Office for National Statistics

Statistical bulletin

Experimental estimates of green jobs, UK: 2024

Experimental estimates of green jobs using the industry, occupation and firm approaches. These are official statistics in development.

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To be announced

Table of contents

1 . Main points

- Using the industry approach, UK employment in green jobs in 2022 was estimated at 639,400 full-time equivalents (FTEs).

- Using the industry approach for 2022, green jobs are 8.4% higher when compared with our 2021 estimate of 589,600 FTEs, and they are 19.9% higher than our estimate of 533,200 FTEs for 2020.

- In 2022, nearly half (48%) of all UK employees across the economy worked in 1 of 10 industries that each accounted for less than 1% of total UK greenhouse gas emissions (residence basis).

- Overall three industries accounted for more than 62% of total UK emissions (residence basis) in 2022, and 14% of all UK employees; these were the electricity, gas, steam and air conditioning industry, manufacturing, and the transportation and storage industry.

- Green jobs are defined as "employment in an activity that contributes to protecting or restoring the environment, including those that mitigate or adapt to climate change"; they can be estimated using industry, occupation, and firm approaches.

These are official statistics in development and we advise caution when using the data. The methods and sources are currently under development, which means that the data and the scope of the estimates presented are likely to be subject to revision. More information can be found in Section 8: Measuring the data.

2 . How we define a green job

This publication provides an update to our Experimental estimates of green jobs, UK: 2023 bulletin using the definition "employment in an activity that contributes to protecting or restoring the environment, including those that mitigate or adapt to climate change".

We provide estimates using three approaches: industry-based, occupation-based, and firm-based. They are described in our accompanying Developing estimates of green jobs in the UK methodology.

There are overlaps between each of these approaches; for example, an individual may have a green occupation in a green industry, so each should be considered in turn and should not be added together.

Our green job definition focuses on the activities undertaken within an occupation. More information on definitions can be found in Section 7: Glossary. These statistics do not consider the environmental impact of any individual job. For example, building a wind turbine would be considered a green job, even though doing so may involve the use of materials that are known to contribute towards greenhouse gas emissions.

3 . Jobs in green industries

The industry-based approach includes all jobs in a green industry or sector and provides our headline estimate of employment in green jobs.

The Office for National Statistics (ONS) currently produces two sets of estimates relating to the industry approach. These are our [Environmental goods and services sector (EGSS) dataset](#) and our [Low carbon and renewable energy economy (LCREE) datasets](#).

A full breakdown of the green activities that underpin our definition of green jobs can be found in our [Developing estimates of green jobs in the UK methodology](#).

Using existing statistics, primarily from our EGSS and LCREE estimates, we have identified data for the majority of the sectors to estimate total employment within green industries.

In 2022, total UK employment in green jobs was an estimated 639,400 full-time equivalents (FTEs). Energy efficient products and waste were the two biggest activities, with around 116,100 and 138,900 full-time equivalent (FTE) employees in 2022, respectively, accounting for 40% of all employment in green jobs.

Employment in green jobs in 2022 was 8.4% higher than our estimate of 589,600 FTEs for 2021 and 19.9% higher than our estimate of 533,200 FTEs for 2020. Increases in the last two years were seen across a number of activities, in particular:

- employment in waste by around 32,000 FTEs

- low carbon transport sector by around 16,000 FTEs

- employment in renewable energy by around 13,000 FTEs

- environmental consultancy saw employment by around 10,000 FTEs

These estimates include employment in nuclear power, which some users may not classify as green. In 2022, employment in nuclear power was estimated to be around 23,000 FTEs.

Our total estimates also exclude some activities for which we do not have a data source; most notably those working on decarbonising grid networks, and in low-carbon travel (other than low and zero emission vehicles).

We have also sought to minimise double counting when combining data sources. Some double counting may remain because of the complexity of underlying sources. Work will continue to reduce the potential for double counting in any future releases.

Where data are not yet available for a number of activities for 2022, these have been modelled using two-year average growth rates. More information can be found in the notes section within our accompanying [Experimental estimates of green jobs, UK: 2015 to 2022 dataset](#).

