

Statistical bulletin

Low carbon and renewable energy economy, UK: 2021

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

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Release date:
16 February 2023

Next release:
To be announced

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1 . Main Points

- Low carbon and renewable energy economy (LCREE) turnover and employment estimates are both at their highest level since the first comparable figures in 2015.
- Between 2020 and 2021, LCREE turnover (all in current prices) increased by 30.8%, from £41.6 billion to £54.4 billion.
- Employment increased by 16.4% in the same period, from 212,600 full-time equivalents (FTEs) to 247,400.
- The energy efficient products group had the highest LCREE turnover in 2021 at £19.6 billion (36.0%) and the highest LCREE employment at 138,300 FTEs (55.9%).
- The manufacturing industry had the highest LCREE turnover in 2021 at £16.9 billion (31.1%), and the construction industry had the highest LCREE employment at 91,000 FTEs (36.8%).
- Although a proportion of this observed increase could be attributed to the recovery of the UK economy from the coronavirus (COVID-19) pandemic, this is not likely to be the whole picture.

2 . Measuring green jobs and development work

The Office for National Statistics (ONS) is currently leading a piece of work aimed at defining and measuring “green jobs” in the UK, recently publishing [a response to our user engagement exercise \(PDF, 342 KB\)](#).

The Low Carbon and Renewable Energy Economy (LCREE) Survey is not intended as a complete measure of green jobs or green businesses. However, we expect LCREE will be an important source for planned green jobs statistics.

In this release series, we have previously provided estimates of wider, indirect economic effects because of direct LCREE activity. We are currently reviewing and updating the methodology involved, including incorporating new data sources. Revised indirect statistics for previous years will now be published later in 2023, with 2021 data following early in 2024. For full details, see our [LCREE Survey Quality and Methodology Information \(QMI\)](#).

3 . The UK’s low carbon and renewable energy economy, 2021

This bulletin outlines important low carbon and renewable energy economy (LCREE) turnover and employment trends. Data are collected from businesses on an annual basis. All financial estimates in this bulletin are given in current prices as provided by the survey respondents; no inflation adjustments have been made.

LCREE activity is spread across a range of industries. Many of the bespoke LCREE sectors are small, and LCREE is many businesses’ secondary activity. Because of this, LCREE sectors can be further grouped by activities considered similar (see [Section 7: Glossary](#) for industry, sector and group detail). Given the increased uncertainty in estimates for individual LCREE sectors, data presented in this bulletin are provided instead by LCREE group.

The [accompanying dataset](#) gives more detail on trade, acquisitions, and disposals.

In 2021, the UK LCREE generated £54.4 billion in turnover within contributing businesses, which was a 30.8% increase since 2020. This accounted for employment of 247,400 full-time equivalents (FTEs), which was a 16.4% increase since 2020.

Table 1: The UK’s low carbon and renewable energy economy (LCREE) generated £54.4 billion in turnover and 247,400 full-time equivalent (FTE) employment
LCREE turnover and FTE employment estimates (and confidence intervals), UK and constituent countries, 2021

	Turnover (£ billions)			Employment (FTE)		
	Estimate	Lower CI	Upper CI	Estimate	Lower CI	Upper CI
UK	54.4	51.1	57.7	247,400	220,800	274,000
England	41.3	38.5	44.1	201,900	178,400	225,400
Scotland	8.7	7.5	9.9	28,300	22,200	34,500
Wales	2.8	2.6	3.0	10,400	9,100	11,700
Northern Ireland	1.5	1.0	2.1	6,700	2,500	11,000

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

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.

Businesses are considered part of the LCREE if they report activity in one or more of 17 defined sectors -that are then further combined into six larger groups of similar activity. A breakdown of LCREE turnover and employment by groups between 2020 and 2021 is provided in Figure 1 and Figure 2.

Energy efficient products was the LCREE group with the highest turnover in 2021 at £19.6 billion (36.0%). The low carbon electricity group saw the largest turnover increase, from £13.4 billion in 2020 to £18.2 billion in 2021 (35.8%).

