

Statistical bulletin

Experimental estimates of green jobs, UK: 2023

Exploring estimates of green jobs using the industry, occupation and firm approaches.

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1 . Main points

- Using the industry approach, employment in green jobs was estimated to be around 526,000 full-time equivalents (FTE) in the UK in 2020, compared with 507,000 FTE in 2015.
- Around a quarter (27%) of working adults in Great Britain reported in May 2023 that they would describe any part of their job as a "green job", while around 1 in 20 (4%) reported that all or most of their job relates to "green" activities.
- Working males (30%) appeared more likely than working females (24%) to describe any part of their job as green.
- Working adults in Scotland (38%) and Wales (36%) appeared more likely to describe any part of their job as green than those in England (26%).
- Nearly half (47%) of UK employees worked in 1 of 10 industries that accounted for less than 1% of total UK greenhouse gas (GHG) emissions in 2021.
- Just three industries – the electricity, gas, steam and air conditioning industry, manufacturing, and the transportation and storage industry – accounted for over 61% of total UK GHG emissions in 2021 and 15% of UK employees.

These new experimental estimates of green jobs under the industry approach use publicly available data. They are subject to revision as definitions, methods and data sources are reviewed.

2 . How we define a green job

This bulletin provides indicative estimates of green jobs under 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 – described in our accompanying [Developing estimates of green jobs in the UK methodology](#). Inevitably, there are overlaps with each of the approaches; for example, an individual may have a green occupation in a green industry, so each should be considered in turn and cannot be aggregated to a whole. Note that our definition of a green job focuses on the activities undertaken within jobs ([see Section 7: Glossary for a full definition](#)). Also, 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 are our headline estimate of employment in green jobs. We currently produce two sets of estimates that relate to the industry approach: our [Environmental goods and services sector \(EGSS\) dataset](#) and our [Low carbon and renewable energy economy \(LCREE\) survey](#).

We know from stakeholder feedback that the scope of green jobs is wider than these two individual estimates. The LCREE does not include jobs that relate to wider environmental activities, such as nature jobs. The EGSS estimates do not provide the breakdown that users require. For example, it includes estimates of employment in the production of renewable electricity but not by source, such as onshore wind, offshore wind, and so on.

After reviewing relevant literature and engaging with several important stakeholders, we have identified the following list of green activities as forming the composition of our definition of green jobs:

- alternative fuels, including hydrogen supply
- bioenergy
- carbon capture and storage
- energy efficient products
- energy saving and monitoring
- energy storage
- environmental charities
- environmental consultancy not elsewhere classified
- environmental related education
- grid infrastructure
- in-house environmental activities
- low carbon transport
- management of forests
- managerial activities of government bodies
- nature protection and restoration (excluding forests)
- nuclear power
- recycling
- renewable energy
- repairs
- waste
- wastewater
- water quantity

Where appropriate, these activities include research and development, design, production, installation, operation and maintenance, and specialised consultancy services relating to the topic area. Full definitions of these activities can be found in our [Developing estimates of green jobs in the UK methodology](#), published alongside this release.

Using existing statistics primarily from our EGSS and LCREE estimates, we have identified data for the majority of the sectors we have listed to estimate total employment within green industries. In 2020, employment in green jobs was an estimated 526,000 full time-equivalents (FTE) in the UK. Energy efficient products and waste were the two biggest activities, with around 113,000 and 97,000 FTE employees in 2020, respectively. These two activities accounted for 40% of all employment in green jobs in 2020.

Employment in green jobs was 3.8% higher than our estimate of 507,000 FTE for 2015, the earliest available, but 3.5% lower than the peak in 2018 (545,000 FTE). Growth between 2015 and 2020 was seen across a number of activities, in particular:

- employment in renewable energy increased by around 10,000 FTE
- the water quantity sector saw an increase of around 8,000 FTE
- employment in environmental charities grew by around 6,000 FTE
- the low emission vehicles sector saw employment increase by around 6,000 FTE

The fall in employment in green jobs between 2018 and 2020 was largely because of lower employment in the energy efficient products and waste activities industries. These activities saw a decrease in employment of around 20,000 and 23,000 FTE between 2018 and 2020, respectively.

