thousand tonnes of mercury as well as other heavy metals. These have all reduced markedly since 1990, although there were increases between 2009 and 2010 in PM₁₀, cadmium, copper, nickel, selenium and vanadium emissions.

Emissions affecting air quality, Summary 2010

UK resident basis

	PM10¹	Carbon Monoxide	NMVOG²
Agriculture, forestry & fishing	20.87	66.84	82.26
Mining & quarrying	8.05	30.56	88.61
Manufacturing	22.20	363.66	267.58
Electricity, water & waste	7.74	84.50	71.03
Construction	5.41	190.95	50.14
Wholesale & retail trade	3.50	29.37	41.80
Transport & communication	37.29	134.25	33.51
Accommodation & food services	0.36	3.42	0.89
Financial & insurance activities	0.15	0.83	0.30
Real estate, professional & support services	0.94	24.00	2.53
Public administration & defence	1.18	29.21	3.34
Education	0.60	3.34	0.39
Human health & social work	0.28	5.44	1.25
Entertainment & other services	0.39	7.15	6.05
Households as employers	0.00	46.95	3.48
Consumer expenditure	34.97	1,156.41	219.18
Emissions affecting air quality	144.23	2,181.22	895.48

	PM10 ¹	Carbon Monoxide	NM VOC ²
Of which, emissions from road transport	25.46	912.14	70.44

Table notes:

1. PM10 and PM2.5 are airborne particulate matter i.e. suspended particles in air arising from incomplete combustion. Specifically PM10 is that fraction of 'black smoke' that is thought most likely to be deposited in the lungs. It can be defined as the fraction resulting from a collection from black smoke by a size selective sampler that collects smaller particles preferentially, capturing 50 per cent of 10 micron aerodynamic diameter particles, more than 95 per cent of 5 micron particles, and less than 5 per cent of 20 micron particles
2. Non-methane Volatile Organic Compounds including benzene, 1,3-butadiene and all other organic compound emissions except methane

Download table

 [XLS format](#)

(32 Kb)

Source: AEA Energy & Environment, Office for National Statistics.

Get data for [heavy metals \(838.5 Kb Excel sheet\)](#) and [other pollutants \(513.5 Kb Excel sheet\)](#).

Notes for Atmospheric emissions

1. Includes repair of motor vehicles and motorcycles.
2. Electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management activities and remediation services.
3. Includes consumer expenditure and activities of households as employers; undifferentiated goods & services-producing activities of households for own use.
4. Transport and storage; information and communication.
5. Emissions from fuel sources which are used by road vehicles across industry groups.

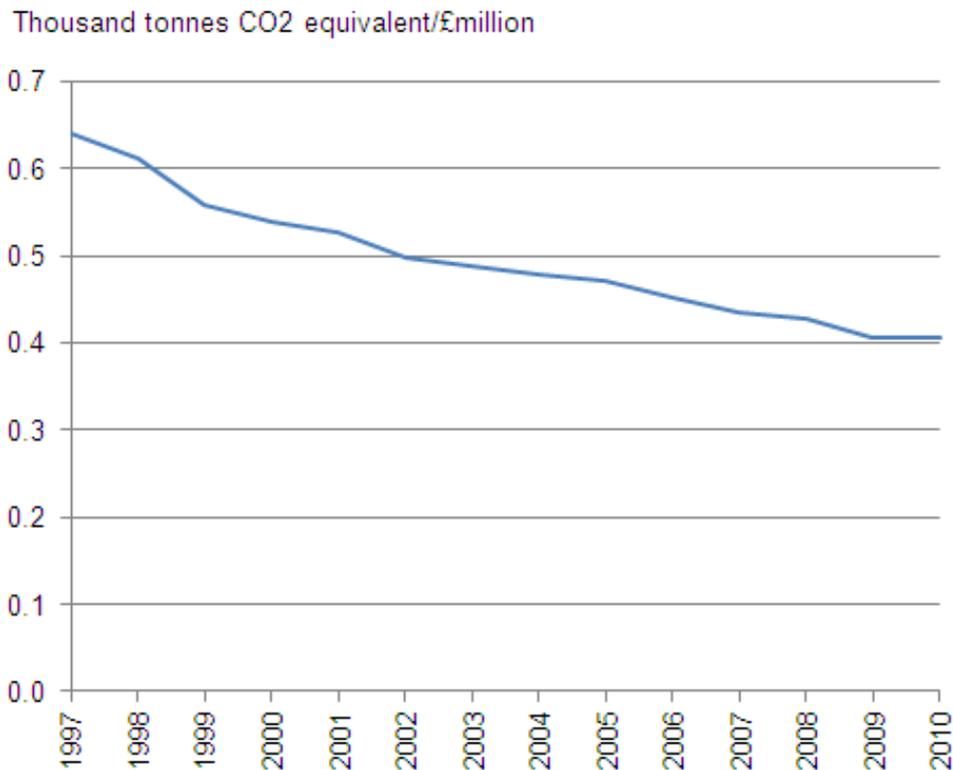
Greenhouse gas emissions intensity

The level of greenhouse gas emissions created per unit of economic output¹, also known as emissions intensity, can be used to examine whether economic growth is causing emissions or is sustainable.

Emissions intensity of the UK economy excluding consumer expenditure was 0.4 thousand tonnes of CO2 equivalent per £ million value added in 2010. This was the same as in 2009. Examining the longer term trend, emissions intensity decreased by 35.9 per cent between 1997 and 2010.

Greenhouse Gas Emissions Intensity

UK resident basis



Source: Office for National Statistics

Source: Office for National Statistics

Download chart

[XLS](#) [XLS format](#)

