

Compendium

UK environmental accounts



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1. UK environmental accounts

Environmental accounts are:

- “satellite accounts” to the main national accounts
- compiled in accordance with the [System of Environmental-Economic Accounting \(SEEA\)](#), which closely follows the [United Nations System of National Accounts \(SNA\)](#).

Environmental accounts measure:

- the impact of the economy on the environment
- how the environment contributes to the economy by using the accounting framework and concepts of the national accounts

Environmental accounts are used to:

- inform sustainable development policy
- model impacts of fiscal or monetary measures
- evaluate the environmental impacts of different sectors of the economy

Environmental accounts data:

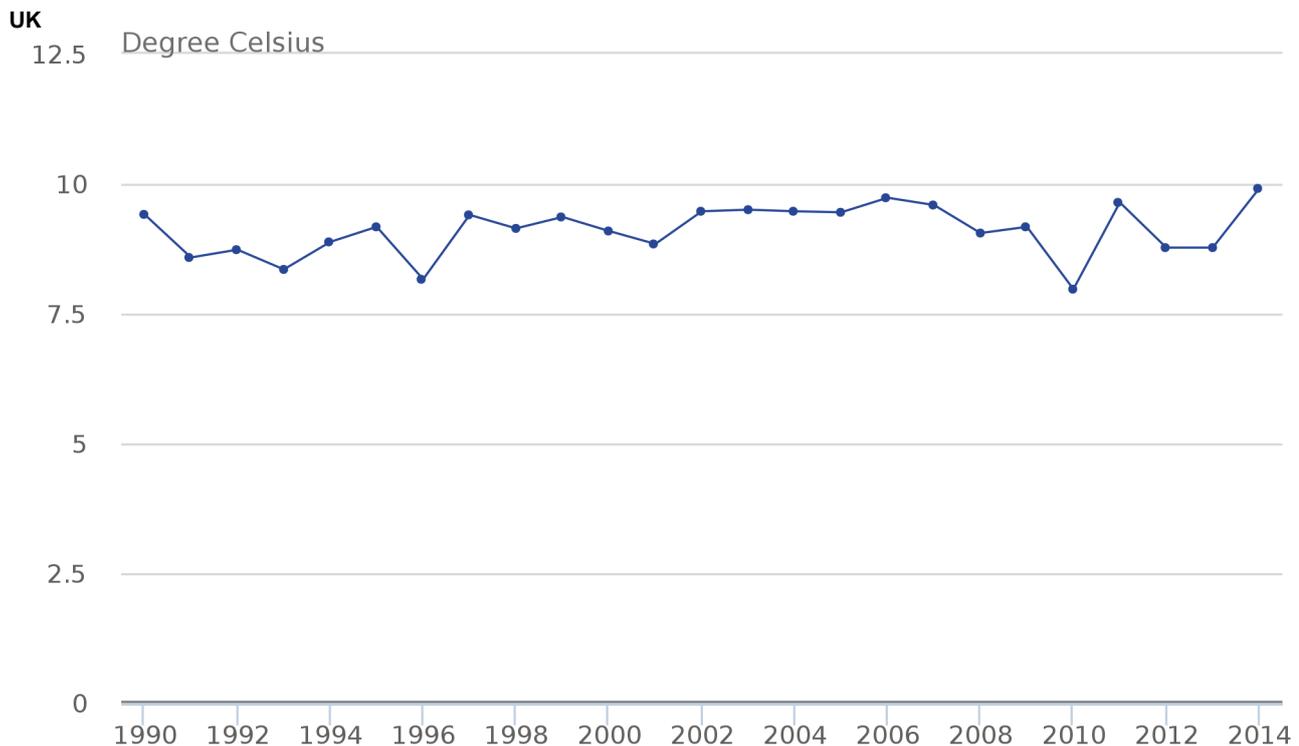
- are mostly provided in units of physical measurement (mass or volume)
- can be provided in monetary units, where this is the most relevant or only data available

[Tables 12.1 to 12.5](#) show estimates of oil and gas reserves, energy consumption, atmospheric emissions and material flows. More data, information and other environmental accounts (including fuel use, environmental goods and services sector, waste, water use, environmental taxes, environmental protection expenditure, low carbon and renewable energy economy and experimental natural capital accounts) can be found on the [UK Environmental Accounts release page](#) on our website.