These estimates include employment in nuclear power, which some users may not classify as green. In 2020, employment in nuclear power was estimated to be around 15,000 FTE.

Our total estimates also exclude some activities for which data are not currently available, most notably those working on decarbonising grid networks and in low-carbon travel other than low and zero emission vehicles. Efforts have been made to minimise double-counting when combining data sources, and while some may remain, further work will be done to ensure double-counting is avoided in future releases.

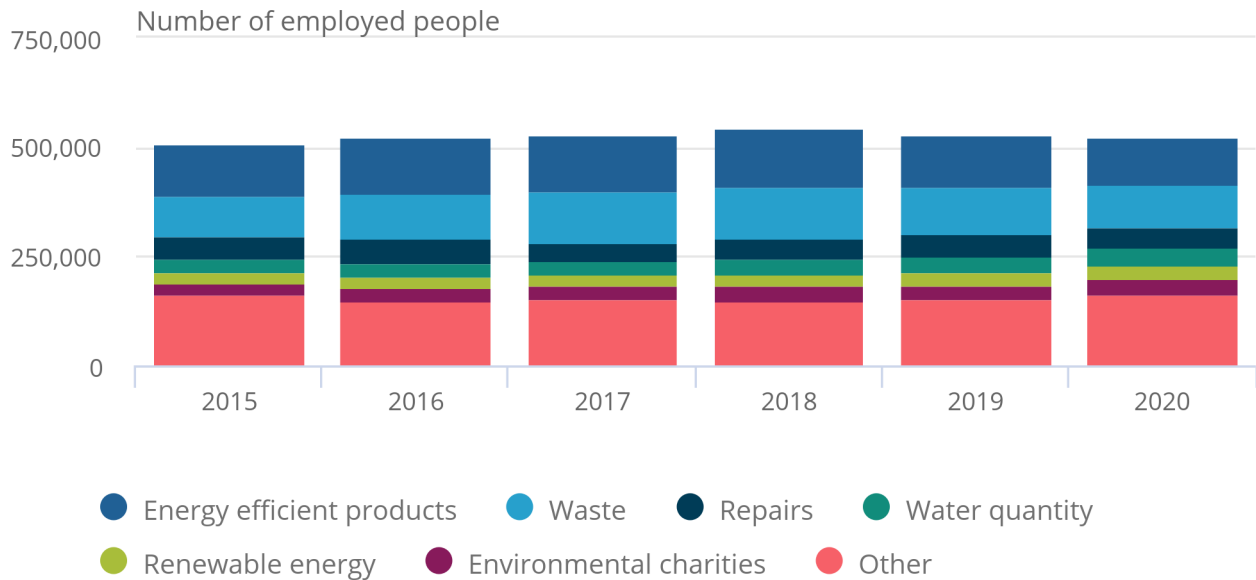
It is important to note that these are experimental estimates of green jobs under the industry approach that use publicly available data. Therefore, they are subject to revision as definitions, methods and data sources are reviewed. We will continue to have discussions with stakeholders about the activities listed and 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 the timeliness and developing sub-national estimates. More information on the quality of these estimates can be found in our [Developing estimates of green jobs in the UK methodology](#), accompanying this bulletin.

Figure 1: Employment in green industries

Employment, full time equivalent, in green industries for top five activities and "other", UK: 2015 to 2020

Figure 1: Employment in green industries

Employment, full time equivalent, in green industries for top five activities and "other", UK: 2015 to 2020



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

Our occupation-based approach measures 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. It is useful to understand the characteristics of who is working in green jobs, regardless of the sector they are in.

We have been exploring adding questions on green jobs to our main survey used to collect information on employment – the Labour Force Survey. The Labour Force Survey is currently undergoing transformation and will be replaced with the Transformed Labour Force Survey in 2024. Statistics on green jobs is now considered one of several important requirements by users, and consultation is ongoing as to whether it will be feasible to add questions on this topic to the transformed survey in the future.

