

Statistical bulletin

Low carbon and renewable energy economy, UK: 2022

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

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1 . Main points

- UK low carbon and renewable energy economy (LCREE) turnover and employment estimates are both at their highest level since the first comparable figures in 2015.
- UK LCREE turnover (in current prices) increased by an estimated 28.0% between 2021 and 2022, from £54.2 billion to £69.4 billion.
- UK LCREE employment also increased, by an estimated 8.0% between 2021 and 2022, from 252,300 to 272,400 full-time equivalents (FTEs).
- The low carbon electricity group within LCREE had the highest turnover (£29.0 billion) in 2022, while the energy efficient products group had the largest employment (134,900 FTEs).
- Electricity, gas, steam and air conditioning supply had the highest turnover among LCREE industries (£22.0 billion, 31.7% of the total) in 2022, while construction had the largest employment (99,100 FTEs, 36.4% of the total).

Along with other data sources, LCREE survey results are an important input into our experimental estimates of green jobs. The next update for our green jobs statistics, using this latest set of LCREE survey results, will be published on 14 March 2024.

2 . The UK's low carbon and renewable energy economy, 2022

This bulletin outlines low carbon and renewable energy economy (LCREE) turnover and employment trends. Our [accompanying dataset](#) gives more detail on these, as well as trade, acquisitions, and disposals statistics.

UK businesses are considered part of the LCREE if they report activity in one or more of 17 defined sectors. Many of these sectors are small, and LCREE is a secondary activity for many businesses. Because of this, similar LCREE sectors can be further aggregated into groups. More information can be found in [Section 5: Glossary](#).

Given the increased uncertainty in estimates for individual LCREE sectors, data presented in this bulletin are provided instead by LCREE group.

We collect these data from businesses annually. All financial estimates in this bulletin are given in current prices as provided by the survey respondents; no inflation adjustments have been made.

Low carbon and renewable energy economy: UK and by country

In 2022, UK businesses generated an estimated £69.4 billion in LCREE turnover, a £15.2 billion (28.0%) increase since 2021. LCREE employment in 2022 was estimated at 272,400 full-time equivalent (FTE) employees, a 20,100 FTE (8.0%) increase since 2021 (Table 1).

In addition to these turnover and employment rises, the number of businesses estimated to be active in the LCREE has increased by 9.6%, from 88,500 in 2021 to 97,000 in 2022.

Table 1: UK low carbon and renewable energy economy turnover was £69.4 billion, with 272,400 FTE employees in 2022

LCREE turnover and full-time equivalent (FTE) employment estimates (with confidence intervals), UK and constituent countries, 2022

	Turnover (£ billions)			Employment (FTE)		
	Estimate	Lower CI	Upper CI	Estimate	Lower CI	Upper CI
UK	69.4	65.8	72.9	272,400	247,600	297,100
England	51.4	48.4	54.5	230,600	206,200	254,900
Scotland	13.0	11.5	14.5	25,700	23,200	28,100
Wales	3.4	3.0	3.7	11,000	9,600	12,400
Northern Ireland	1.6	1.3	1.9	5,200	4,100	6,200

Source: Low Carbon and Renewable Energy Economy Survey from the Office for National Statistics

Notes

1. Figures may not sum because of rounding.
2. Confidence intervals (CI) are a standard way of expressing the statistical accuracy of a survey-based estimate.

Low carbon and renewable energy economy: groups

Sectors with similar activity can be further combined into six larger groups. More information can be found in [Section 5: Glossary](#).

All LCREE groups showed increased turnover between 2021 and 2022 (Figure 1). Of these groups, low carbon electricity had the highest turnover in 2022 at £29.0 billion (41.8% of total LCREE turnover). This group also saw the largest increase in turnover since 2021 of 53.4% (£10.1 billion).

Figure 1: The low carbon electricity group had the largest LCREE turnover increase in 2022, rising by 53% to £29.0 billion

LCREE group turnover and percentage change, UK, 2021 and 2022, £ billions

Notes:

1. Full definitions of each LCREE group can be found in Section 6 of our [Low Carbon and Renewable Energy Economy \(LCREE\) QMI](#).
2. Given uncertainty of estimates, rankings of the smaller groups are indicative only.

