

Statistical bulletin

UK Environmental Accounts: 2024

Measuring the contribution of the environment to the economy, impact of economic activity on the environment, and response to environmental issues.



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1 . Main points

- UK greenhouse gas emissions on a residence basis increased by 1.2% between 2021 and 2022, to 506 million tonnes of carbon dioxide equivalent.
- Consumer expenditure remained the largest single contributor to UK emissions in 2022, with 24.6%, while the energy sector continued to be the second largest, at 16.4%.
- Emissions from the transport sector have increased by 39.6% since 2021, largely driven by increasing activity after Coronavirus (COVID-19) restrictions.
- Energy from renewable sources accounted for 13.9% of total UK energy use in 2022, increasing from 13.3% in 2021.
- Output from the UK environmental goods and services sector (EGSS) was estimated to be £103.6 billion in 2021, up 15.9% from 2020.
- Full-time equivalent employment in the UK EGSS was estimated to be 450,700 in 2021, up 12.4% from 2020.

The most recent data for different measures in this release vary because of source data availability. Greenhouse gas emissions and energy use are available to 2022, while environmental goods and services sector estimates are available to 2021.

2 . Greenhouse gas emissions

Information about different emissions measures can be found in our [Measuring UK greenhouse gas emissions explainer](#).

Total UK greenhouse gas (GHG) emissions on a residence basis in 2022 were just under 506 million tonnes of carbon dioxide equivalent (Mt CO₂e). This was a 1.2% increase from 2021.

Emissions from households, accounted for through consumer expenditure, has continued to be the largest single contributor to this measure of UK emissions. In 2022, these emissions - primarily from heating homes and travelling - were 125 Mt CO₂e, accounting for 24.6% of total UK emissions, down 5.8% on 2021.

The second-highest emitter was the energy sector, with 83 Mt CO₂e in 2022, 16.4% of the total, and down 4.0% on 2021. The energy sector saw the largest fall in emissions since 2012, at 53.6%. By comparison, manufacturing and transport - the two other highest-emitting industries - saw decreases in emissions of 13.0% and 3.8%, respectively.

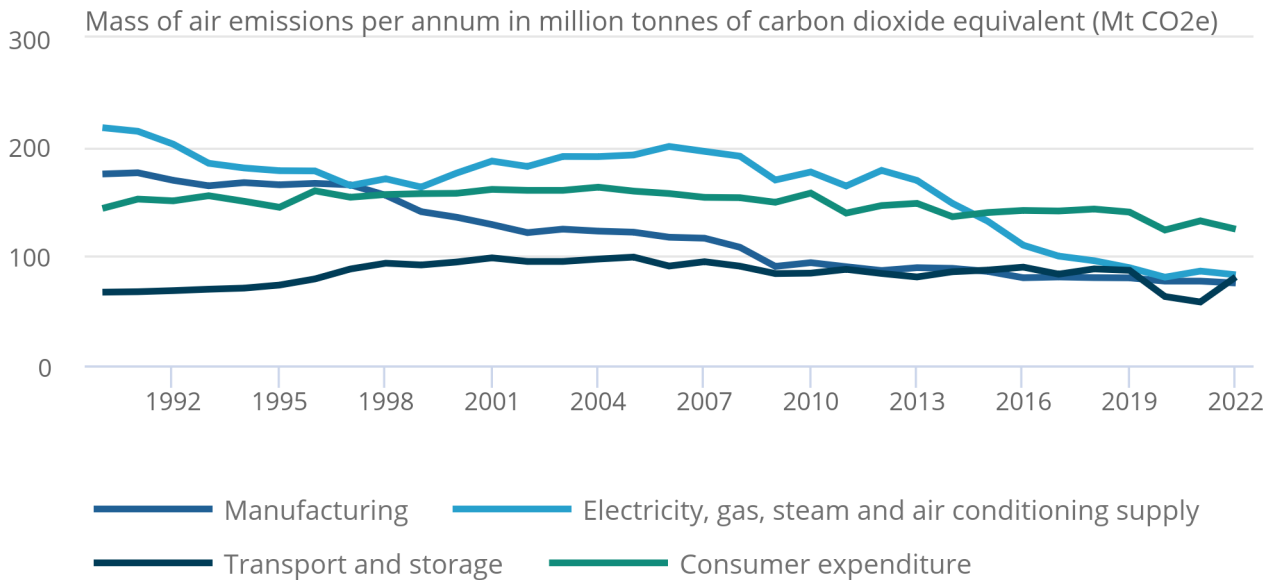
Notably, transport sector emissions increased by 39.6% from 2021 to 2022, following an 8.0% decrease from 2020 to 2021. The industry also saw the largest increase (28.4%) across all industries since 2020. The rise in 2022 was largely attributed to increasing transport industry activity after the coronavirus (COVID-19) pandemic. In particular, there were substantial increases in emissions from aviation fuel use after air travel restrictions during the pandemic.