While we explore adding green jobs related questions to larger Office for National Statistics (ONS) surveys, we used our Opinion and Lifestyle Survey to gain an understanding of the proportion of working people who believe that part of their job is green, based on the agreed definition.

During the survey periods 4 to 14 May and 17 to 29 May, respondents to the [Opinions and Lifestyle Survey \(OPN\)](#) were asked a series of green jobs questions. The following findings are based on a pooled dataset of those survey periods. They relate to Great Britain only, as the survey does not cover Northern Ireland.

The questions were on people's opinions, so are only indicative of the number of those working in green jobs under the occupation approach. It is important to note that responses have not been edited and so inconsistencies may be present in the data. For example, respondents who said they would describe any part of their job as green may then go on to report they spend no time on green activities, and vice-versa.

Around a quarter (27%) of working adults reported that they would describe any part of their job as a "green job", based on our definition in Section 7: Glossary.

Approximately 4% of respondents reported that all or most of their job related to green activities.

The majority of those who said that they would describe any part of their job as green were male (56%). Working males also appeared more likely than working females to describe any part of their job as green, at 30% compared with 24%.

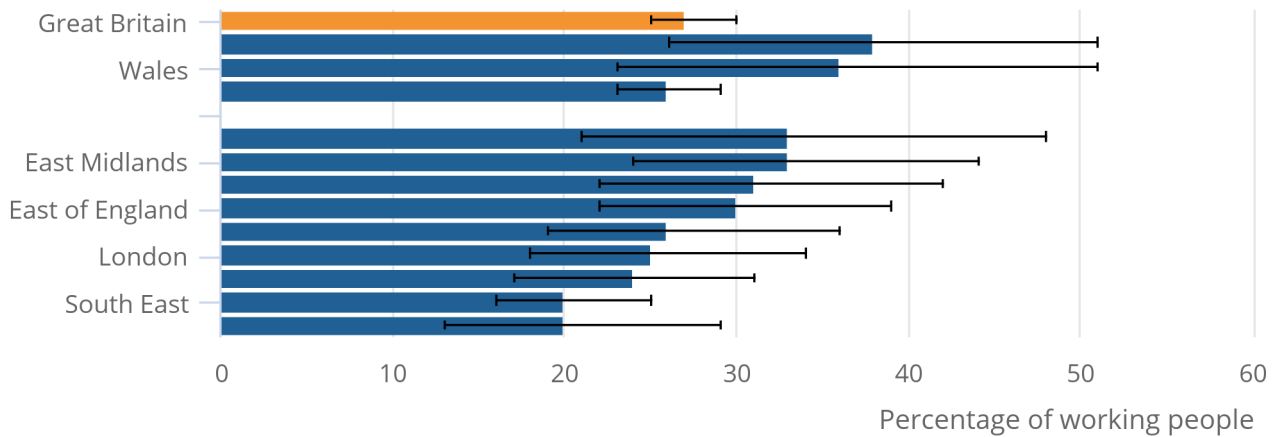
While more people who reported describing any part of their job as a green job were located in London than any other region, this is likely to be because of the number of working adults there. When considering all working adults in London, 25% said they would describe any part of their job as green. Working adults in Scotland (38%) and Wales (36%) appeared more likely to describe any part of their job than those in England (26%). It is important to note that estimates for some of the regions are subject to higher levels of uncertainty because of sample sizes. Confidence intervals for all the estimates can be found in the accompanying dataset.

Figure 2: Working adults in Wales and Scotland appeared more likely to describe any part of their job as green

Percentage of working adults who described any part of their job as green, by region, Great Britain, 4 to 29 May 2023

Figure 2: Working adults in Wales and Scotland appeared more likely to describe any part of their job as green

Percentage of working adults who described any part of their job as green, by region, Great Britain, 4 to 29 May 2023



Source: Opinions and Lifestyle Survey from the Office for National Statistics

Notes:

1. Question: Would you describe any part of your job as a "green job"?
2. Base: All working adults within each region. Those who didn't respond to the question have been excluded from the base.