[Download the data](#)

All LCREE groups saw increased employment between 2021 and 2022 (Figure 2). The energy efficient products group had the largest LCREE employment in 2022, with 134,900 FTEs (49.5% of total LCREE employment). Meanwhile, the low carbon services group saw the largest employment increase between 2021 and 2022. Employment in this group is estimated to have almost doubled, rising from 8,500 to 16,300 FTEs (a 91.8% increase).

Figure 2: The energy efficient products group had the largest LCREE employment in 2022, at 134,900 FTEs

LCREE group employment and percentage change, UK, 2021 and 2022, full-time equivalents (FTEs) in thousands

Notes:

1. Full definitions of each LCREE group can be found in Section 6 of our [Low Carbon and Renewable Energy Economy \(LCREE\) QMI](#).
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Low carbon and renewable energy economy: industries

Sector and group breakdowns are unique to the LCREE survey and help draw out specific low carbon and renewable energy activities. UK businesses can also be classified by industry using the [Standard Industrial Classification \(SIC\) 2007](#).

Using the SIC breakdown, the electricity, gas, steam and air conditioning supply industry had the highest turnover in 2022 at £22.0 billion (31.7% of total LCREE turnover), and the largest increase of 59.6% (£8.2 billion) between 2021 and 2022 (Figure 3).

Figure 3: The electricity, gas, steam and air conditioning supply industry had the largest LCREE turnover increase in 2022, rising by 60% to £22.0 billion

LCREE industry turnover and percentage change, UK, 2021 and 2022, £ billions

Notes:

1. The 5 industries with the highest 2022 turnover are shown; all 14 industries are available in our [accompanying dataset](#).
2. Given uncertainty of estimates, rankings of the smaller industries are indicative only.
3. Extra precision is available in the downloadable chart to help highlight small movements in one industry.

[Download the data](#)

The construction industry had the largest employment in 2022, with 99,100 FTEs (36.4% of total LCREE employment). The professional, scientific and technical activities industry saw the largest employment increase, rising from 36,600 to 46,200 FTEs (26.2%) between 2021 and 2022. The manufacturing industry is estimated to have seen a slight employment decrease in the same period, down 3.2% from 77,500 to 75,000 FTEs (Figure 4).

Figure 4: The construction industry had the largest LCREE employment in 2022, at 99,100 FTEs

LCREE industry employment and percentage change, UK, 2021 and 2022, full-time equivalents (FTEs) in thousands

Notes:

1. The 5 industries with the highest 2022 employment are shown; all 14 industries are available in our [accompanying dataset](#).
2. Given uncertainty of estimates, rankings of the smaller industries are indicative only.

[Download the data](#)

Between 2021 and 2022, all LCREE groups increased in terms of both turnover and employment, this was also the case for most LCREE industries.

3 . Trends in turnover and employment since 2015

Following the increase in both low carbon and renewable energy economy (LCREE) turnover and employment estimates between 2021 and 2022, these are both at their highest level since the first comparable figures in 2015. More information can be found in [Section 2: The UK's low carbon and renewable energy economy, 2022](#).

In absolute terms, this estimated annual change between 2021 and 2022, is the largest recorded since 2015 in terms of turnover (£15.2 billion). It is also the second largest annual change in employment (20,100 FTEs), with the largest change in that measure happening between 2020 and 2021. However, the scale of these changes should always be assessed against the relatively large confidence intervals associated with each yearly estimate.