Figure 1: Consumer expenditure has been the single largest emitter of UK greenhouse gases since 2015

Residence-based greenhouse gas emissions for the three highest-emitting industries and households, 1990 to 2022, UK

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Residence-based greenhouse gas emissions for the three highest-emitting industries and households, 1990 to 2022, UK



Source: UK Environmental Accounts from Ricardo Energy and Environment, and the Office for National Statistics

Notes:

1. Industry aggregations are based on the UK Standard Industrial Classification (SIC) 2007. Households include “consumer expenditure” and “activities of households as employers; undifferentiated goods and services – producing activities of households for own use” (for example, employing a cleaner and growing vegetables for your own consumption). The electricity, gas, steam and air-conditioning supply sector is referred to as the energy supply sector. The transport and storage sector is referred to as the transport sector.
2. Greenhouse gas emissions include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃).

3 . Greenhouse gas emission intensity

Decreasing UK greenhouse gas (GHG) emission intensity is likely to indicate that the UK is moving towards a lower carbon economy.

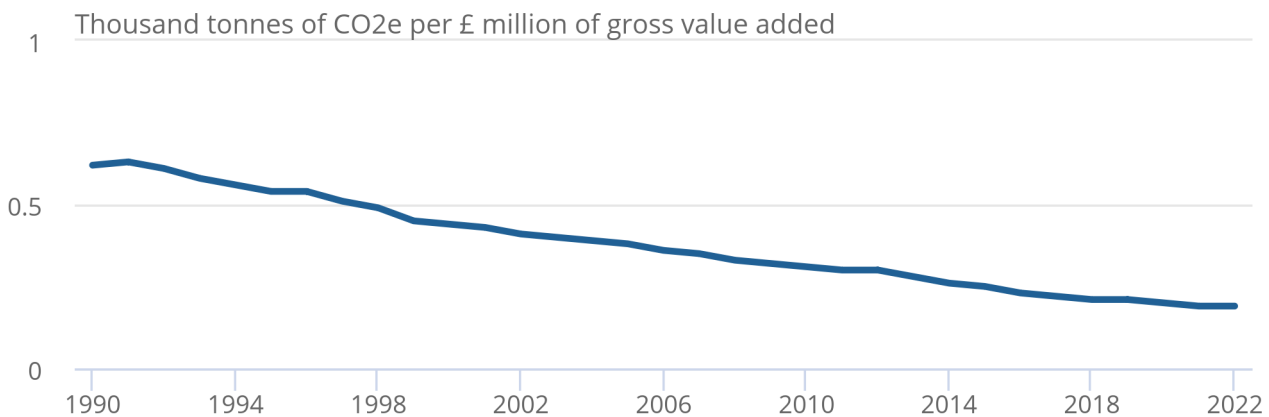
In 2022 the UK emitted 0.19 thousand tonnes of CO₂e per £ million of gross value added (GVA), the same as the previous year. This is a reduction of 69.4% since 1990.

Figure 2: Emission intensity has declined steadily since 1990

Residence-based greenhouse gas emission intensity (thousand tonnes of CO₂e per £ million of gross value added), 1990 to 2022, UK

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Residence-based greenhouse gas emission intensity (thousand tonnes of CO₂e per £ million of gross value added), 1990 to 2022, UK



Source: UK Environmental Accounts from Ricardo Energy and Environment, and the Office for National Statistics

Notes:

1. Greenhouse gas emissions intensity is calculated by dividing the level of greenhouse gas emissions by gross value added (GVA). GVA is the difference between output and intermediate consumption for any given industry. This means the difference between the value of goods and services produced (output) and the cost of raw materials and other inputs that are used up in production (intermediate consumption). GVA are chained volume measures, in constant prices with 2022 as the base year. All emissions intensity figures are calculated excluding consumer expenditure (often referred to as “households” in the article accompanying this dataset).
2. Greenhouse gas emissions include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃).