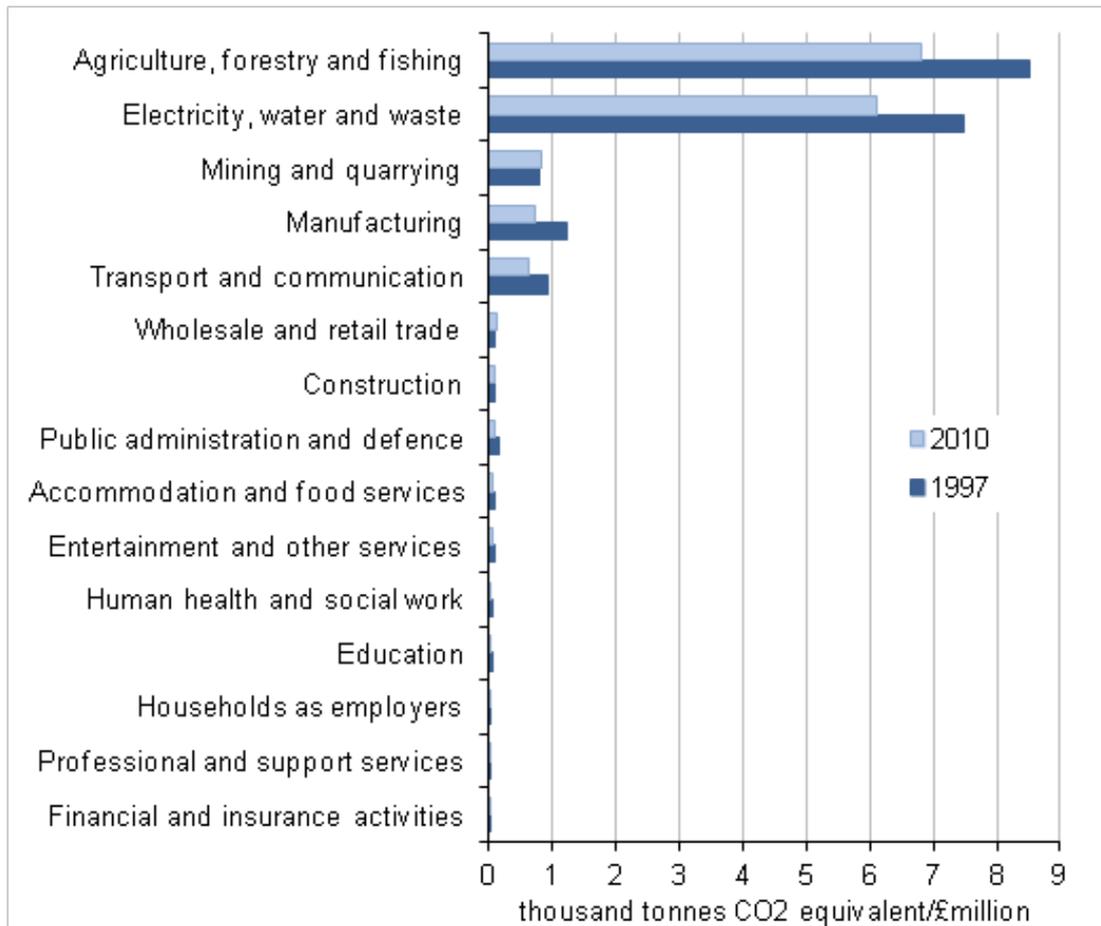
(25 Kb)

Comparisons are made with 1997 for the analyses of greenhouse gas emissions and energy intensity as this is the earliest year for which economic output (GVA) data are available on an SIC07 basis at the industry level.

Intensity for agriculture, forestry & fishing and electricity, water & waste² industry groups is high although there have been gains since 1997. Manufacturing and transport & communication³ were also intensive in 2010 but have seen larger reductions. There have been increases in the intensity of mining & quarrying and wholesale & retail trade⁴.

Greenhouse Gas Emissions Intensity by Industry Group

UK resident basis



Source: Office for National Statistics

Download chart

[XLS](#) [XLS format](#)

(25 Kb)

Notes for Greenhouse gas emissions intensity

1. Output is based on calculations using the constant price measure of Gross Value Added, the contribution of individual industry groups to Gross Domestic Product. The Eurostat [sustainable development indicators](#) include a narrower definition of [greenhouse gas emissions intensity of energy consumption](#), see the ONS [World Environment Day](#) article for further information. The [OECD Green Growth Indicators](#) include the inverse CO₂ productivity, i.e. GDP per unit of CO₂ emitted.
2. Electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management activities and remediation services.
3. Transport and storage; information and communication.

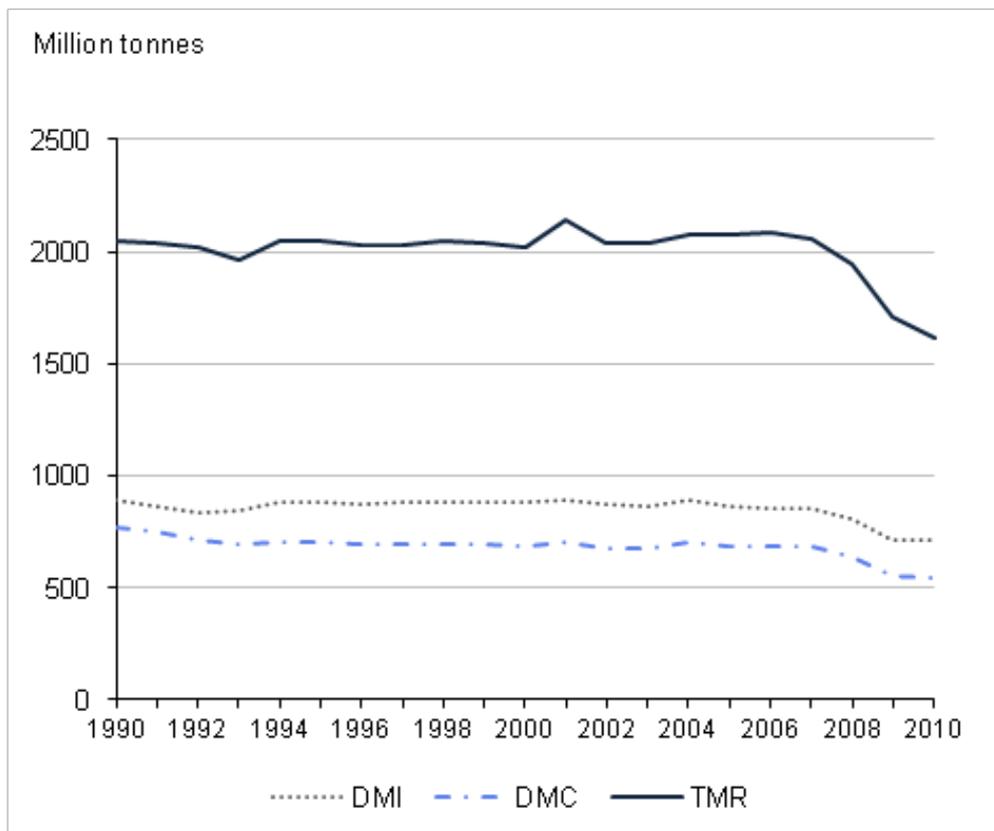
4. Includes repair of motor vehicles and motorcycles.

Material flows

Material flows are defined as the total mass of natural resources and products that are used by the economy, either directly in the production and distribution of products and services, or indirectly through the movement of materials in order for production and distribution of goods and services to take place.