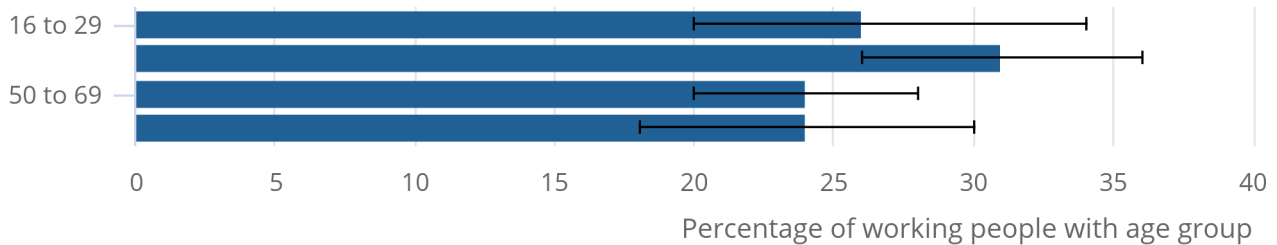
Working adults aged between 30 and 49 years accounted for 48% of all working adults who described any part of their job as green. Working adults within this age group also appeared more likely to describe any part of their job as green, at 31% (Figure 3).

Figure 3: Working adults aged 30 to 49 were most likely to describe any part of their job as green

Percentage of working adults within age group who described any part of their job as green, Great Britain, 4 to 29 May 2023

Figure 3: Working adults aged 30 to 49 were most likely to describe any part of their job as green

Percentage of working adults within age group who described any part of their job as green, Great Britain, 4 to 29 May 2023



Source: Opinions and Lifestyle Survey from the Office for National Statistics

Notes:

1. Question: Would you describe any part of your job as a "green job"?
2. Base: all working adults within each age group. Those who didn't respond to the question have been excluded from the base.

5 . Jobs in green firms

A firm-based approach to measuring green jobs would measure all jobs in firms classified as "green". By looking at this, we can also identify firms which will need to transition towards green, and therefore the number and characteristics of employees within them. In the longer term, we will consider how we can define a "green" firm and explore relevant firm-level data.

Here, we look at UK greenhouse gas (GHG) emissions intensity of employees at industry level, as a proxy for firms. While GHG emissions help us understand the economy's contribution to climate change, they do not reflect wider environmental impacts. For these calculations, GHG emissions on a residence basis have been used and emissions from households excluded. This measure covers only direct emissions, and so excludes emissions related to supply chains.

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 2021, there were 10 industries whose emissions contributed less than 1% to total GHG emissions (Figure 4). In 2021, these 10 industries collectively accounted for 4% of total GHG emissions and employed 47%, or 12.3 million, of total employees.