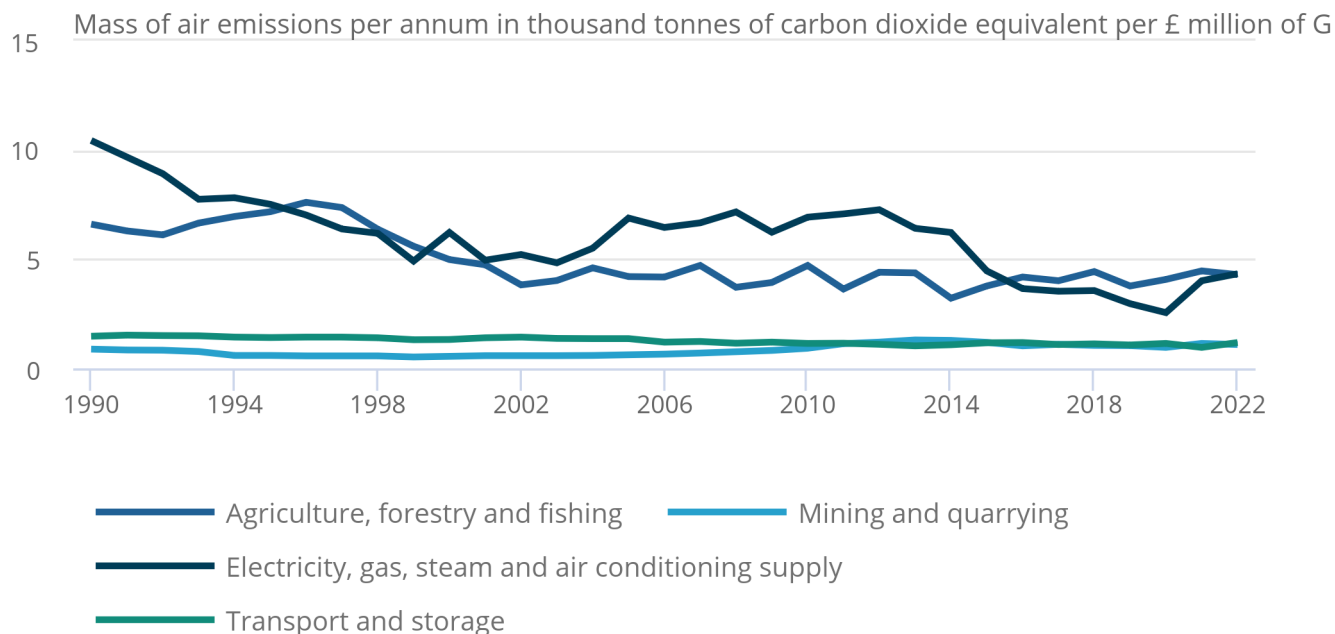
The energy supply sector was the most emission intensive industry in 2022, closely followed by the agriculture industry. Although overall energy industry emissions decreased slightly in 2022 compared with 2021, the increase in intensity was caused by a decrease in GVA rather than increasing emissions.

Figure 3: The energy sector and agriculture industry have consistently been the most emission intense industries since 1990

Residence-based greenhouse gas intensity for the four highest-emitting industries in 1990 to 2022

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4 . Energy use

Most greenhouse gas emissions are related to energy use.

The UK used a total of almost 177 million tonnes of oil equivalent (Mtoe) of energy in 2022, 81.0% from fossil fuels.