Material Flows

UK



Source: Office for National Statistics

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(66 Kb)

Changes in resource use are based on the movement of the following three indicators derived from the material flows account:

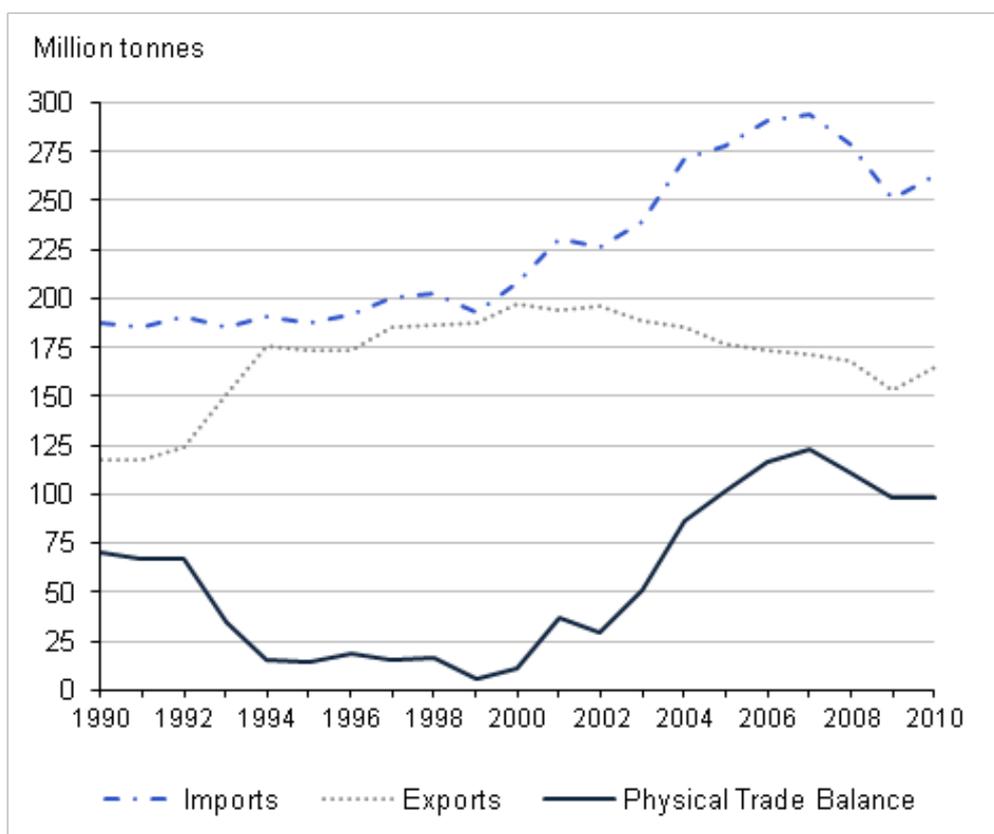
- Direct Material Input (DMI).
- Domestic Material Consumption (DMC).
- Total Material Requirement (TMR).

Direct Material Input¹ (DMI): inputs of material directly used in the economy increased by 0.3 million tonnes in 2010, compared with 2009, to 710 million tonnes. This was the first increase since 2004, primarily due to an increase in imports, largely offset by a fall in total domestic extraction.

The material requirements for a country's economy are dominated by domestic raw material extraction. However, the chart below shows that the UK has a positive **Physical Trade Balance²** in all years since 1990 indicating that the mass of imports exceeds the mass of exports. This means that the UK is not self-sufficient for all the materials needed, and therefore has to import to meet its material requirements.

Physical Trade Balance

UK



Source: Office for National Statistics, HM Revenue and Customs

Download chart

[XLS](#) [XLS format](#)

(66 Kb)

Imports increased by 4.6 per cent, from 251 million tonnes in 2009, to 263 million tonnes in 2010. This was primarily due to an increase in imports of minerals, which increased from 38 million tonnes to 46 million tonnes between 2009 and 2010. In 2010, imports have increased after falling for two years; however, exports increased for the first time since 2002.

The recent increase in imports is primarily due to an increase in import of minerals, while an increase in exports is mainly due to an increase in exports of fossil fuels. Overall, the gap between imports and exports is decreasing since 2008; however, it is flat between 2009 and 2010 due to an equal increase in both imports and exports.

Total domestic extraction, the sum of materials extracted from the UK environment for economic use, decreased by 2.5 per cent, from 458 million tonnes in 2009, to 446 million tonnes in 2010, the lowest since records began in 1970.

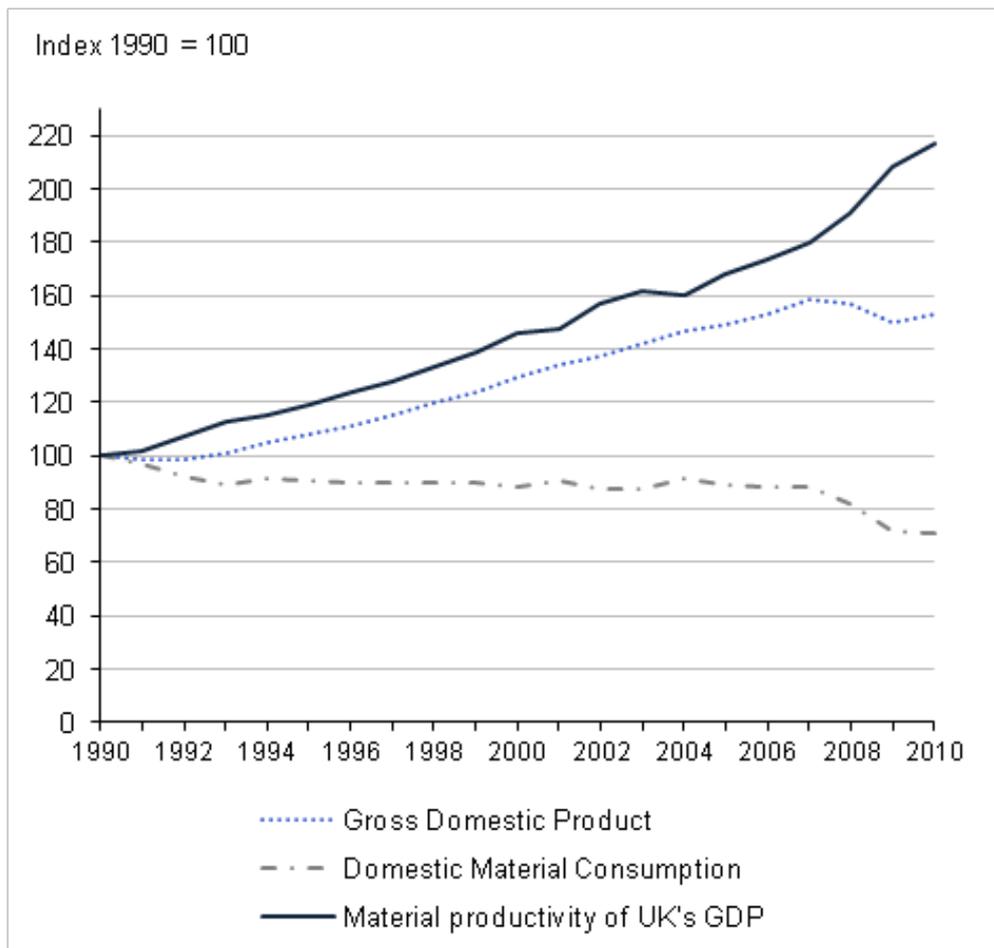
This was primarily due to a fall in fossil fuels extraction, which has been falling every year since 1999. Fossil fuels extraction decreased by 7 million tonnes to 139 million tonnes in 2010, compared with 146 million tonnes in 2009. This was due to a fall in both crude oil and natural gas extraction. Crude oil extraction fell by 5 million tonnes, while natural gas extraction fell by 3 million tonnes.