Additionally, activities whose source is provided by the environmental goods and services sector (EGSS) contain a full set of estimates for 2021, with initial estimates for some sectors for 2022. Modelled estimates are used where data for the latest period are not available. The full 2021 EGSS dataset will be published later in 2024.

These are experimental estimates of green jobs and are therefore subject to revision as we review methods and data sources.

We will continue to engage with stakeholders on the activities listed, and we welcome feedback. We will also be reviewing data sources to identify potential improvements to methods, or if alternative data sources are available. This work will have a particular focus on improving timeliness. More information on the quality of these estimates can be found in our [Developing estimates of green jobs in the UK methodology](#).

Figure 1: Employment in green industries by major activity

Employment, full-time equivalent, in green industries for top five activities and "other", UK: 2015 to 2022
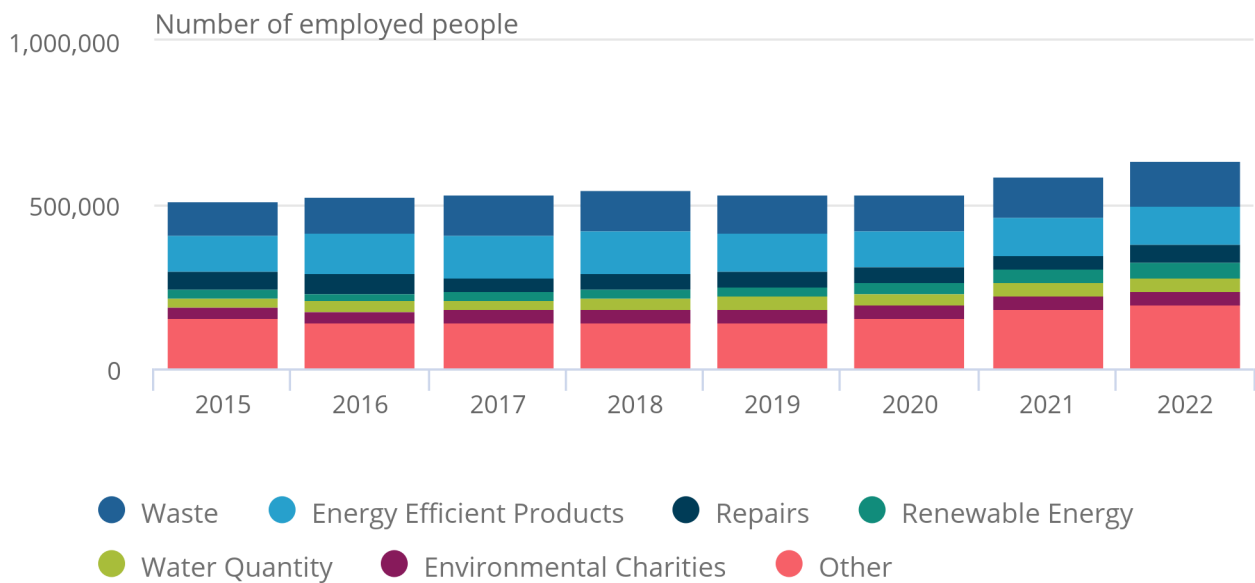
Source: Office for National Statistics

Notes:

1. Estimates are based on experimental estimates and are subject to revision as definitions, methods and data sources are reviewed.

2. The category "other" is obtained from combining the remaining 16 activities, data for which can be found in the dataset accompanying this release.

4 . Green occupations

The occupation-based approach would measure all jobs that are "green" regardless of the industry they are in, based on the activities undertaken by workers or the objectives of their work.

We continue to explore adding green job-related questions to a larger Office for National Statistics (ONS) survey and have used our Opinions and Lifestyle Survey (OPN) to explore the proportion of people who report their job being green, based on our definition.

During the survey periods 4 to 14 January and 17 to 28 January 2024, adults in Great Britain were asked a series of green jobs questions. Northern Ireland is not covered by the OPN.

We then undertook analysis on dataset pooling for these two survey periods.

In our previous release, we reported peoples' survey responses on whether they felt their job was green, with 27% saying they thought it was.