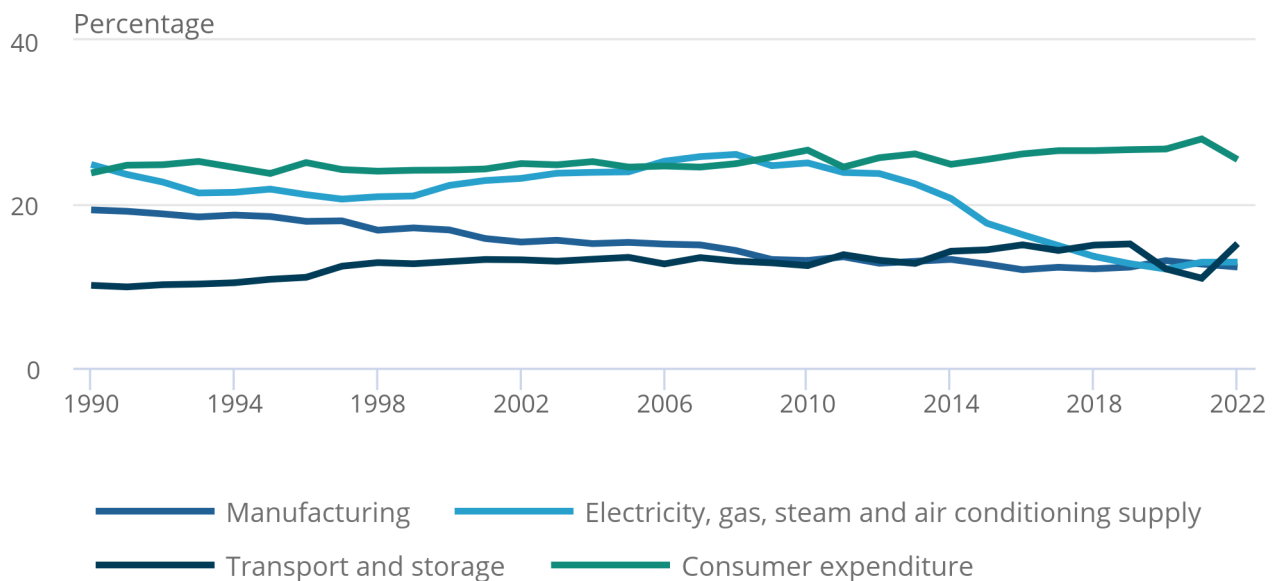
In 2022, energy from renewable sources accounted for 13.9% of all energy use in the UK, compared with 0.7% in 1990. Energy use from fossil fuels has been decreasing for the energy and manufacturing sectors, largely because of a switch from coal to other fuels, such as natural gas, which generate relatively lower emissions. The remaining energy use (5.9%) was nuclear energy.

Figure 4: Energy use from fossil fuels have generally trended downwards among the top industries, with the energy sector decreasing markedly across the time series

Share of energy use from fossil fuel sources, %, 1990 to 2022, UK

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Share of energy use from fossil fuel sources, %, 1990 to 2022, UK



Source: UK Environmental Accounts from Ricardo Energy and Environment, and the Office for National Statistics

Notes:

1. Industry aggregations are based on the UK Standard Industrial Classification (SIC) 2007. Households include “consumer expenditure” and “activities of households as employers; undifferentiated goods and services – producing activities of households for own use” (for example, employing a cleaner and growing vegetables for your own consumption). The electricity, gas, steam and air-conditioning supply sector is referred to as the energy supply sector. The transport and storage sector is referred to as the transport sector.

5 . Environmental goods and services sector

Our environmental goods and services sector (EGSS) statistics measure 17 economic activities producing goods and services for environmental protection and resource management purposes.

The framework follows the [United Nations \(UN\) System of Environmental-Economic Accounting \(SEEA\)](#). For more detail, see our [EGSS Quality and Methodology Information report](#).

Output

Output from the UK EGSS was an estimated £103.6 billion in 2021, up 15.9% from 2020.

The largest contributors to this increase were production of renewable energy (25.6% of the total increase), recycling (18.4%), and environmental-related construction (17.8%). While increases were seen across most activities, the only activity with a fall in output in 2021 was environmental consultancy and engineering (down 3.7% from 2020).