Domestic Material Consumption³ (DMC): the quantity of natural resources used by the UK economy - decreased by 11 million tonnes to 545 million tonnes in 2010, compared with 556 million tonnes in 2009. This was the lowest level since record began in 1970; however, in 2010, the fall in DMC was only 2.0 per cent compared with 2009 when DMC fell by 12.0 per cent.

In 2010, DMC decreased primarily due to a fall in consumption of fossil fuels, partly offset by an increase in consumption of minerals. Consumption of fossil fuels decreased by 15 million tonnes to 192 million tonnes in 2010, compared with 2009, mainly due to a fall in domestic extraction of 7 million tonnes combined with an increase in exports of 7 million tonnes. Consumption of minerals increased by 4 million tonnes to 215 million tonnes in 2010, compared with 2009, mainly due to an increase in imports of minerals by 8 million tonnes to 46 million tonnes partly offset by a decrease in domestic extraction of 3 million tonnes to 208 million tonnes.

Material Productivity

UK



Source: Office for National Statistics

Download chart

[XLS](#) [XLS format](#)

(19 Kb)

DMC helps to explain material productivity - a concept used to assess progress towards sustainable development. Material productivity is calculated by dividing the Gross Domestic Product in real terms by DMC. The above chart shows that material productivity more than doubled (increased by 117 per cent) between 1990 and 2010.

The trend indicates that material use is falling in relation to the level of economic activity in the UK and supports evidence that since 1990 the UK economy has generally been able to sustain GDP growth without having a negative impact on the environmental conditions. However, levels of imports have generally risen over the same period, except in 2008 and 2009 – a time period during which the economy was in recession, suggesting that some of the environmental impacts associated with consumption were being transferred abroad.

Total Material Requirement⁴ (TMR) decreased by 5.4 per cent, from 1,707 million tonnes in 2009, to 1615 million tonnes in 2010, the lowest level since records began in 1970. Indirect flows account for the largest proportion of TMR, accounting for 56.1 per cent in 2010.

This decrease was primarily due to 17.8 per cent fall in import of indirect flows, from 561 million tonnes in 2009, to 461 million tonnes in 2010. This was largely driven by a fall in imports of fossil fuels by 121 million tonnes, partly offset by an increase in imports of both minerals and biomass by 6 million tonnes and 15 million tonnes respectively.

Notes for Material flows

1. DMI is the sum of the total amounts of primary resources extracted from the UK environment and the amount of imports into the UK.
2. Physical Trade Balance demonstrates the impact of imports and exports in the material flows.
3. DMC is the difference between Domestic Material Input and the mass of goods exported from the UK (Domestic extraction + imports – exports).
4. Total Material requirement is a combination of Domestic Material Input, the excess material or hidden flows associated with the extraction of materials from the UK environment, and the indirect flows associated with the extraction of raw materials and semi-natural products imported into the UK.

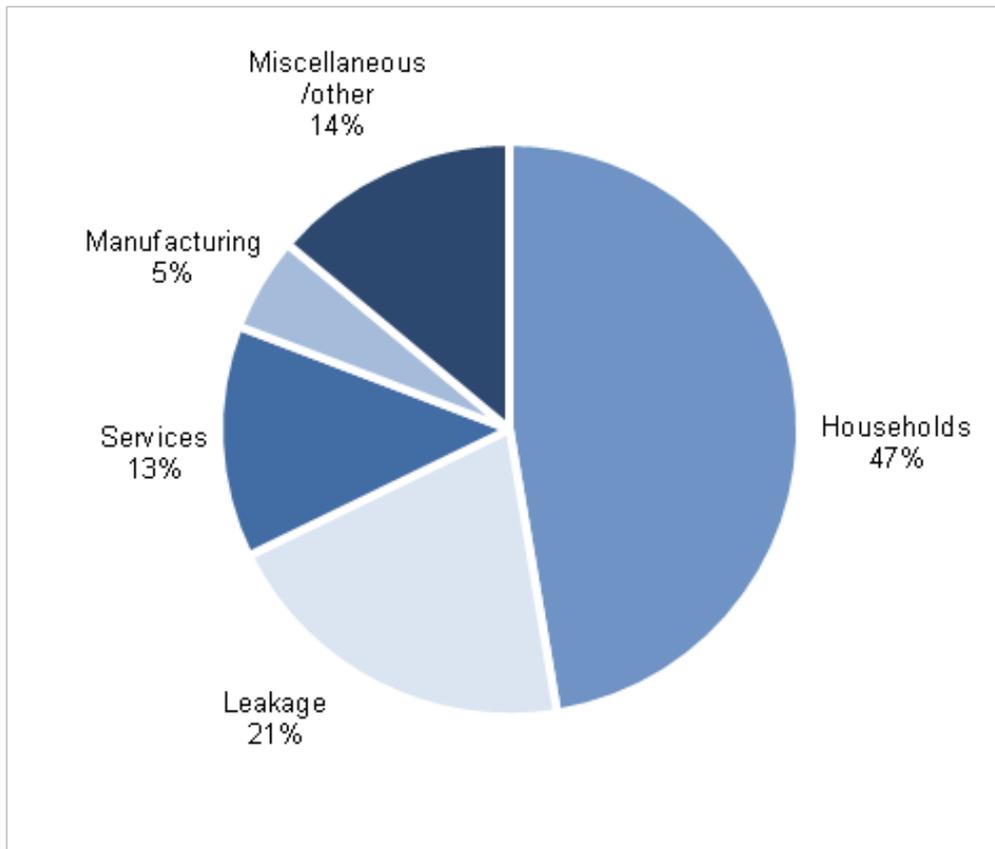
Water use

Use of groundwater and non-tidal surface water by Industrial Sector in England and Wales 2006-07:

- Of the total volume of groundwater and non-tidal water abstractions in England and Wales in 2006-07, just under half (48%) was for public water supply.
- In terms of use, non-domestic sectors accounted for 77 per cent of the water abstracted. The bulk of this (60 per cent) related to water supply (including losses), sewerage and electricity generation, mainly through direct abstraction.
- The agriculture, forestry and fishing/aquaculture sector was also a major user, with 1,143 million cubic metres directly abstracted and a further 144 million cubic metres taken from the public water supply.
- Other significant non-domestic uses were the production of chemicals and chemical products (270 million cubic metres, mainly direct abstractions); and food and beverage manufacturing (173 million cubic metres, mainly public water supply use).