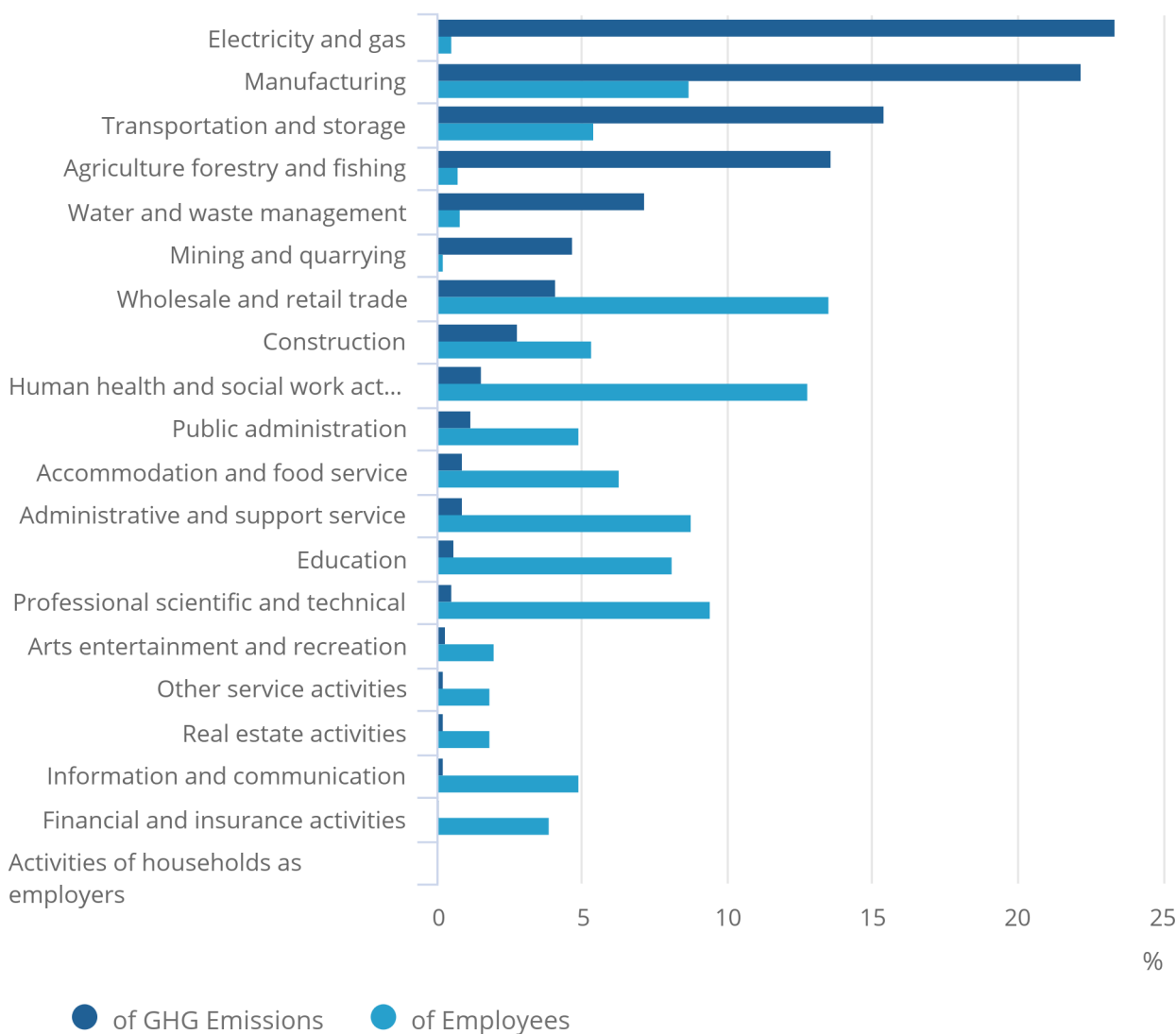
In contrast, just three industries – the electricity, gas, steam and air conditioning industry, manufacturing, and the transportation and storage industry – accounted for over 61% of total GHG emissions in 2021. These industries employed 3.8 million people, 15% of total employees. These industries are likely to be most affected by the UK's transition to net zero, and our [UK Environmental Accounts: 2023 bulletin](#) statistics show that some of these industries have the highest number of "green jobs", such as renewable energy. We plan to explore characteristics of employees in these industries in an upcoming publication.

Figure 4: 10 industries that together employ almost half of all employees each emit less than 1% of total UK GHG emissions

Percentage of total greenhouse gas emissions (residence basis) and total employees by industry, UK, 2021

Figure 4: 10 industries that together employ almost half of all employees each emit less than 1% of total UK GHG emissions

Percentage of total greenhouse gas emissions (residence basis) and total employees by industry, UK, 2021



Source: Office for National Statistics, Ricardo Energy and Environment, Business Register and Employment Survey, Northern Ireland Statistics and Research Agency

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 and 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 refers to percentage of total greenhouse gases produced by the economy.