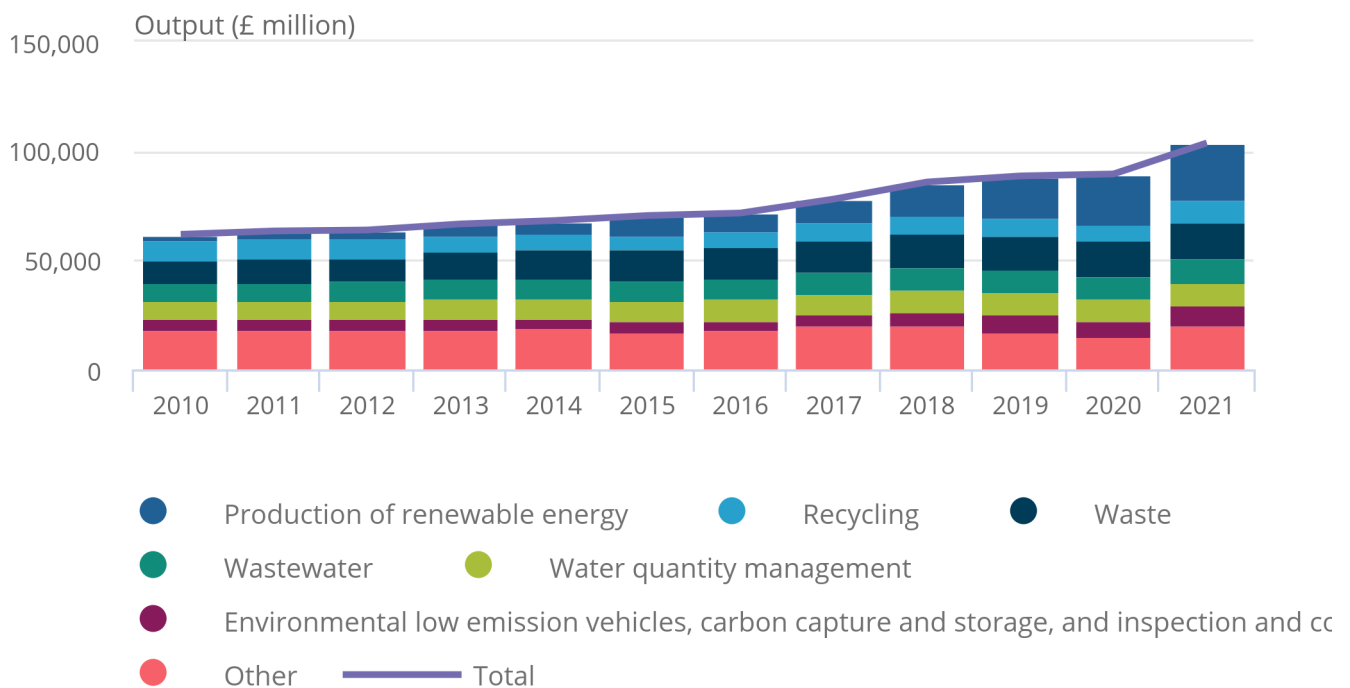
Overall EGSS output has increased annually since 2010 in current price terms, with the increase in 2021 being the largest, and the second largest in 2018 (10.0%).

Figure 5: In 2021, output of the UK’s environmental goods and services sector saw the largest increase since 2010

£ million, 2010 to 2021, UK

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£ million, 2010 to 2021, UK



Source: Office for National Statistics

Notes:

1. Data are in current prices and are not adjusted for inflation
2. The "Other" category consists of 11 further activities. See the full [dataset](#) for details.

Employment

The UK EGSS was estimated to have 450,700 full-time equivalent (FTE) employees in 2021, up 12.4% from 2020.

Waste had the largest FTE across EGSS activities in 2021, with 121,200 FTE, accounting for 26.9% of the UK total.