Public Water Supply, 2006-07

England and Wales



Notes:

1. Estimates exclude abstractions below the licensing threshold

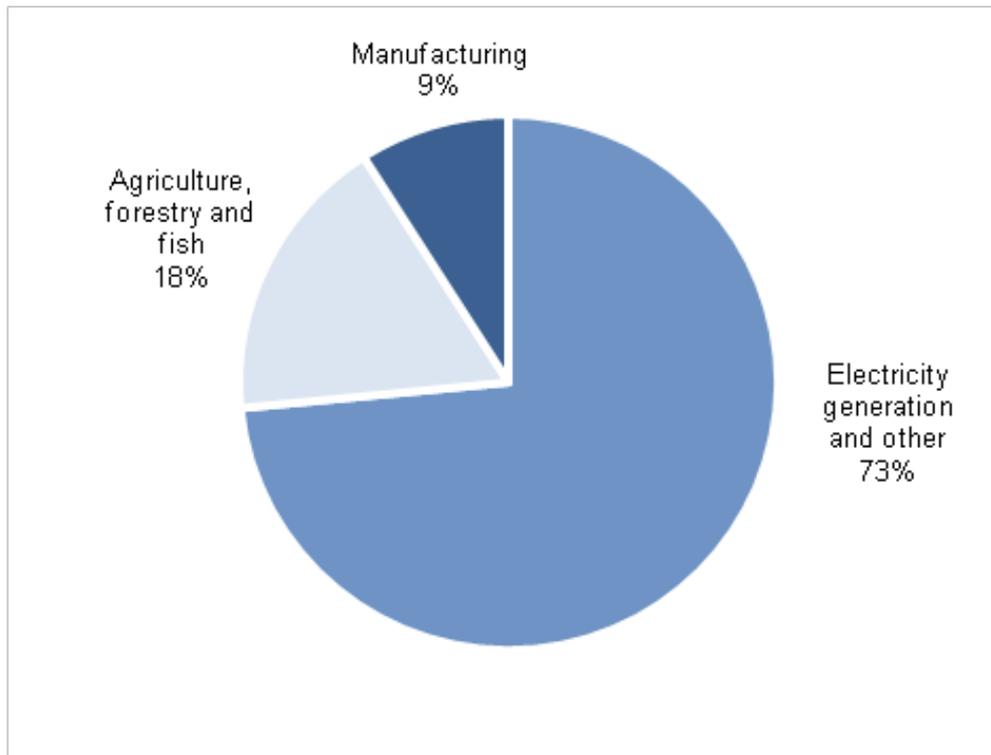
Download chart

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(27.5 Kb)

Direct abstractions from groundwater and non-tidal waters, 2006-07

England and Wales



Notes:

1. Estimates exclude abstractions below the licensing threshold

Download chart

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(27.5 Kb)

Source: DEFRA, Environment Agency, WRAP, WRc.

Environmental taxes

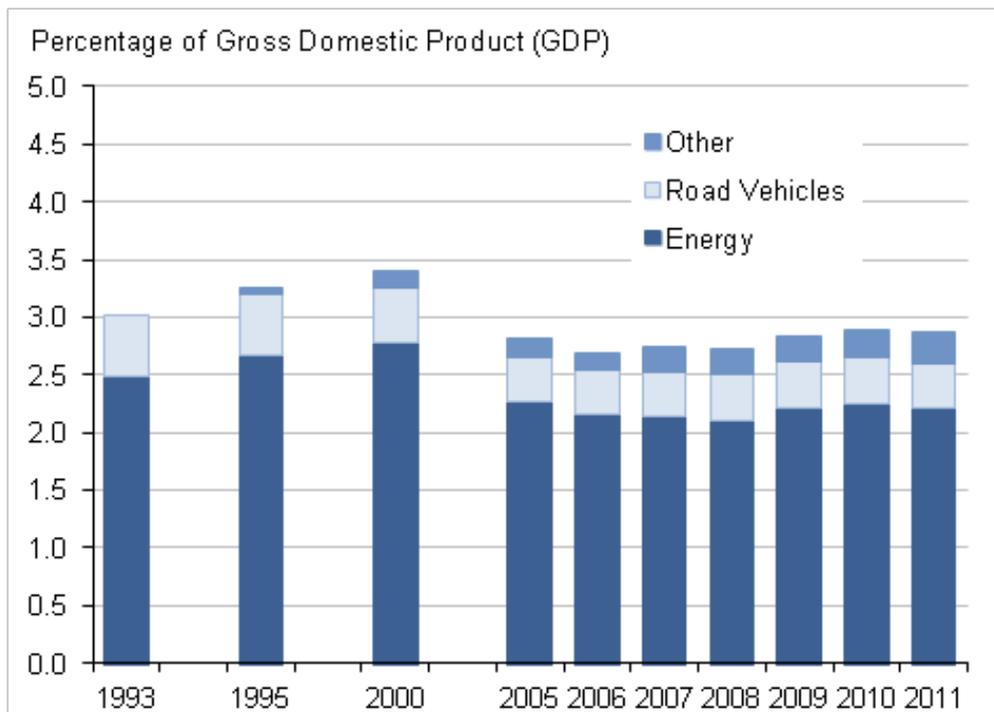
In 2011, the UK Government received £43.3 billion from environmental taxes¹. This was £1.2 billion more than in 2010 and more than double the amount received in 1993. In 2011, environmental taxes accounted for 7.9 per cent of total taxes and social contributions, down from 8.1 per cent in 2010. Receipts from environmental taxes were equivalent to 2.9 per cent of Gross Domestic Product (GDP) in current prices in 2011, unchanged from 2010 and down from 3.5 per cent in 1999.

Environmental tax receipts increased in 2011, compared with 2010, as:

- Energy taxes increased by £0.6 billion to £33.5 billion.
- Road vehicles taxes were unchanged at £5.8 billion.
- Other environmental taxes – air passenger duty, landfill tax, and aggregates levy – increased by £0.6 billion to £4.0 billion.

Environmental Tax Revenue

UK



Source: Office for National Statistics

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(40 Kb)

Energy

Tax revenue from energy increased in 2011, compared with 2010, primarily due to an increase in VAT on duty. Revenue from hydrocarbon oils decreased by £0.1 billion to £26.9 billion. Receipts from diesel increased by £0.4 billion to £14.3 billion, while receipts from petrol decreased by £0.4 billion to £10.6 billion. This was driven by increases in fuel duty rates since the small increase in the volume of diesel sales was more than offset by the decrease in demand for petrol². In 2011, petrol and diesel together accounted for 57.7 per cent of the total environmental tax revenue and overall energy taxes were 2.2 per cent of GDP.

Road Vehicles

Tax revenue from road vehicles remained unchanged in 2011, compared with 2010, as vehicle exercise duty remained at £5.8 billion - the largest since 1993. Road Vehicle taxes were 0.4 per cent of GDP in 2011.

Other environmental taxes

Tax revenue from other sources increased in 2011, compared to 2010, due to an increase in receipts from both air passenger duty and landfill tax. Receipts from air passenger duty increased by £0.5 billion to £2.6 billion, and receipts from landfill tax increased by £0.1 billion to £1.1 billion. Other environmental taxes were 0.3 per cent of GDP in 2011.

Notes for Environmental taxes

1. Get definitions of environmental taxes and international standards from [Government revenues from environmental taxes \(15.7 Kb Pdf\)](#).
2. Get more detail on automotive fuel sales from the [Retail Sales release](#) and an article on [The effect of duties on petrol and diesel on household disposable income, 2011](#).

Environmental Protection Expenditure (EPE)

- Environmental Protection Expenditure (EPE)¹ accounts are comprised of two different sections, Public Sector EPE, and EPE by industry.