Figure 1: Energy efficient products was the LCREE group with the highest turnover in 2021, at £19.6 billion

LCREE group turnover and change, UK, 2020 and 2021, £ billions

Notes:

1. For full definitions of each LCREE sector and group, please see [Section 6 of the Quality and Methodology Information report](#).
2. Given uncertainty of estimates, rankings of the smaller groups are indicative only.

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The energy efficient products group also had the largest LCREE employment in 2021, at 138,300 (55.9%). The low emission vehicles and infrastructure group saw the largest employment increase, from 21,400 FTEs in 2020 to 36,500 in 2021 (70.6%).

Figure 2: The energy efficient products group had the largest LCREE employment in 2021, at 138,300 FTEs

LCREE group employment and change, UK, 2020 and 2021, full-time equivalents (FTEs) in thousands

Notes:

1. For full definitions of each LCREE sector and group, please see [Section 6 of the Quality and Methodology Information report](#).
2. Given uncertainty of estimates, rankings of the smaller groups are indicative only.

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The LCREE can also be analysed by industry; we use the [Standard Industrial Classification 2007](#). A breakdown of LCREE turnover and employment by industry between 2020 and 2021 is provided in Figure 3 and Figure 4.

The manufacturing industry had the largest LCREE turnover in 2021 at £16.9 billion (31.1%). The construction industry saw the largest turnover increase, from £9.0 billion in 2020 to £14.6 billion in 2021 (62.2%).

Figure 3: The manufacturing industry had the largest LCREE turnover in 2021, at £16.9 billion

LCREE industry turnover and change, UK, 2020 and 2021, £ billions

Notes:

1. For the full list of LCREE industries, please see [Section 7: Glossary](#).
2. The five industries with the highest 2021 turnover are shown; all 14 industries are available in [the accompanying dataset](#).
3. Given uncertainty of estimates, rankings of the smaller industries are indicative only.
4. Extra precision has been provided to highlight small movements in one industry.

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The construction industry had the largest LCREE employment in 2021, at 91,000 FTEs (36.8%), and the largest increase in employment, rising by 19.0% from 76,500 FTEs in 2020.

Figure 4: The construction industry had the largest LCREE employment in 2021, at 91,000 FTEs

LCREE industry employment and change, UK, 2020 and 2021, full-time equivalents (FTEs) in thousands

Notes:

1. For the full list of LCREE industries, please see [Section 7: Glossary](#).
2. The five industries with the highest 2021 employment are shown: all 14 industries are available in [the accompanying dataset](#).
3. Given uncertainty of estimates, rankings of the smaller industries are indicative only.

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Most LCREE groups and industries increased in terms of both turnover and employment between 2020 and 2021.

4 . Trends in turnover and employment since 2015

Low carbon and renewable energy economy (LCREE) turnover and employment estimates are both at their highest level since the first comparable figures in 2015.

Although a proportion of this observed increase could be attributed to the recovery of the UK economy from the coronavirus (COVID-19) pandemic, this is not likely to be the whole picture.

Between 2020 and 2021, UK turnover increased by 30.8%, from £41.6 billion to £54.4 billion (Figure 5), while employment rose by 16.4%, from 212,600 full-time equivalents (FTEs) to 247,400 (Figure 6).