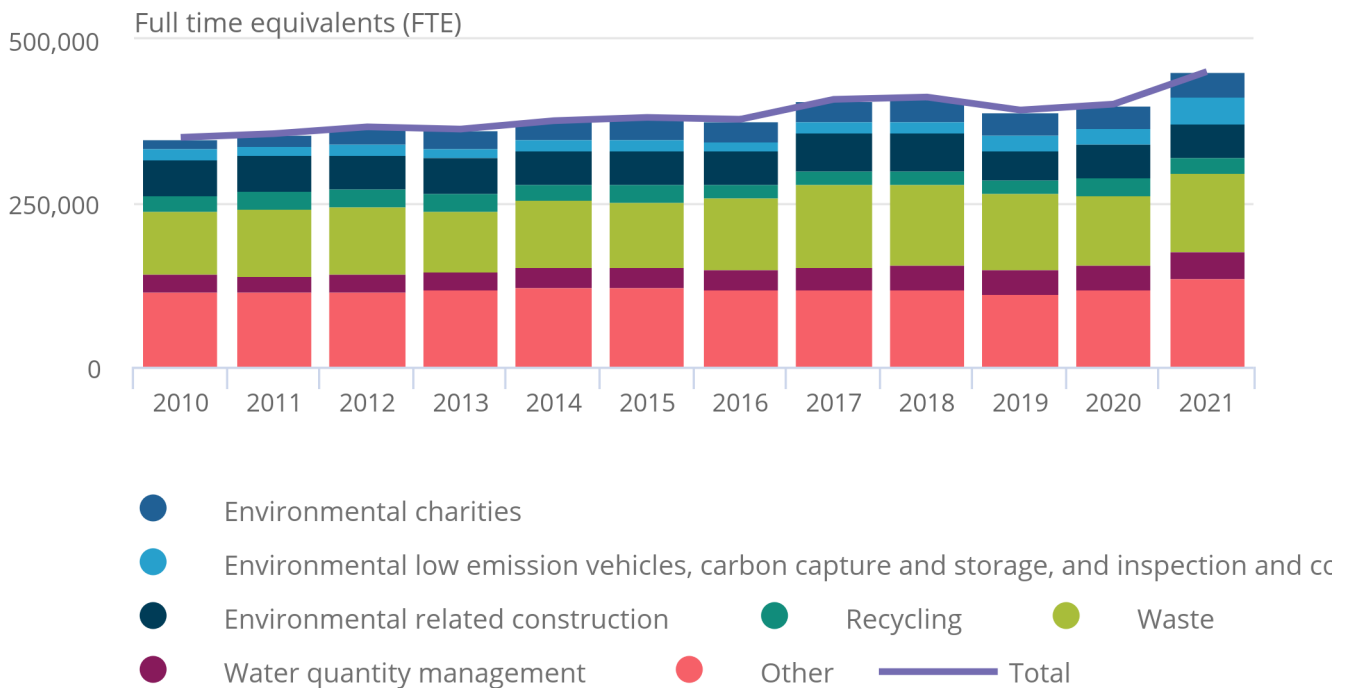
EGSS activities with the largest employment increases in 2021 were low emission vehicles, carbon capture and inspection and control (up 59.3%), and waste (up 13.5%). These two activities accounted for 57.3% of the overall EGSS employment increase in 2021. Recycling was the only activity with a substantial decrease in employment in 2021, down 6,300 FTE (21.2%).

Figure 6: Employment in the UK's environmental goods and services sector has increased to its highest level since 2010

UK, 2010 to 2021

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UK, 2010 to 2021



Source: Office for National Statistics

Notes:

1. Data are rounded to the nearest hundred full-time equivalents (FTEs)
2. The "Other" category consists of 11 further activities. See the full [dataset](#) for details.

Comparing sectors across measures

The UK environmental accounts are produced according to the UN [System of Environmental Economic Accounting \(SEEA\)](#) and are available by [Standard Industrial Classification \(SIC\)](#). This enables various comparisons, including across industries. For example, for the top emitting industries we can look at energy use, contributions to environmental taxes and GVA for a specific time period, or across available time series.

In 2021, the two largest UK EGSS industries by output and GVA were the water, waste and remediation sector (46.4% of output and 51.0% of GVA) and the energy sector (25.1% and 26.2%). These industries contributed 71.5% of all UK EGSS output and 77.2% of UK EGSS GVA in 2021.

This contribution from the water, waste and remediation sector contrasts with it accounting for 5.1% of total UK greenhouse gas emissions in 2021.