General Government Environmental Protection Expenditure

The UK Government spent £13.3 billion on environmental protection in 2010. Expenditure rose from 2009 by £140 million as:

- Expenditure on pollution abatement increased by £228 million to £521 million.
- Expenditure on protection of bio-diversity and landscape increased by £96 million to £558 million.

Expenditure on research & development, education and administration activities contributing to environmental protection increased by £109 million to £415 million

The increases were partly offset as:

- Expenditure on waste and waste water management fell by £106 million to £10.0 billion.
- Expenditure on other abatement activities fell by £187 million to £1.8 billion.

The General Government expenditure on environmental protection has shown a general upward trend since 1996, rising by £10.0 billion between 1996 and 2010. Waste water management activities account for a large proportion of expenditure annually due to the definition of the category, and consequently its large scope of activities.

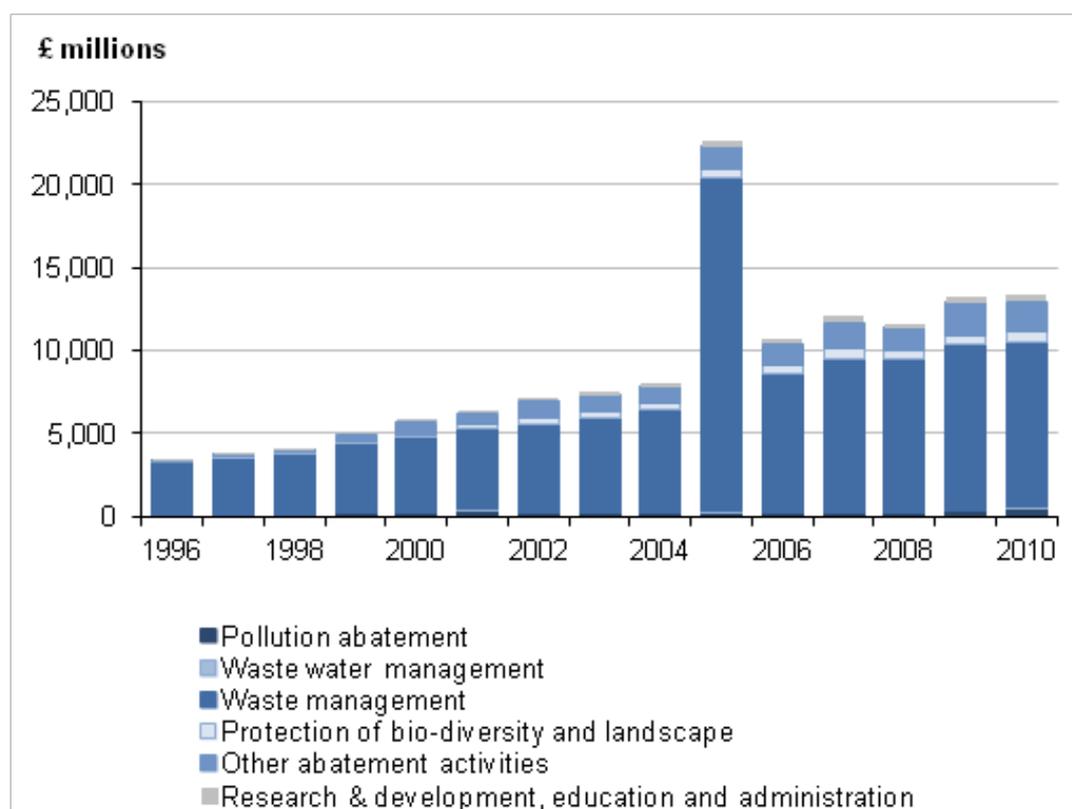
In 2010, this figure was £10.0 billion, 75.1 percent of total EPE; however, the largest expenditures on waste and waste water management were recorded in 2005. The sharp increase of £14.5 billion in EPE to £22.6 billion in 2005, compared with 2004, can be accredited to the decommissioning of British Nuclear Fuels, as this activity partly falls under the waste management category of the EPE classification. Despite the considerable size of the project, the trend should not be misinterpreted, as the decommissioning event was a singular occurrence.

In 2010, public sector EPE contributed 0.91 per cent of Gross Domestic Product (GDP). Compared with 1996, the contribution of environmental protection expenditure to GDP has risen from 0.43 per cent to 0.48 per cent.

The amount contributed to GDP by General Government EPE shows a consistent, gradual rise, which may suggest that as the country's output grows or contracts, the amount spent on environmental protection remains constant.

General Government EPE

UK



Source: Treasury (Her Majestys), Office for National Statistics

Download chart

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(39.5 Kb)

Environmental Protection Expenditure by Industry

Industry environmental protection expenditure² (EPE) stood at £3,920 million in 2009. This was a decrease of £411 million compared with 2008³, as:

- Expenditure on other abatement activities fell by £701 million to £513 million.
- Expenditure on waste management fell by £334 million to £633 million.

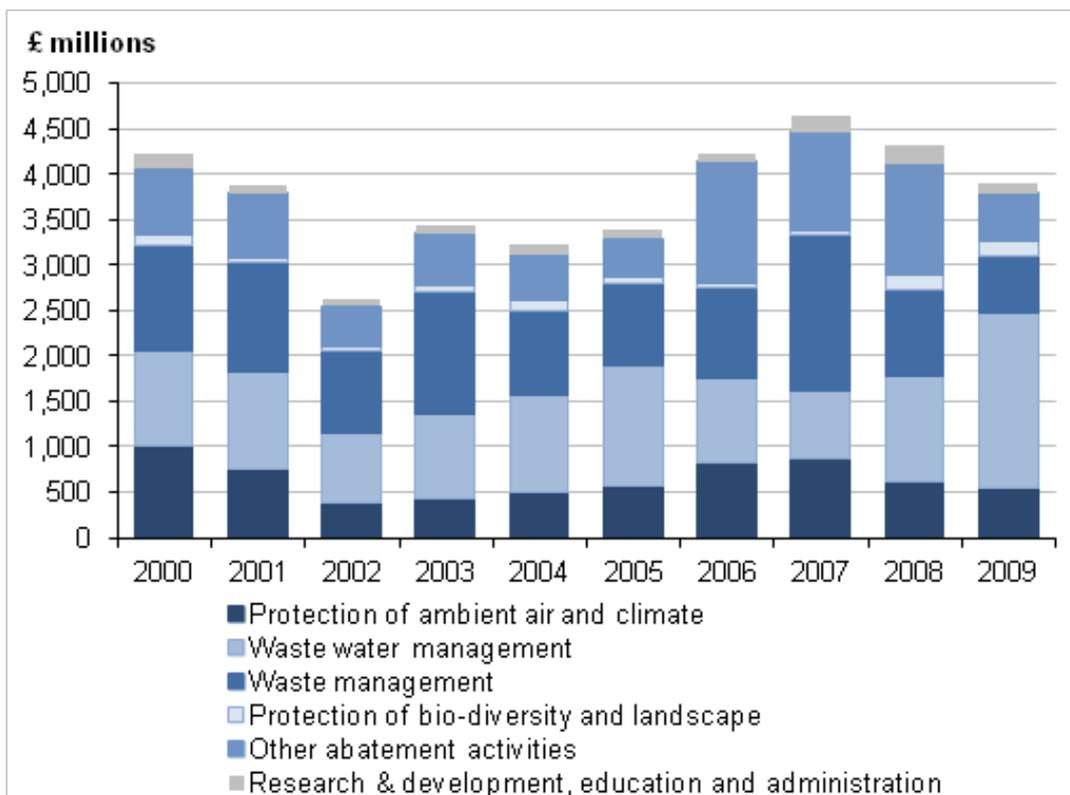
- Expenditure on research & development, education and administration activities fell by £87 million to £124 million.
- Expenditure on air and climate protection fell by £85 million to £553 million.