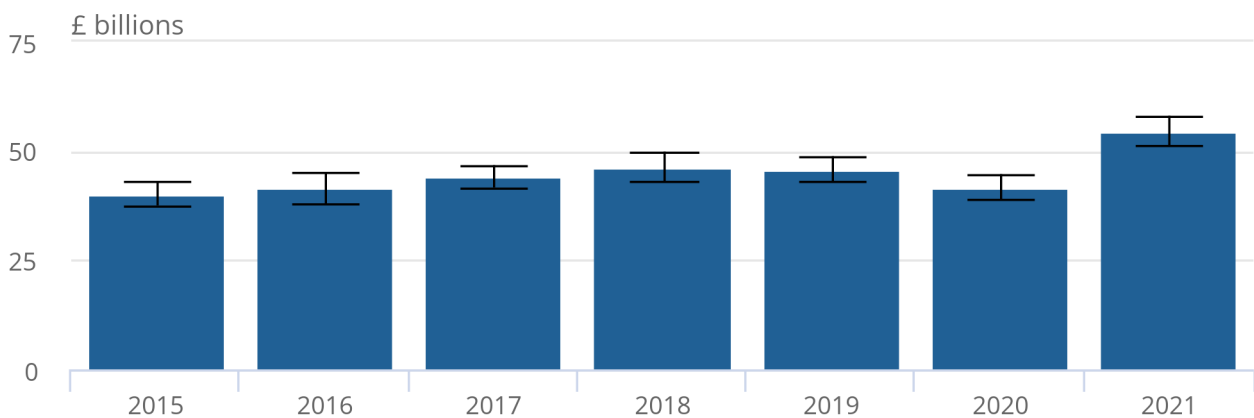
This annual change is the largest recorded (in terms of both turnover and employment) since 2015. However, the scale of these changes should always be assessed against the relatively large confidence intervals associated with each yearly estimate.

Figure 5: UK LCREE turnover increased by 35.3% between 2015 and 2021

LCREE turnover and confidence intervals, UK, 2015 to 2021, £ billions

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LCREE turnover and confidence intervals, UK, 2015 to 2021, £ billions



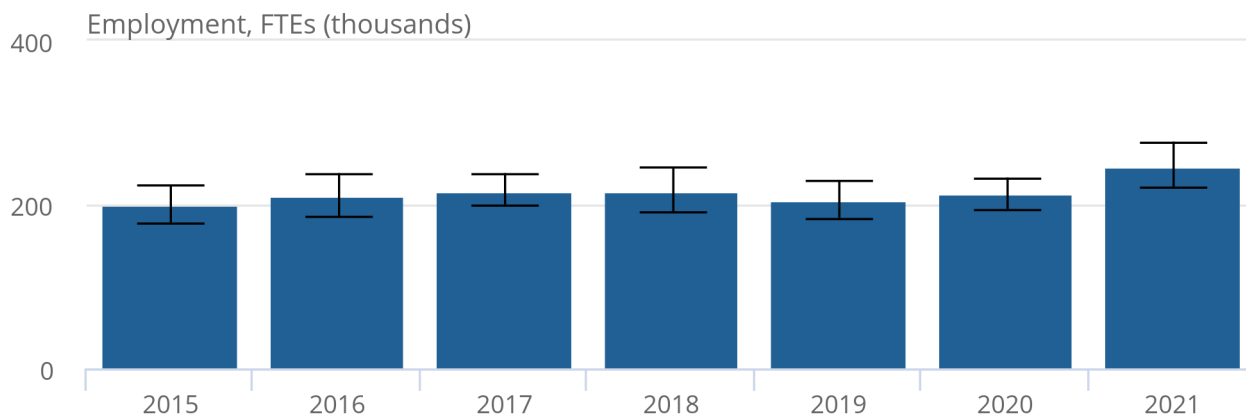
Source: Office for National Statistics – Low Carbon and Renewable Energy Economy (LCREE) Survey

Figure 6: UK LCREE employment increased by 23.4% between 2015 and 2021

LCREE, employment, full-time equivalents (FTEs) in thousands with confidence intervals, UK, 2015 to 2021

Figure 6: UK LCREE employment increased by 23.4% between 2015 and 2021

LCREE, employment, full-time equivalents (FTEs) in thousands with confidence intervals, UK, 2015 to 2021



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

Since 2015, energy efficient products has remained the largest LCREE group for both turnover and employment.