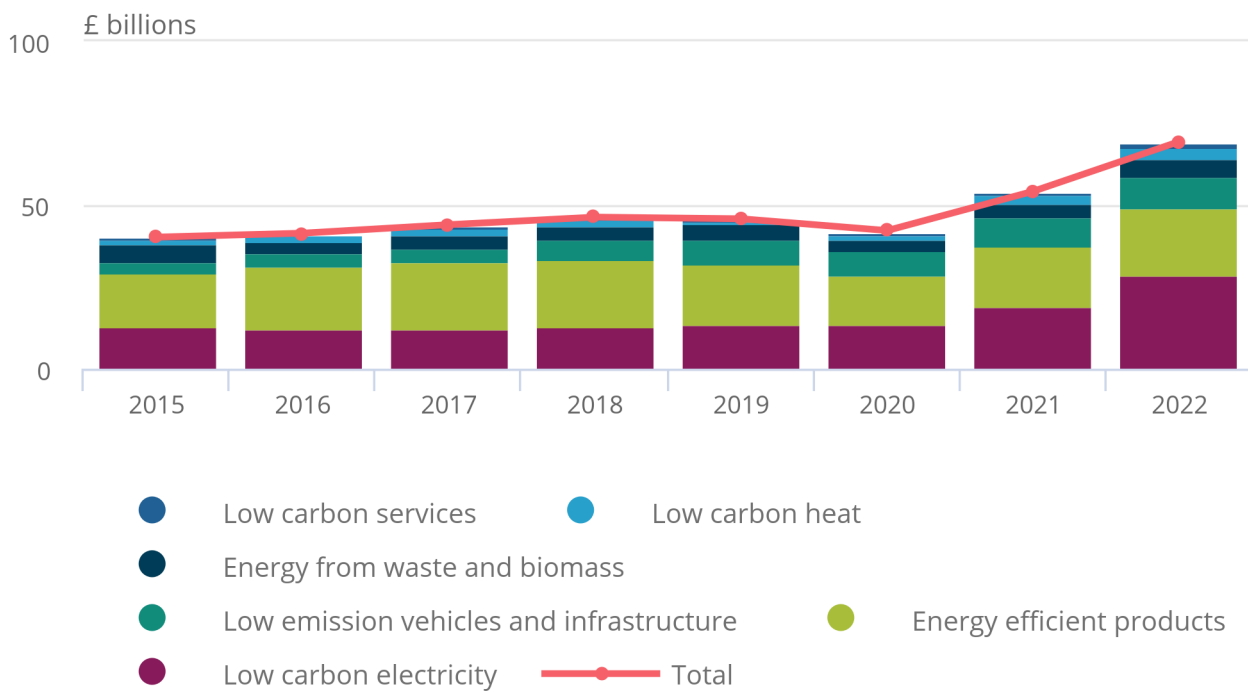
In 2021, low carbon electricity overtook energy efficient products as the largest LCREE group for turnover, this has remained the case for 2022. In terms of employment, the energy efficient products group has consistently reported as the largest group since 2015.

Figure 5: UK LCREE turnover increased by 72.6% between 2015 and 2022

LCREE group and total turnover, UK, 2015 to 2022, £ billions

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LCREE group and total turnover, UK, 2015 to 2022, £ billions



Source: Low Carbon and Renewable Energy Economy (LCREE) Survey from the Office for National Statistics

Notes:

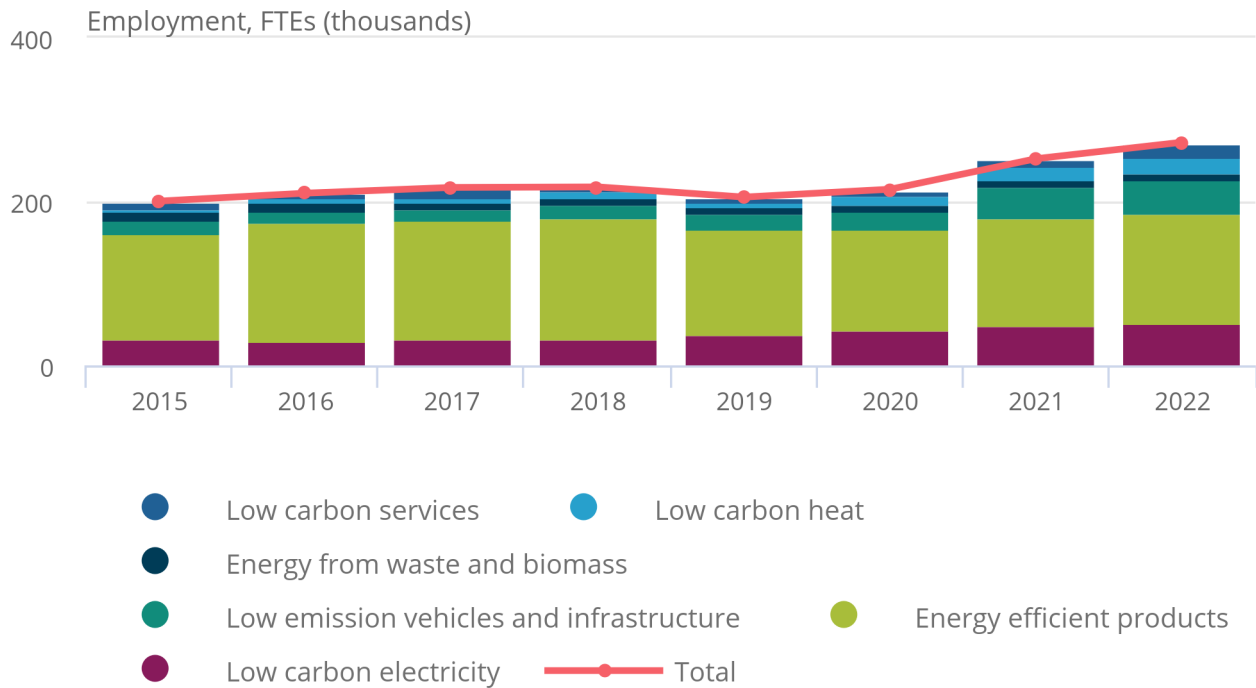
1. Full definitions of each LCREE group can be found in Section 6 of our [Low Carbon and Renewable Energy Economy \(LCREE\) QMI](#).
2. Confidence intervals can be found in our [accompanying dataset](#).
3. Given uncertainty of estimates, rankings of the smaller groups are indicative only.