These falls were partly offset as:

- Expenditure on waste water management increased by £781 million to £1.9 billion.
- Expenditure on bio-diversity and landscape protection increased by £15 million to £172 million.

Industry EPE

UK



Source: Environment, Food and Rural Affairs

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(201.5 Kb)

EPE can be divided into three categories:

- Operational expenditure (OPEX) consists of in-house operating costs of a company's own environmental protection activities.
- Capital expenditure (CAPEX) consists of 'end of pipe' investments (expenditure on equipment to clean up at the end of the production process).
- Research & development.

EPE Industry expenditure in 2009:

- Electricity, gas and water: Expenditure from these industries was £2.7 billion, accounting for 68 per cent of the total EPE. Of this £2.7 billion; 50 per cent was operational expenditure, while 48 per cent was capital expenditure, and 2 per cent was spent on research & development.
- Other manufacturing: Expenditure from these industries was £0.6 billion, accounting for 16 per cent of the total EPE. Of this £0.6 billion; 72 per cent was operational expenditure, while 19 per cent was capital expenditure, and 9 per cent was spent on research & development.
- Food products, beverages, and tobacco: Expenditure from these industries was £0.3 billion, accounting for 8 per cent of the total EPE; of this £0.3 billion, 87 per cent was operational expenditure, while 12 per cent was capital expenditure, and 1 per cent was spent on research & development

Overall, the EPE by industry has shown a mixed picture between 2000 and 2009. Expenditure stood at £4.6 billion in 2007 – the highest since 2000, whilst in 2002 expenditure reached £2.6 billion, the lowest on record. The reduction in spending could be explained by the general downturn in the manufacturing sector and industrial production during these periods. It is hard to identify a clear trend of spending due to changes in industry sample size, and in survey classification.

Notes for Environmental Protection Expenditure (EPE)

1. United Nations System of Integrated Environmental and Economic Accounting (SEEA) defines EPE as expenditures whose primary purpose is the prevention, reduction and elimination of pollution and other forms of degradation of the environment.
2. Environmental protection expenditure includes: expenditure to reduce or prevent emission to air and water; expenditure to protect or clean up soil and groundwater; expenditure to prevent noise and vibration; and expenditure to reduce, treat and dispose of waste materials. Expenditure may be operating expenditure (OPEX) or capital expenditure (CAPEX).
3. Comparisons between years should be treated with caution due to changes in survey methodology: Department for Environment, Food and Rural Affairs (DEFRA) [Industrial survey report](#).

Background notes

1. What's new?

The Board of the UK Statistics Authority has completed its review of the UK Environmental Accounts against the Code of Practice for Statistics and designation against the related 'National Statistics' quality mark. Following the review, 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 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.

Following the UK Statistics Authority's recommendations to improve the presentation and the accompanying commentary and analysis of UK Environmental Accounts to aid user interpretation, ONS has implemented the following steps this year:

- Environmental Accounts are published in one single Statistical Bulletin instead of three separate reports.
- Additional industry analysis has been carried out for the air emissions and energy accounts to add value.
- A number of improved charts are presented to better explain the trends and an interactive tool is now available for users to explore emissions data.

The Environmental Protection Expenditure accounts have been reviewed and after consulting with users, the ONS has moved to include public sector expenditure within the accounts on an annual basis. This was possible after a new data source was made available.

Energy from wood, straw, biofuels and waste is included in total energy consumption and in industry group totals for direct use of energy and reallocated use of energy throughout 1990 to 2010 for the first time.

This publication includes accounts on Use of Water Resources by Industrial Sector in England and Wales 2006-07. The analysis was carried out by Department for Environment, Food and Rural Affairs (DEFRA) Environmental Statistics Service.

2. What's coming up?

Open Consultation on Ecosystem Accounting is planned for 17 July to 30 September

The Government's White Paper, *The Natural Choice*, published last year, highlighted the critical role of the natural environment for economic and social wellbeing. One of the commitments made in the White Paper was:

"We will put natural capital at the heart of Government accounting. We will work with the Office for National Statistics to fully include natural capital in the UK Environmental Accounts In 2012 we will publish a roadmap for further improvements up to 2020..."

In order to progress towards this vision, ONS will be running a consultation and publishing a paper jointly produced by the Government and ONS. This paper will explain the benefits of extending the accounts, the issues involved in developing such a roadmap and seek views on scope and priorities.

Forestry asset accounts

In November 2011, in response to the Natural Environment White Paper (NEWP) commitments, ONS published a paper "[Towards a sustainable environment – UK Natural Capital and Ecosystem Accounting](#)" to outline its approach to deliver the 'early changes by 2013' to the UK Environmental Accounts.

The ONS plans to produce physical and monetary asset accounts for forestry in line with the SEEA Central Framework along with a pilot to explore the extent to which a full forestry ecosystem account could be produced. As a first step, estimates for a physical asset account for forest and other wooded land along with a physical asset account for timber resources will be published in autumn 2012.

Review of oil & gas monetary asset account methodology

In 2011, the ONS published the monetary asset accounts for the UK Continental Shelf oil and gas reserves with an improved methodology. However, to continue providing quality estimates and adopting the best possible estimation model, the ONS will be reviewing this methodology again in autumn 2012.

General waste

The general waste account is published every two years, with the next update in 2013. It was last updated in [Environmental Accounts \(1.07 Mb Pdf\)](#) publication in June 2011.

3. Use of the statistics

The environmental accounts are used to make international comparisons of the impact of the economy on the environment. They inform sustainable development policy and will feed into the ONS National Well-being programme that considers environment and sustainability issues as well as the economy and quality of life. They are also used to model impacts of fiscal or monetary measures and to evaluate the environmental performance of different industrial sectors.

Get more detailed information in [Uses of the UK Environmental Accounts \(19.6 Kb Pdf\)](#).

4. User feedback

Since a review in 2006/07, ONS has included a very small amount of geothermal energy (around 0.001 Mtoe) in 'Energy from other sources' under 'Energy from renewable & waste sources'. However this energy is in the form of heat and not electricity as other renewable sources in this category.

When combined with the recent growth in active solar energy for heat (0.087 Mtoe in 2010) and use of heat pumps (0.061 Mtoe in 2010), this has now become a substantial category of energy use (0.07 per cent of total energy consumption in 2010). ONS is seeking user feedback on the classification of renewable sources used to generate heat.