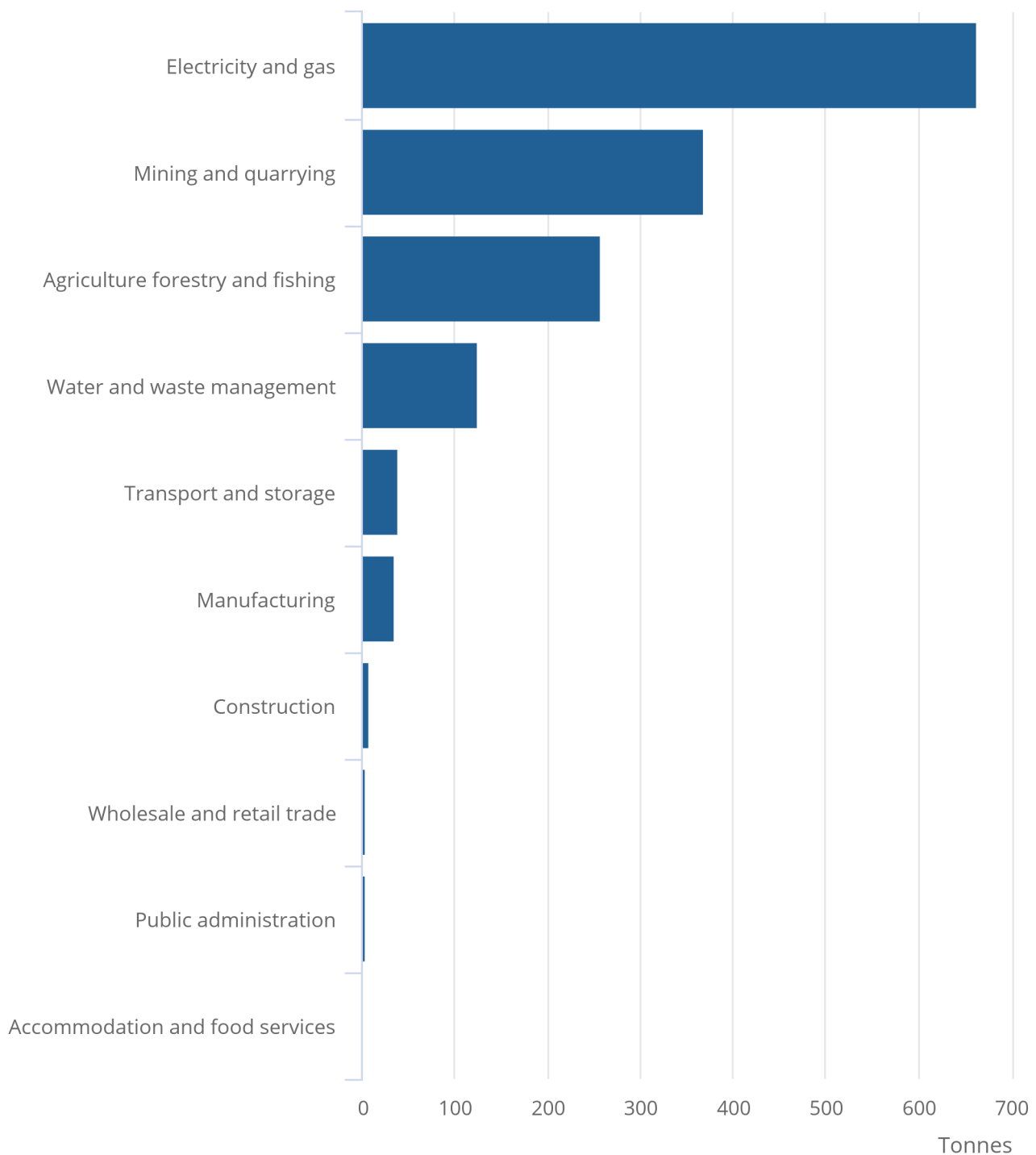
Looking at GHG emissions intensity, tonnes of GHG emissions per employee (Figure 5), the electricity, gas, steam and air conditioning supply industry produced the most emissions per employee (663 tonnes of CO₂ equivalent per employee). It is important to note that figures exclude those who are self-employed, which is particularly important for the agriculture, forestry and fishing industry.

Figure 5: The electricity, gas, steam and air conditioning supply industry emits more GHG emissions per employee than other industries

Greenhouse gas emissions (tonnes of carbon dioxide equivalent) per employee by industry, UK, 2021

Figure 5: The electricity, gas, steam and air conditioning supply industry emits more GHG emissions per employee than other industries

Greenhouse gas emissions (tonnes of carbon dioxide equivalent) per employee by industry, UK, 2021



Notes:

1. Intensity has been calculated by dividing greenhouse gas emissions (residence basis, excluding emissions by households) by number of employees.
2. 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 and excludes those who are self-employed, voluntary workers and working owners who are not paid through Pay As You Earn (PAYE).
3. Industries with intensity of less than 10 have been excluded from the chart; figures can be found in the accompanying dataset.