Figure 6: UK LCREE employment increased by 35.9% between 2015 and 2022

LCREE group and total employment, UK, 2015 to 2022, full-time equivalents (FTEs) in thousands

Figure 6: UK LCREE employment increased by 35.9% between 2015 and 2022

LCREE group and total employment, UK, 2015 to 2022, full-time equivalents (FTEs) in thousands



Source: Low Carbon and Renewable Energy Economy (LCREE) Survey from the Office for National Statistics

Notes:

1. Full definitions of each LCREE group can be found in Section 6 of our [Low Carbon and Renewable Energy Economy \(LCREE\) QMI](#).
2. Confidence intervals can be found in our [accompanying dataset](#).
3. Given uncertainty of estimates, rankings of the smaller groups are indicative only.

4 . Low carbon and renewable energy economy data

[Low carbon and renewable energy economy estimates](#)

Dataset | Released 8 March 2024

This release includes annual estimates of low carbon and renewable energy economy activity in the UK and constituent countries: turnover, employment, exports, imports, acquisitions, disposals, and number of businesses.

5 . Glossary

Confidence Interval

Confidence intervals (CI) are a standard way of expressing the statistical accuracy of survey-based estimates. A 95% confidence interval is the range within which the true population value would fall for 95% of the time, if the survey was repeated. If an estimate has a high error level, the corresponding confidence interval will be very large.

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.

Industry

Businesses are classified into an industry using the current [Standard Industrial Classification \(SIC\) 2007](#) by the type of economic activity in which they are engaged. The Low Carbon and Renewable Energy Economy (LCREE) Survey samples UK businesses in these 14 industries, but not all sub-groups within these industries are sampled:

- A - agriculture, forestry and fishing
- B - mining and quarrying
- C - manufacturing
- D - electricity, gas, steam and air conditioning supply
- E - water supply; sewerage, waste management and remediation activities
- F - construction
- G - wholesale and retail trade; repair of motor vehicles and motorcycles
- H – transportation and storage
- J - information and communication
- L - real estate activities
- M - professional, scientific and technical activities
- N - administrative and support service activities
- P - education
- S - other activities

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.

Low carbon and renewable energy sectors

The LCREE survey asks UK businesses to self-classify themselves into 17 low carbon and renewable energy sectors:

1. Offshore wind
2. Onshore wind
3. Solar
4. Hydropower
5. Other renewable electricity
6. Bioenergy
7. Alternative fuels
8. Renewable heat
9. Renewable combined heat and power
10. Energy efficient lighting
11. Energy efficient products
12. Energy monitoring, saving or control systems
13. Low carbon consultancy, advisory and offsetting services
14. Low emission vehicles and infrastructure
15. Carbon capture and storage
16. Nuclear power
17. Fuel cells and energy storage systems

A business can be active in more than one sector.

Low carbon and renewable energy groups

The LCREE sectors can be combined into groups of activities that are considered similar.

- Low carbon electricity group: includes the sectors of offshore wind, onshore wind, solar, hydropower, other renewable electricity, carbon capture and storage and nuclear power.
- Low carbon heat group: includes the sectors of renewable heat and renewable combined heat and power.
- Energy from waste and biomass group: includes the sectors of bioenergy and alternative fuels.
- Energy efficient products group: includes the sectors of energy efficient lighting, energy efficient products and energy monitoring, saving or control systems.
- Low carbon services group: includes the sector of low carbon consultancy, advisory and offsetting services.
- Low emission vehicles group: includes the sectors of low emission vehicles and infrastructure and fuel cells and energy storage systems.