Should we:

1. Include geothermal aquifers, heat pumps and active solar heating in 'Total Energy consumption' in 'Energy from other sources' under 'Energy from renewable & waste sources', allocate to industry group with other renewable & waste electricity and then reallocate to industry with distribution & transformation losses.

OR

2. Remove geothermal aquifers from 'Energy from renewable & waste sources' and other totals and industry breakdowns; then provide heat energy as a separate table for reference only.

Get further data on [heat energy \(91 Kb Excel sheet\)](#).

Please respond to environment.accounts@ons.gsi.gov.uk by 8 August.

5. Coherence with other published sources

Emissions and energy consumption presented in this bulletin differ from other estimates as explained in the relevant sections and bridging tables.

The material flow accounts are based on information published by [HM Revenue and Customs](#), the [British Geological Survey](#) and the [Food and Agriculture Organisation of the United Nations](#). During the compilation process validation checks ensure that published ONS material flows data are consistent with the source data but it should be noted that a snapshot of the data are extracted at a single point in time and so may differ slightly from the latest information available from these sources.

6. Industry Classifications

The Industry Classification used in the Environmental Accounts is the Standard Industrial Classification (SIC) 2007. [Current standard classifications](#)

The UK transport sector, as defined on a SIC basis, comprise those enterprises whose dominant activity is the provision of transport services - railways, tubes and trams, buses and coaches, taxis and mini cabs, road freight, air transport, water transport and transport via pipelines. The road freight industry covers road haulage companies as opposed to all types of road freight. Lorries owned by retailers, for instance, are allocated to the retail industry. The use of private cars by households is allocated to the domestic sector.

7. Methodology

Information on UK Environmental Accounts methodology, currently under review, is available on the [Environmental Accounts guidance and methodology pages](#).

The estimates of public sector environmental protection expenditure are derived from the Public Expenditure Statistics Analysis database produced by HM Treasury. The methodology for

these statistics was reviewed in January 2012 in [Developments in Environmental Protection Expenditure Accounts](#).

As well as improved coverage and restructured, updated data noted in the revisions section, air emissions and energy account methodology has been updated for new supply use tables, affecting public sector combustion and emissions from surface cleansing.

The primary economic activity for point sources have been reviewed re-assigning some plants to new industries. Industry splits for stationary refrigeration have also been updated, this impacts on estimates for hydro-fluorocarbons (HFC) emissions particularly leading to reductions in the retail industry.

8. Summary quality reports

Get summary Quality Reports for air emissions accounts, energy accounts, material flow accounts and environmental taxes from [Quality reports for economic statistics](#).

Work is planned to replace these Summary Quality Reports with Quality and Methodology Information Reports. These will be made available as soon as they are finalised. As well as the four specific accounts outlined above, an overarching report is being prepared for the UK Environmental Accounts.

9. Accuracy and reliability

ONS atmospheric emissions and energy consumption data are produced by contractors (AEA Energy and Environment) based on the [National Atmospheric Emissions Inventory](#) and [Greenhouse Gas Emissions Inventory](#) and the latest available National Accounts and official statistics sources, for example, supply-use tables. Other elements of the environmental accounts also draw on National Accounts data and administrative sources.

10. Revisions

Reliability can partly be estimated by measuring revisions to previously published statistics. Very few statistical revisions arise as a result of 'errors' in the popular sense of the word. All estimates, by definition, are subject to statistical 'error' but, in this context, the word refers to the uncertainty in any process or calculation that uses sampling, estimation or modelling. Most revisions reflect either the adoption of new methodology or the incorporation of new information. Only rarely are there avoidable 'errors' such as human or system 'errors' and such mistakes are made clear when they are discovered and corrected.

Revisions since previous publication in 2011

The environmental accounts have been updated since the 2011 publication to incorporate recent information and revisions to previously published estimates. The following accounts have been either updated or revised:

Greenhouse gas emissions and energy consumption

Data for greenhouse gas emissions has been revised upwards between 2004 and 2010 and downwards between 1990 and 2003 compared with data published in November and June 2011. Maximum revisions were a 1.4 per cent increase in 2009 and a 1.6 per cent decrease to 1990.

Data for total energy consumption has been revised upwards from a 0.6 per cent increase in 1990 to a 3.1 per cent increase in 2009, primarily through the inclusion of wood, straw, biofuels and waste.

These changes are also a result of:

- Including new sources for inland waterways, road transport biofuels and military aviation spirit as well as new estimates for burning gas oil. These increases are larger in later years.
- Revising or restructuring existing sources such as emissions from landfills, agricultural soils, mobile air conditioning, emission factors for heavy duty vehicles, methodology for emissions degradation, types of road vehicles, road freight data, cold start trip lengths and fuel consumption. These changes produce noticeable decreases to earlier years and smaller increases in later years.
- Changes to cross-boundary estimates such as including motorcycles, mopeds, biofuels, liquid petroleum gas (LPG) and road abrasion and changes to aviation and other data. These changes are smaller decreases.
- Energy from wood, straw, biofuels and waste is included in total energy consumption and in industry group totals for direct use of energy and reallocated use of energy throughout 1990 to 2010 for the first time in this year's publication.

Taxes

Total environmental taxes is unchanged, although there have been changes to the allocation between petrol and diesel of hydrocarbon duty due to improved coverage of fuel duty and demand.

Material Flows

Data for Domestic Material Input, Direct Material Consumption, and Total Material Requirement are revised due to a change in methodology and moving to a new system.

Environmental Accounts Revisions, 2012 Publication

UK

Percentage change when compared with previous publication

		1990	1995	2000	2005	2008	2009
Emissions ¹	Nov-11	-1.6	-0.6	-0.1	0.3	1.2	1.4
Energy	Nov-11	0.6	0.8	0.8	1.4	2.7	3.1
		2000	2005	2007	2008	2009	2010
Taxes	Nov-11	-	-	-	-	-	-
Material Flows		2004	2005	2006	2007	2008	2009
DMI	Nov-11	0.2	0.1	0.1	0.2	0.1	-2.3
DMC	Nov-11	0.2	0.1	0.2	0.2	0.1	-1.7
TMR	Nov-11	-1.5	-2.4	-2.1	-1.8	-1.7	-2.7

Table source: Office for National Statistics

Table notes:

1. Greenhouse gas emissions

Download table

 [XLS format](#)

(27 Kb)

11. Following ONS

1. Follow ONS on [Twitter](#) and [Facebook](#).
2. View the latest podcasts on [YouTube](#).

The UK Environmental Accounts are an output of the Measuring National Well-being Programme. The programme aims to produce accepted and trusted measures of the well-being of the nation and how the UK as a whole is doing.

Find out more on the [Measuring National Well-being](#) website pages.

Why not join [StatsUserNet](#) to contribute to the discussion?

The next update to Environmental Accounts will be announced via the [ONS release calendar](#).

12. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

These National Statistics are produced to high professional standards and released according to the arrangements approved by the UK Statistics Authority.

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Next Publication Date:

26 June 2013

Issuing Body:

Office for National Statistics

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