For this release we undertook an additional validation stage to test whether respondents' views on their jobs were likely to match our definition on the occupation approach. To enable this, we added a question to the survey asking respondents to identify which list of areas (that we consider to be green) their job involves. We used these answers, with information about their occupation and industry, to validate whether their job is likely to be green. We do not recommend a direct comparison with the previous results. Prior to this validation, 19% of respondents believed their job to be green; this fell to 12% after validation.

Given the variability in these data, the current OPN survey is not a reliable proxy estimate of green jobs under the occupation approach. For similar reasons, we have also not published breakdowns, though the microdata will be available through the Secure Research Service (SRS) for accredited researchers.

5 . Jobs in green firms

A firm-based approach to measuring green jobs would measure all jobs in firms classified as "green". These data would provide insights on firms that have, and that are yet to, transition towards being "green".

We are initially focusing on the greenhouse gas (GHG) emissions intensity of employees at industry level, as a proxy for firms being green.

While GHG emissions help us understand the economy's contribution to climate change, they do not reflect wider environmental impacts. In the longer term, we will explore alternative methods to identify "green" firms covering the whole of the green jobs definition.

For these calculations GHG emissions on a residence basis have been used, excluding emissions from households (Figure 2). This measure covers only direct emissions, and so excludes emissions related to supply chains. The following analysis updates our [Experimental estimates of green jobs, UK: 2023 bulletin](#) with new data.

As a proxy for "green" industries, we have considered the relative contribution of each industry to total GHG emissions, setting a threshold of 1% or less. In 2022, there were 10 industries whose emissions contributed less than 1% to total GHG emissions. These industries collectively accounted for 3.7% of total GHG emissions (on a residence basis) in that year, and employed 12.8 million people, 48% of total employees. The 10 industries that comprise this group have not changed since 2021.

In contrast, just 3 industries accounted for more than 62% of total GHG emissions in 2022. These were the electricity, gas, steam and air conditioning industry, manufacturing, and the transportation and storage industry.. These industries employed 3.9 million people, 14% of total employees.

Figure 2: There were 10 industries that were each responsible for less than 1% of total UK residence-based emissions in 2022

Percentage of total greenhouse gas emissions (residence basis) and total employees by industry, UK, 2022