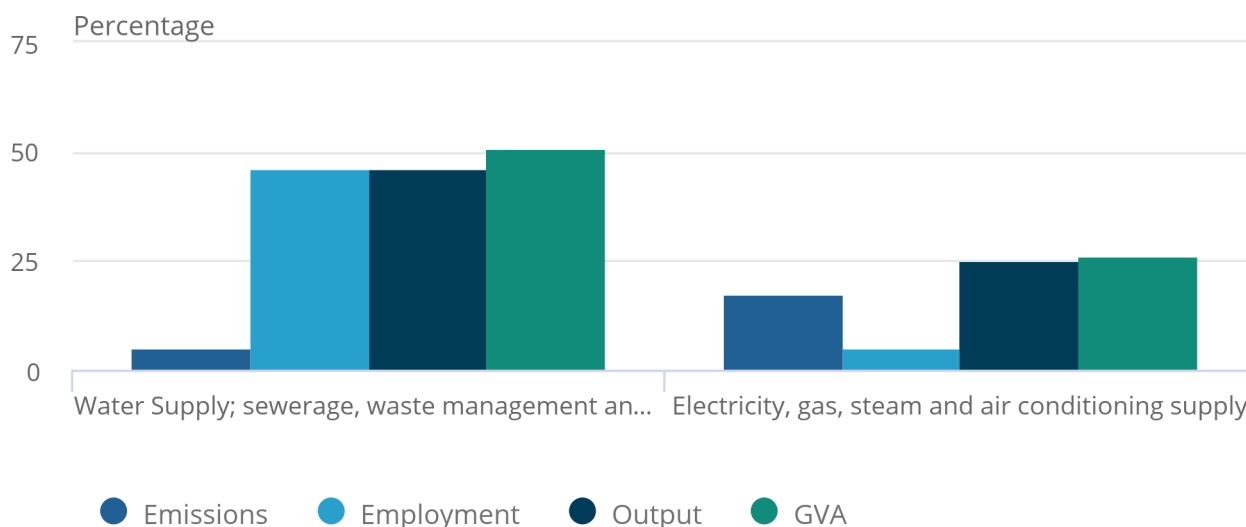
While in 2021, the energy sector accounted for 25.1% of EGSS output, 26.2% of EGSS GVA and 17.3% of emissions - the second highest among all industries after consumer expenditure - employment in the sector was 5.0% of the EGSS total in 2021.

Figure 7: Emissions and other metrics for 2021 contrast across the water and energy industries

% share of UK residence-based emissions or EGSS employment, output and GVA, 2021

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% share of UK residence-based emissions or EGSS employment, output and GVA, 2021



Source: Office for National Statistics

Notes:

1. Data may be calculated using unrounded data and so may differ from calculations on published figures.

6 . Environmental accounts data

[Atmospheric emissions: greenhouse gases by industry and gas](#)

Dataset | Released 5 June 2024

The emissions of carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, perfluorocarbons, sulphur hexafluoride, nitrogen trifluoride and total greenhouse gas emissions, by industry (SIC 2007 group - around 130 categories), UK, 1990 to 2022.

[Energy use: total](#)

Dataset | Released 5 June 2024

The UK's direct use of energy from fossil fuels and other sources (nuclear, net imports, renewables, biofuels and waste and reallocated use of energy by industry (SIC 2007 section - 21 categories), 1990 to 2022.

[Energy use: fossil fuels by fuel type and industry](#)

Dataset | Released 5 June 2024

The UK's fuel use by industry (SIC 2007 group - around 130 categories) and type (coal, natural gas, petrol, diesel oil for road vehicles (DERV), fuel oil, gas oil, aviation fuel and other); UK level fuel use of nuclear, hydro, wind, solar, geothermal aquifers and net imports, 1990 to 2022. This table excludes biofuels and waste.

[Environmental goods and service sector accounts](#)

Dataset | Released 5 June 2024

First estimates of the UK environmental goods and services sector (EGSS) for 2021 and revised estimates for 2010 to 2020. Included are estimates of output, gross value added, employment and exports.

[Environmental protection expenditure: accounts](#)

Dataset | Released 05 June 2024

Estimates for the UK's environmental protection expenditure, output and use by general government, businesses, and households, 2010 (or 2006 where available) to 2021.

View all data used in this statistical bulletin on the Related data page.

7 . Glossary

Greenhouse gases

The greenhouse gases (GHG) included in the atmospheric emissions accounts are those covered by the Paris Agreement, which has superseded the Kyoto Protocol:

- carbon dioxide (CO₂)
- methane (CH₄)
- nitrous oxide (N₂O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulphur hexafluoride (SF₆)
- nitrogen trifluoride (NF₃)

These gases contribute directly to global warming and climate change, because of their positive radiative forcing effect. The potential of each GHG to cause global warming is assessed in relation to a given weight of CO₂, so all greenhouse gas emissions are measured as carbon dioxide equivalents (CO₂e).

Residence basis

Estimates compiled on a residence basis include data relating to UK residents and UK-registered businesses, regardless of whether they are in the UK or overseas. Data relating to foreign visitors and foreign businesses in the UK are excluded.

Territory basis

Estimates of GHG emissions compiled on a [territory basis](#) include emissions within UK borders. [UK air emissions statistics on a territory basis](#) are published by the Department for Energy Security and Net Zero (formerly the Department for Business, Energy and Industrial Strategy).

