

Compendium

Environmental accounts

Estimates of oil and gas reserves, energy consumption, atmospheric emissions, material flows and natural capital.

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Correction

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We have corrected an error in the input data for the services of agricultural biomass, water abstraction and minerals for the year 2002. The series affected are; FU2N, FU2Q, FU2S, FV4X, FV52 and FV54. For these series, mixed income was not added to the gross operating surplus when calculating our resource rent residual value. This error affects the annual value for 2002 (table 12.7) and the asset values for 2002 to 2006 (table 12.6).

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1 . Environmental accounts

- Environmental accounts are “satellite accounts” to the main UK National Accounts.
- They are compiled in accordance with the [System of Environmental-Economic Accounting \(SEEA\)](#), which closely follows the [United Nations System of National Accounts \(SNA\)](#).
- They measure the impact the economy has on the environment, how the environment contributes to the economy, and how society responds to environmental issues by using the accounting framework and concepts of the national accounts.
- They are used to inform sustainable development policy, model impacts of fiscal or monetary measures and evaluate the environmental impacts of different sectors of the economy.
- Data are mostly provided in units of physical measurement (mass or volume) but can be provided in monetary units, where these are the most relevant or only data available.

Tables 12.1 to 12.5 in the [accompanying dataset \(XLS, 143.9KB\)](#) 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, environmental taxes and environmental protection expenditure) can be found on the [UK Environmental Accounts release page](#).

2 . Oil and gas reserves

Table 12.1 in the [accompanying dataset \(XLS, 143.9KB\)](#) 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.

Discovered reserves can be proven, probable or possible depending on the level of certainty that, based on the available evidence, they can be technically and commercially producible:

- proven reserves have better than a 90% chance
- probable reserves have between a 50% and 90% chance
- possible reserves have between a 10% and 50% chance

Contingent resources are also shown in Table 12.1. These are the quantities of oil and gas estimated to be potentially recoverable from known sites, but the plans are not yet mature enough for commercial development. Potentially recoverable in this case means a better than 50% chance of being technically producible.

The Oil and Gas Authority (OGA) also produce estimates for prospective resources – those undiscovered or “yet to find”. Methodology for estimating this has changed over the years so it is not possible to show a consistent time series in Table 12.1.

Oil is defined as both oil and the liquids that can be obtained from gas fields. Shale oil is not included in the estimates.

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.

Data are sourced from the OGA and the Department for Business, Energy and Industrial Strategy (BEIS).

3 . Energy consumption

Table 12.2 in the [accompanying dataset \(XLS, 143.9KB\)](#) 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. The term “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. On the other hand, “reallocated use of energy” means that the losses incurred during transformation [note 1] and distribution [note 2] are allocated to the final consumer of the energy rather than incorporating it all in the electricity generation sector.

Fossil fuels are the main source of energy for consumption, although other sources (including nuclear, net imports, renewable [note 3], and waste sources) are becoming increasingly important.

Short-term fluctuations in energy consumption are often attributable to changes in temperature or gross domestic product (GDP). Longer term, the decline in energy consumption has largely been driven by the switch away from coal by the energy supply and manufacturing industries to other, more efficient fuels, such as natural gas and, more recently, renewable sources.

Data are provided by Ricardo Energy and Environment.

Notes for: Energy consumption

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

4 . Atmospheric emissions

Tables 12.3 and 12.4 in the [accompanying dataset \(XLS, 143.9KB\)](#) 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.

The greenhouse gases included in the tables are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydro-fluorocarbons (HFC), perfluorocarbons (PFC), nitrogen trifluoride (NF₃) and sulphur hexafluoride (SF₆). For comparability, all figures are presented as carbon dioxide equivalents (CO₂e).

Other important atmospheric emissions include acid rain precursors (ARPs). Acid rain is caused primarily by emissions of sulphur dioxide (SO₂), nitrogen oxides (NO_x) and ammonia (NH₃) and can have harmful effects on the environment. For comparability, all figures are weighted according to their acidifying potential and presented as sulphur dioxide equivalents (SO₂e).

Emissions levels are influenced by factors such as gross domestic product (GDP) and UK temperatures. They are also influenced by policy initiatives, for example, those encouraging adoption of cleaner technologies or emissions standards on motor vehicles. Changes in energy consumption, particularly energy from fossil fuels, directly influence air emissions.

Data are provided by Ricardo Energy and Environment.

5 . Material flows

Table 12.5 in the [accompanying dataset \(XLS, 143.9KB\)](#) presents economy-wide material flow accounts, which estimate the physical flow of materials through the UK economy.

Domestic extraction is divided into four categories: biomass, non-metallic minerals, fossil energy materials and carriers, and metal ores:

- biomass includes material of biological origin that is not from fossil, such as crops, wood and wild fish catch
- non-metallic minerals are mainly construction and industrial minerals, including limestone and gypsum, sand and gravel, and clays
- fossil energy materials and carriers include coal, peat [note 1], crude oil and natural gas
- metal ores include precious metals such as gold

Data are compiled from multiple sources including the Department for Environment, Food and Rural Affairs (Defra), the United Nations Food and Agriculture Organisation (FAO), the British Geological Survey (BGS), Eurostat, and the Kentish Cobnuts Association.

Physical trade balance

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 imports [note 2]. The UK has a positive PTB, meaning that more materials and products are imported than are exported suggesting that the UK may be becoming more reliant on the production of materials in other countries.

Material consumption

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.

Notes for: Material flows

1. For fossil energy materials and carriers (which include coal, crude oil, natural gas and peat) peat estimates were not available from 2016.
2. 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.

6 . Natural capital

In collaboration with the Department for Environment, Food and Rural Affairs (Defra) we have been developing natural capital accounts to estimate the wealth of the UK's environment. These are currently Experimental Statistics.

The UK's natural wealth is reflected in the productivity of its soils, its access to clean water, and its mountains. Any natural resource or process that supports human life forms an important part of our natural capital. Natural capital is one part of a wider move to better understand wealth. In that respect, we are not only estimating what wealth the UK inherited in its islands and seas but what it might provide to future generations.

These figures are partial in terms of the number of services. We will continue to work to include as much of the economic value of the natural world as possible but may never complete that work, given the complexity and scale of the natural world. Our asset values are also narrowly market driven and not an absolute "value" of the natural world because nature supports all life on earth. Nature's wholesale collapse would be our own. For more details please see the [UK Natural Capital Accounts: 2021](#).

7 . More information

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

The residency adjustment is included, as the UK Environmental Accounts are based on a UK residency basis (as opposed to a territory basis). This is in line with national accounting principles, allowing environmental impacts to be compared on a consistent basis with economic indicators such as gross domestic product (GDP).

UK figures for energy and air emissions on a territory basis are published by the Department for Business, Energy and Industrial Strategy (BEIS) and the Department for Environment, Food and Rural Affairs (Defra). Energy and air emissions bridging tables are available, which illustrate the difference between these estimates.

Further explanation of the differences can be found in [our article on energy consumption](#) and [our article on net zero and the different official measures of the UK's greenhouse gas emissions](#).

Data rounded to thousand tonnes can be found on the [UK Environmental Accounts release page](#).

8 . Cite this chapter

Office for National Statistics (ONS), released 31 October 2022, ONS website, compendium chapter, [Environmental accounts, UK National Accounts, The Blue Book: 2022](#)