2. Temperature

Figure 12.1 shows the change in mean air temperature between 1990 and 2014. This measure helps to contextualise some of the changes observed across the environmental accounts. For example, the average temperature fell to 8.0 degrees Celsius (°C) in 2010 from 9.2°C in 2009, which contributed to the increases in energy consumption and greenhouse gas emissions observed during that year. At the same time, GDP started to recover following the economic downturn, which may also explain the increases in consumption and emissions. Between 2013 and 2014, the average air temperature increased by 1.1°C (from 8.8°C to 9.9°C). This warmer weather can help to partly explain the decline in energy consumption over this period.

Figure 12.1: Mean air temperature, 1990 to 2015



Source: Met Office

3. Oil and gas reserves

[Table 12.1](#) presents non-monetary estimates of the oil and gas reserves and resources in the UK. “Resources” are minerals that are potentially valuable and could eventually be extracted, whereas “reserves” refer to discovered minerals that are recoverable and commercially viable.

Reserves can be proven, probable or possible depending on the confidence level:

- proven reserves (based on the available evidence) are virtually certain to be technically and commercially producible, that is, have a better than 90% chance of being produced
- probable reserves are not yet proven but have a more than 50% chance of being produced
- possible reserves cannot be regarded as probable at present, but are estimated to have a significant (but less than 50%) chance of being technically and commercially producible

Oil is defined as both oil and the liquids that can be obtained from gas fields. Shale oil is not included in the estimates. Total (discovered; proven and probable, plus possible reserve and undiscovered) oil reserves and resources for 2014 were estimated to be between 1,504 million tonnes and 2,404 million tonnes. The upper range for total oil reserves decreased between 2013 and 2014 by 0.5%, whilst the lower range decreased by 2.1%.

Gas includes gas expected to be available for sale from dry gas fields, gas condensate fields, oil fields associated with gas and a small amount from coal bed methane projects. Shale gas is not included in these estimates. These reserves include onshore and offshore discoveries, but not flared gas or gas consumed in production operations. Total gas reserves and resources were estimated between 959 billion cubic metres (bcm) and 1,594 bcm in 2014. The lower range for total gas reserves and resources had fallen by 4.8% between 2013 and 2014, and the upper range had fallen by 3.2%.

4. Energy consumption

[Table 12.2](#) presents energy consumption by industry for the UK. Energy consumption is defined as the use of energy for power generation, heating and transport. This is essential to most economic activities, for example, as input for production processes. “Direct use of energy” refers to the energy content of fuel for energy at the point of use, allocated to the original purchasers and consumers of fuels. For “reallocated use of energy”, the losses incurred during transformation¹ and distribution² are allocated to the final consumer of the energy rather than incorporating it all in the electricity generation sector.

Total energy consumption of primary fuels and equivalent was 202.7 million tonnes of oil equivalent (Mtoe) in 2014, 5.4% lower than in 2013. Fossil fuels remained the dominant source of energy supply in 2014; however, less primary fuel was consumed than in previous years. Energy consumption from fossil fuels in 2014 was at the lowest level since 1990 at 172.7 Mtoe. This represented 85.2% of total energy consumption.

Although fossil fuels are the main source of energy for consumption, other sources (including nuclear, net imports, and renewable and waste sources) are becoming increasingly important. Total energy consumption from other sources was 30.0 Mtoe in 2014, 2.7% higher than in 2013.

5. Atmospheric emissions

[Tables 12.3 and 12.4](#) show emissions of greenhouse gases, acid rain precursors (ARP) and other pollutants by industry for the UK.

Atmospheric emissions of greenhouse gases are widely believed to contribute to global warming and climate change. In 2014, emissions of greenhouse gases were estimated to be 608.6 million tonnes of carbon dioxide equivalent (mt CO₂e), the lowest level since 1990. Across the time series, the largest annual fall in emissions of greenhouse gases occurred in 2009, following the onset of the economic downturn in 2008, when emissions decreased by 8.5%. Between 2013 and 2014, emissions decreased by 33.0 mt CO₂e (5.1%). This was primarily due to reductions in carbon dioxide and methane emissions from the “energy supply, water and waste” sector.

Carbon dioxide (CO₂) was the dominant greenhouse gas, accounting for 84.8% of the UK’s total greenhouse gas emissions in 2014. The remainder of greenhouse gas emissions comprised methane (8.8%), nitrous oxide (3.6%) and fluorinated gases (2.8%).