Environmental goods and services sector

Our [environmental goods and services sector \(EGSS\) accounts](#), which follow the [United Nations \(UN\) System of Environmental-Economic Accounting \(SEEA\)](#), measure areas of the economy engaged in producing goods and services for environmental protection purposes. It also includes areas of the economy engaged in conserving and maintaining natural resources.

8 . Measuring the data

The UK Environmental Accounts are "satellite" or extended accounts to the main UK National Accounts and are compiled in accordance with the [System of Environmental Economic Accounting \(SEEA\)](#), which closely follows the United Nations (UN) System of National Accounts (SNA).

Air emissions and energy use

The air and energy accounts in the UK Environmental Accounts are compiled by Ricardo Energy and Environment on behalf of us at the Office for National Statistics (ONS).

The main source of information for this reporting is the National Atmospheric Emissions Inventory (NAEI). These data sources provide air emissions data, calculated from activity data and emission factors, for all relevant sources in the UK as a starting point for generating the air emissions accounts. The residence principle is then applied to these datasets, thereby apportioning the emissions to an industrial classification based on the [Standard Industrial Classification: SIC 2007](#).

The UN's Intergovernmental Panel on Climate Change (IPCC) summarises the latest scientific knowledge on climate change, greenhouse gasses and their impact on the environment in their Assessment Reports. The Fifth Assessment Report (AR5) sets out the reporting standards for global warming potential (GWP). GWP is an emission metric used to quantify the contributions of different greenhouse gasses to climate change. Our estimates are reported with a GWP of AR5.

More strengths, limitations, appropriate uses, and how the data are created is available in our [Environmental accounts air emissions Quality and Methodology Information QMI report](#).

Environmental goods and services sector

These data are from a wide range of sources; major sources include:

- supply and use tables
- the Low Carbon and Renewable Energy Economy Survey
- the Annual Business Survey
- the Business Register and Employment Survey

Sources are used in different ways to compile estimates of output, gross value added (GVA), employment, and exports for 17 activities.

Further information is available in our [Environmental accounts on the EGSS QMI](#) and our [methodology annex](#).

Environmental protection expenditure

Our [Environmental protection expenditure \(EPE\) accounts](#) are produced as part of the environmental accounts and provide estimates for the UK's environmental protection expenditure, output and use by general government, businesses, and households.

The main data sources for the EPE accounts are:

- supply and use tables
- the Annual Business Survey
- the EPE survey
- the European System of Accounts, Table 11 (general government annual expenditure)

Estimates of the EPE accounts cover general government, households, and businesses. Estimates from the [EPE survey](#) are also published by us.

Further information is available in our [EPE survey QMI](#) and our [EPE accounts QMI](#).

Quality

More information on strengths, limitations, appropriate uses, and how these data were created is available in our [Environmental accounts QMI](#).

Data are subject to revisions, so data in this bulletin may differ from previous publications; more information is available in [ONS revisions policies](#). For example, EGSS estimates use supply and use data, which have incorporated [Blue Book 2023](#) methodology improvements, resulting in revisions back to 2010. Details of the sources used to compile the supply and use tables can be found in our [Supply and use tables data sources catalogue](#).

9 . Strengths and limitations

For information on the strengths and limitations of air emissions and energy accounts, environmental goods and services sector, and environmental protection expenditure, see [Section 8: Strengths and limitations of our UK Environmental Accounts: 2022 bulletin](#).

10 . Related links

[UK environmental taxes: 2023](#)

Bulletin | Released 7 May 2024

The value and composition of UK environmental taxes between 1997 and 2023, by type of tax and economic activity, and comparisons with other European countries.

[Material flow accounts](#)

Dataset | Released 1 May 2024

Data on the UK's domestic extraction, imports and exports and flow of materials (biomass, minerals and fossil fuels), 1990 to 2022.

[Green jobs estimates from the Opinions and Lifestyle Survey. Great Britain](#)

Dataset | Released 14 March 2024

This dataset includes analysis from the Opinions and Lifestyle Survey pooled data.

[England natural capital accounts: 2023](#)

Bulletin | Released 25 January 2023

Estimates the value of English natural capital and its beneficial effects for the population.

[Low carbon and renewable energy economy, UK: 2022](#)

Bulletin | Released 8 March 2024

Estimates of the size of the UK's low carbon and renewable energy economy, including turnover and employment.

11 . Cite this statistical bulletin

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