● of GHG Emissions ● of Employees
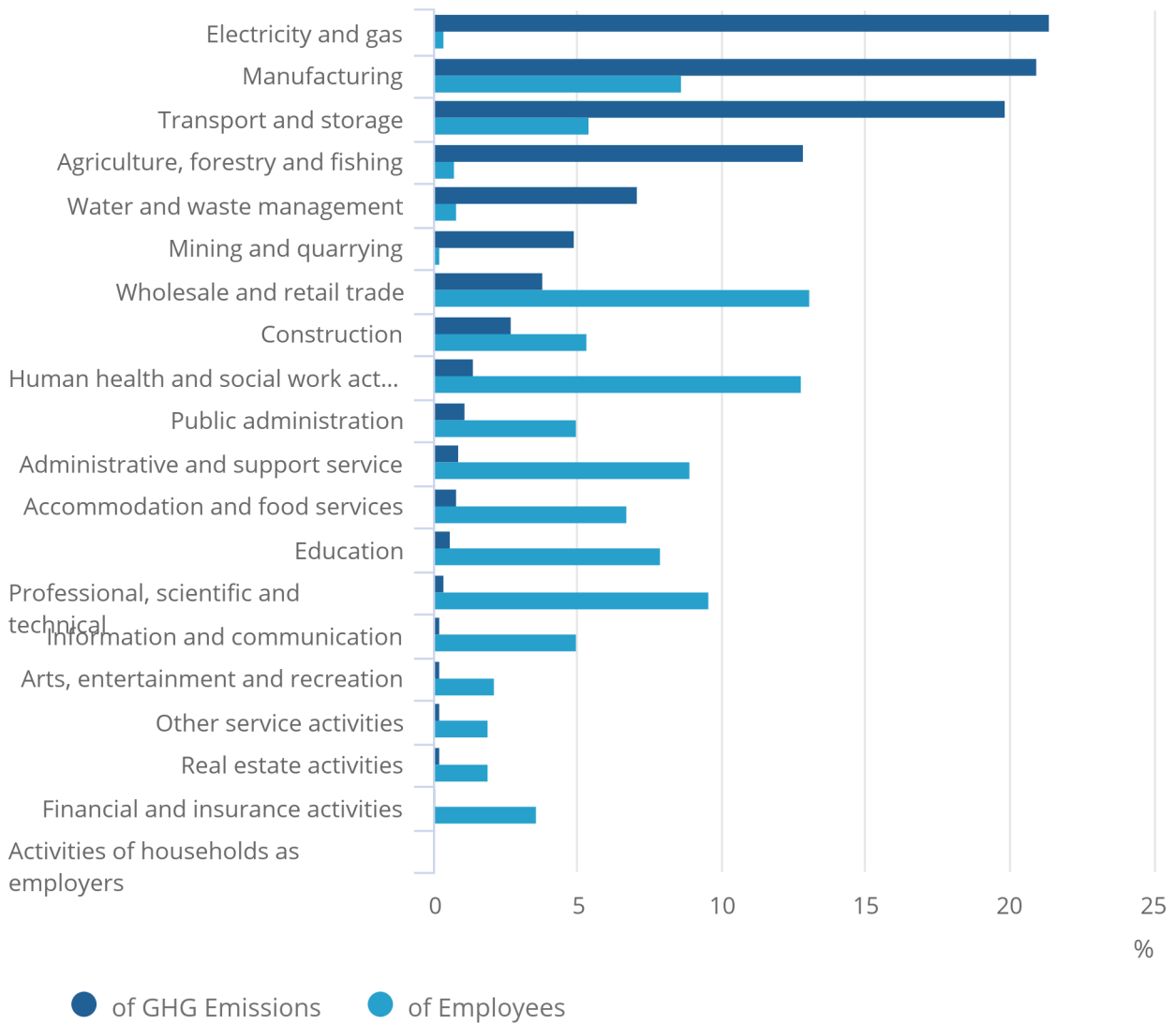
Source: Environmental Accounts and Business Register Employment Survey from the Office for National Statistics

Notes:

1. Employees refers to anyone aged 16 years or over that an organisation directly pays from its payroll(s), in return for carrying out a full-time or part-time job or being on a training scheme; it excludes those who are self-employed, voluntary workers and working owners who are not paid through Pay As You Earn (PAYE).

2. Number of employees for activities of households as employers; undifferentiated goods and services-producing activities of households for own use is not available.

3. The percentage of greenhouse gases has been calculated excluding emissions from households, so this refers to the percentage of total greenhouse gases produced by the economy.

6 . Green jobs data

Experimental estimates of green jobs, UK: 2015 to 2022
Dataset | Released 14 March 2024
Estimates of employment within green industries, using data from the environmental goods and services sector, the Low Carbon and Renewable Energy Economy Survey and the Business Register Employment Survey.

Emissions per employee, UK: 2015 to 2022
Dataset | Released 14 March 2024
Greenhouse gas emissions (residence basis) per employee by industry.

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 between 4 to 14 and 17 to 29 January 2024.

7 . Glossary

Employment

Employment is measured in terms of full-time equivalent (FTE) employees, where one FTE employee may be thought of as one person working full time for one year.

Environmental goods and services sector

The environmental goods and services sector accounts, which follow the 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.

Green job

Employment in an activity that contributes to protecting or restoring the environment, including those that mitigate or adapt to climate change.

Greenhouse gases

The following greenhouse gases (GHG) included in the atmospheric emissions accounts are those covered by 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 CO_2, so all GHG emissions are measured as carbon dioxide equivalents (CO_2e).

Low carbon and renewable energy economy

Economic activities that deliver goods and services that are likely to help the UK generate lower emissions of greenhouse gases, predominantly carbon dioxide.

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.

8 . Measuring the data

These statistics are labelled as "official statistics in development". Until September 2023, these were called "experimental statistics". More information about the change can be found in our Guide to official statistics in development.

We are developing how we collect and produce the data to improve the quality of these statistics. Read more in our Developing estimates of green jobs in the UK methodology.