6 . Green jobs data

[Experimental estimates of green jobs, UK: 2015 to 2020](#)

Dataset | Released 27 September 2023

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.

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

Dataset | Released 27 September 2023

Responses to questions on green jobs asked on the Opinions and Lifestyle Survey (OPN) of working adults in Great Britain.

[Greenhouse gas emissions per employee, UK: 2021](#)

Dataset | Released 27 September 2023 This dataset includes emissions per employee by industry.

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 CO₂, so all GHG emissions are measured as carbon dioxide equivalents (CO₂e).

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

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 several important stakeholders. We are open to feedback on these activities. We understand that nuclear, in particular, may not be considered by some users to be green. We will continue to monitor the inclusion of this and other activities, including taking into account development of the [UK's green taxonomy](#).

Estimates are presented in this bulletin to the nearest 1,000. Estimates to the nearest 100 are available in the dataset accompanying this release.

To provide an initial estimate of jobs in green industries, we have used publicly available data from the environmental goods and services sector (EGSS) estimates, the low carbon and renewable energy economy survey (LCREE) 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 (OPN) data

In the periods 4 May to 14 May 2023 and 17 May to 29 May, we sampled 4,961 households and 4,976 households, respectively, for the 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 May to 14 May 2023 contained 2,045 individuals, representing a 41% response rate. For 17 May to 29 May, the responding sample contained 1,980 individuals, representing a 40% response rate.

The green jobs questions were asked of working adults only, resulting in a pooled responding sample size of 2,021 working adults in Great Britain. Analysis undertaken excluded those who did not respond to the green jobs questions, including those who did not respond to the questions has limited impact on the estimates.

Survey weights were applied to make estimates representative of the population (based on ONS population estimates). Further information on the survey design and quality can be found in our [Opinions and Lifestyle Survey Quality and Methodology Information \(QMI\)](#).

The self-reported data collected has not been edited to correct perceived inconsistencies. For example, 23% of respondents who reported that they would describe any part of their job as green also then reported that they spend no time on green activities. In contrast, 18% reported that they wouldn't describe any part of their job as green but then said they spend some time on green activities.

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. Learn more about uncertainty in our [Uncertainty and how we measure it for our surveys methodology](#).

More information on the green jobs questions specifically can be found in our Developing estimates of green jobs in the UK methodology, accompanying this bulletin.

Emissions intensity data

Because of the unavailability of employment data for Northern Ireland, employee figures have been used to calculate emissions intensity per employee. This has a particular impact on the agriculture, fishing and forestry industry, which has a large number of self-employed. The impact is relatively small for other industries.

Quality

More quality and methodology information on 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 other 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) and the business register and employment survey (BRES) have published data for 2021, so partial estimates of employment in green industries can be found in the accompanying dataset.

For some activities, including grid infrastructure and low carbon travel (with the exception of zero emissions vehicles), no data was currently 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 that they are subject to measurable sampling uncertainty, which has an effect on 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 our [LCREE datasets](#) to support interpretation. More information can be found in our [LCREE quality and methodology information](#). Information on uncertainty can be found in our [Uncertainty and how we measure it for our surveys methodology](#).

Green occupations

Sample sizes on the OPN mean that we have not been able to carry out analysis of characteristics of those who describe any part of their job as green within regions. We will continue to explore how we can develop estimates and analysis to support understanding of green jobs across regions.

10 . Related links

["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:2021](#)

Bulletin | Released 16 February 2023

Estimates of the size of the UK's Low Carbon and Renewable Energy Economy (LCREE), including turnover and employment.

11 . Cite this statistical bulletin

Office for National Statistics (ONS), released 27 September 2023, ONS website, statistical bulletin, [Experimental estimates of green jobs, UK: 2023](#)