The manufacturing industry has had the greatest LCREE turnover since this survey began. However, the largest industry in terms of employment has been either manufacturing or construction, with the latter being the largest industry in 2021 (see [Section 3: The UK's low carbon and renewable energy economy, 2021](#)).

Information for all groups and industries is provided in [the accompanying dataset](#).

5 . Activity in businesses with 250 or more employees

All UK businesses with 250 or more employees that are within the low carbon and renewable energy economy (LCREE) target population are sampled as part of this survey. While these are only a part of the LCREE, related estimates within this group have no sampling variability. They may however be subject to other errors.

Small and medium-size businesses may act differently. Also, as businesses change size, they may move in or out of this employment band over time, while remaining in the wider LCREE.

Businesses with 250 or more employees accounted for 52.6% of LCREE turnover and 32.3% of LCREE employment in 2021.

For businesses with 250 or more employees, turnover and employment increased between 2020 and 2021, by 19.7% (from £23.9 billion to £28.6 billion) and 5.1% (from 76,100 to 80,000 full-time equivalents, or FTEs), respectively. These 2021 estimates are the highest figures for this employment band since 2015.

6 . Low carbon and renewable energy economy data

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

Dataset | Released 16 February 2023

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.

7 . 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 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:

- offshore wind
- onshore wind
- solar
- hydropower
- other renewable electricity
- bioenergy
- alternative fuels
- renewable heat
- renewable combined heat and power
- energy efficient lighting
- energy efficient products
- energy monitoring, saving or control systems
- low carbon consultancy, advisory and offsetting services
- low emission vehicles and infrastructure
- carbon capture and storage
- nuclear power
- 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.

8 . 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 \(doc, 25.4 KB\)](#).

Coverage

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

Revisions

This release contains revisions to estimates for the years 2019 to 2020 since they were last published in February 2022. Revisions can result from a variety of factors, including:

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

Quality and methodology

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

9 . Strengths and limitations

Limitations

Activity in the low carbon and renewable energy economy (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. Estimates of the number of businesses are therefore subject to volatility and, though provided in [the accompanying dataset](#), are not directly considered within this statistical bulletin.

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 take into account both the variability in the estimate of the proportion of businesses active in the LCREE economy 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 [the accompanying dataset](#), and their higher level of uncertainty.

Sample size

The LCREE Survey was undertaken for the eighth time in 2022, for the reporting year 2021, using a sample of around 25,000 businesses. The response rate was 65%, with more than 3,000 businesses captured as being active in the LCREE.

Response rates for 2019, 2020 and 2021 data were lower than in previous years; the response rate in 2018 was 81%. This is likely to be because of the coronavirus (COVID-19) pandemic and related restrictions (2019 data were collected in 2020). This means that these estimates may be subject to additional uncertainty from having fewer responses to base the survey results on.

10 . Related links

[UK Environmental Accounts: 2022](#)

Bulletin | Released 9 June 2022

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: September 2022](#)

Article | Released 20 September 2022

An update to our work on "green jobs", including our user engagement exercise, which closes on 6 October, and new research articles.

[Environmental protection expenditure, UK: 2020](#)

Bulletin | Released 8 June 2022

Estimates of environmental protection expenditure by UK industries for 2015 to 2020, based on the environmental protection expenditure survey, and newly published estimates of the environmental protection expenditure accounts for 2010 to 2019.

[The UK's low emission vehicle sector](#)

Dataset | Released 8 November 2021

Turnover and employment data for the low emission vehicle and infrastructure sector in the UK, 2015 to 2019, and data on vocational qualifications related to low emission vehicles and charging points in England, Wales and Northern Ireland.

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

Dataset | Released 21 March 2022

First estimates of the UK environmental goods and services sector (EGSS) for 2019 and revised estimates for 2010 to 2018. Included are estimates of output, gross value added, employment and exports.

11 . Cite this statistical bulletin

Office for National Statistics (ONS), released 16 February 2023, ONS website, statistical bulletin, [Low carbon and renewable energy economy, UK: 2021](#)