Acid rain can have harmful effects on the environment and is caused primarily by emissions of sulphur dioxide (SO₂), nitrogen oxide (NO_x) and ammonia (NH₃). For comparability, all figures are weighted according to their acidifying potential, and presented as sulphur dioxide equivalents (SO₂e). Since 1990, acid rain precursors (ARP) emissions have decreased sharply, falling by 72.2%, from 6.9 million tonnes of sulphur dioxide equivalent (mt SO₂e) to 1.9 Mt SO₂e in 2014. Between 2013 and 2014, ARP emissions increased slightly by 1.3%.

6. Material flows

[Table 12.5](#) presents economy-wide material flow accounts, which estimate the physical flow of materials through the UK economy. The quantity of materials extracted in the UK has been gradually declining and fell to 419 million tonnes in 2013, the lowest point since 2000. However, between 2013 and 2014, total domestic extraction increased by 3.8% to 435 million tonnes.

Biomass includes material of biological origin that is not from fossil, such as crops, wood and wild fish catch. In 2014, 136 million tonnes were extracted, 4 million tonnes more than in 2013 (132 million tonnes). Of this, crop residues, fodder crops and grazed biomass accounted for 66.2% (90 million tonnes).

Non-metallic minerals are mainly construction and industrial minerals, including limestone and gypsum, sand and gravel, and clays. There has been an overall fall in extraction of non-metallic minerals since 2000. However, extraction of non-metallic minerals increased by 7.7% between 2013 and 2014 (from 196 million tonnes to 211 million tonnes).

Fossil energy materials and carriers include coal, peat, crude oil and natural gas. Since 2000, extraction has continually decreased and fell to 88 million tonnes in 2014, 2.2% lower than in 2013 (90 million tonnes). The decline in the extraction of fossil energy materials is due primarily to a drop in North Sea oil and gas production.

Physical imports increased by 41.4% between 2000 and 2014, rising from 210 million tonnes to 297 million tonnes in 2014. Contrary to this, physical exports have gradually decreased, peaking at 197 million tonnes in 2002 and falling to 153 million tonnes in 2014 – the lowest point since 2000. The rise in imports partly offsets the decline in domestic extraction.

The physical trade balance (PTB) shows the relationship between imports and exports and is calculated by subtracting the weight of exports from the weight of imports³. The UK has a positive PTB, meaning that more materials and products are imported than are exported.

In 2000, the PTB was relatively small at 16 million tonnes. It generally increased until 2007, but then fell between 2008 and 2010 during the economic downturn. Since 2010, the PTB has increased, peaking at 148 million tonnes in 2013. However, the PTB decreased by 2.7% in 2014 (to 144 million tonnes). Despite this, the amount of materials and products that were imported (297 million tonnes) was almost twice the amount of materials and products that were exported (153 million tonnes), suggesting that the UK may be becoming more reliant on the production of materials in other countries.

Direct material input (DMI) (domestic extraction plus imports) measures the total amount of materials that are available for use in the economy.

Domestic material consumption (DMC) (domestic extraction plus imports minus exports) measures the amount of materials used in the economy, and is calculated by subtracting exports from DMI.

In 2014, the UK consumed 563 million tonnes of material, consisting of 205 million tonnes of non-metallic minerals (36.4%), 173 million tonnes of biomass (30.7%), 170 million tonnes of fossil fuels (30.2%) and 15 million tonnes of metal ores (2.7%).

Between 2000 and 2014, DMI and DMC decreased by 21.1% and 23.8% respectively. DMI and DMC have gradually declined since the start of the economic downturn in 2008. This indicates that fewer material resources were being used and consumed in the UK economy. DMI and DMC fell most sharply between 2008 and 2009 (decreasing by 11.4% and 12.2%, respectively). Between 2013 and 2014, DMI increased by 1.5%, from 721 million tonnes to 732 million tonnes. However, DMC decreased by 1.2%, from 570 million tonnes to 563 million tonnes.

7. More information

There is more information about environmental accounts on the [UK Environmental Accounts release page](#) on our website.

Notes

1. Transformation losses are the differences between the energy content of the input and output product, arising from the transformation of one energy product to another.
2. Distribution losses are losses of energy product during transmission (for example, losses of electricity in the grid) between the supplier and the user of the energy.
3. The physical trade balance (imports minus exports) is defined in reverse to the monetary trade balance (exports minus imports). Physical estimates can differ quite significantly from monetary estimates.