Turnover

The amount received in sales from goods and services in a defined time period. It is a useful measure of the health of a business or an economy.

6 . Measuring the data

Data sources and collection

The survey collects information on turnover, imports, exports, employment, and acquisitions and disposals of capital assets, for 17 low carbon and renewable energy economy (LCREE) sectors. More information can be found in our [Low carbon sector codes and descriptions document \(doc, 26.1KB\)](#). Data are collected from businesses on an annual basis.

Coverage

Only the portion of a business' economic activity that directly relates to activity in a defined LCREE sector in the UK is included.

Revisions

This release contains revisions to estimates for the years 2020 and 2021. Revisions can result from a variety of factors, including:

- businesses adding data for previous years
- businesses revising their previous submissions
- developments in methodology

Quality

More information on strengths, limitations, appropriate uses, and how the data were created is available in our [Low Carbon and Renewable Energy Economy \(LCREE\) Survey QMI](#).

Upcoming changes in indirect estimates

We have previously provided estimates of wider, indirect economic effects because of direct LCREE activity. The methodology involved has recently been reviewed and updated to incorporate new data sources. Revised indirect estimates for previous years and provisional 2021 and 2022 indirect estimates will be published later in 2024. Full details can be found in Section 7 of our [Low Carbon and Renewable Energy Economy \(LCREE\) Survey QMI](#).

7 . Strengths and limitations

Strengths

The Low Carbon and Renewable Energy Economy (LCREE) Survey has a high response rate and directly collects information on LCREE activity by sector.

Limitation

Activity in the LCREE is spread across a wide range of industries. While many sectors have grown, they remain small, and for many businesses LCREE activity is secondary rather than primary. Therefore, estimates are subject to volatility.

More information on strengths and limitations can be found in our [Low Carbon and Renewable Energy Economy \(LCREE\) Survey QMI](#).

Uncertainty

Full LCREE estimates presented in this bulletin 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) are presented in the datasets to support interpretation. These uncertainty measures consider both the variability in the estimate of the proportion of businesses active in the LCREE, and the variability of the estimate of those businesses.

The former can be particularly variable because of sampling, as can be seen in the fluctuation in the estimates of the number of businesses in our [accompanying dataset](#), and their higher level of uncertainty.

More information can be found in our [Uncertainty and how we measure it for our surveys methodology](#).

Sample size

The LCREE survey was undertaken for the ninth time in 2023, for the reporting year 2022, using a sample of around 25,000 businesses. The response rate was 75.5% in 2022, with more than 3,800 businesses returning data in at least one LCREE sector (more information can be found in our [Low Carbon and Renewable Energy Economy \(LCREE\) Survey QMI](#)).

The 2022 response rate was higher than the 2019, 2020 and 2021 response rates which were all below 70.0%. A lower response rate leads to more uncertainty as there are fewer responses to base the survey results on.

The lower response rate in 2019 to 2021 was likely to be because of the coronavirus (COVID-19) pandemic and the related restrictions (2019 data were collected in 2020). The response rate before the pandemic was above 80.0%.

8 . Related links

[Environmental protection expenditure survey, UK: 2021](#)

Bulletin | Released 22 June 2023

Estimates of environmental protection expenditure by UK industries, based on the Environmental Protection Expenditure Survey.

[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.

[Exploring regional estimates of activity in the low carbon and renewable energy economy, UK and regions of England: 2020](#)

Article | Released 14 April 2022

Exploring methods to estimate turnover and employment in the low carbon and renewable energy economy (LCREE) in the UK by combining data from the LCREE survey and the Inter-Departmental Business Register, including estimates for the different regions of England. Experimental statistics.

[“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.

[Experimental estimates of green jobs, UK: 2023](#)

Bulletin | Released 27 September 2023

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

[Environmental goods and services sector \(EGSS\) estimates](#)

Dataset | Released 5 June 2023

First estimates of the UK environmental goods and services sector (EGSS) for 2020 and revised estimates for 2010 to 2019. Included are estimates of output, gross value added, employment and exports.

9 . Cite this statistical bulletin

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