Industry estimates of green jobs

The activities used in the calculation of industry estimates of green jobs have been identified following engagement and discussion with important stakeholders. We are open to feedback on these activities.

To provide an initial estimate of jobs in green industries, we have used publicly available data from the Low Carbon and Renewable Energy Economy (LCREE) Survey and the Business Register and Employment Survey (BRES). More information on the methodology of these, and the quality of the associated datasets, are set out in our Developing estimates of green jobs in the UK methodology, published alongside this bulletin.

Opinions and Lifestyle Survey data

In the periods 4 to 14 January and 17 to 28 January 2024, we sampled 4,985 adults and 4,980 adults, respectively, for the Opinions and Lifestyle Survey (OPN). These samples were randomly selected from people in Great Britain who had previously completed the Labour Market Survey (LMS) or OPN. The responding sample for the 4 to 14 January 2024 contained 2,594 individuals, representing a 52% response rate. For 17 to 29 January 2024 the responding sample contained 2,764 individuals, representing a 56% response rate.

The green jobs questions were asked of working adults only, resulting in a pooled responding sample size of 2,557 working adults in Great Britain. Analysis undertaken includes those who did not respond to the green jobs questions.

Survey weights were applied to make estimates representative of the population, based on Office for National Statistics (ONS) population estimates. Further information on the survey design and quality can be found in our Opinions and Lifestyle Survey QMI.

The data collected are self-reported and have subsequently been manually validated. Using the wider range of information provided by the respondent, changes were made to responses where they had been incorrectly categorised under the occupational approach.

The estimates are derived from survey data, so are subject to sampling error. Estimates of the level of uncertainty associated with all figures (confidence intervals) can be found in the dataset to support interpretation. We have also been cautious in our language within this release, to reflect the fact that differences may relate to sampling variation.

More information on the green jobs questions can be found in our Developing estimates of green jobs in the UK methodology.

Emissions intensity data

Because of the unavailability of employment data for Northern Ireland, employee figures have been used to calculate emissions intensity per employee.

Quality

More quality and methodology information can be found in our Developing estimates of green jobs in the UK methodology.

9 . Strengths and limitations

Jobs in green industries

Estimates of jobs in green industries have been calculated using publicly available data. We will continue to explore whether more appropriate data sources are available.

The latest data from the environmental goods and services sector (EGSS) estimates are for 2020. The Low Carbon and Renewable Energy Economy (LCREE) Survey and Business Register and Employment Survey (BRES) have published data for 2021, so partial estimates of employment in green industries can be found in our accompanying dataset.

For some activities, no data were available. We will continue to investigate sources.

There are overlaps between LCREE and EGSS. Every attempt has been made to avoid double counting; further work will be done to ensure double counting is avoided in future releases.

LCREE estimates used here in the estimation for numerous activities are survey-based and gather information from a sample, rather than the whole population. This means they are subject to measurable sampling uncertainty, which effects how changes in the estimates across periods should be interpreted. Estimates of the level of uncertainty associated with all figures (confidence intervals and coefficients of variation) can be found in the LCREE datasets to support interpretation. More information can be found in our Low Carbon and Renewable Energy (LCREE) Survey QMI.

Green occupations

Sample sizes on the OPN mean that we have not been able to carry out analysis of the characteristics of those who describe part of their job as green, within regions.

10 . Related links

[Experimental estimates of green jobs, UK: 2023](#)
Bulletin | Released 27 September 2023
Exploring estimates of green jobs using the industry, occupation and firm approaches.

["Green jobs" update, current and upcoming work: March 2023](#)
Article | Released 13 March 2023
An update to our work on green jobs, including a summary of user engagement, our definition, and future work.

[UK Environmental Accounts: 2023](#)
Bulletin | Released 5 June 2023
Measuring the contribution of the environment to the economy, impact of economic activity on the environment, and response to environmental issues.

[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 (LCREE), including turnover and employment.

[One in five workers in the Midlands in high-emissions industries](#)
Article | Released 5 December 2023
Five industry groups contribute more than 80% of UK greenhouse gas emissions.

11 . Cite this statistical bulletin

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