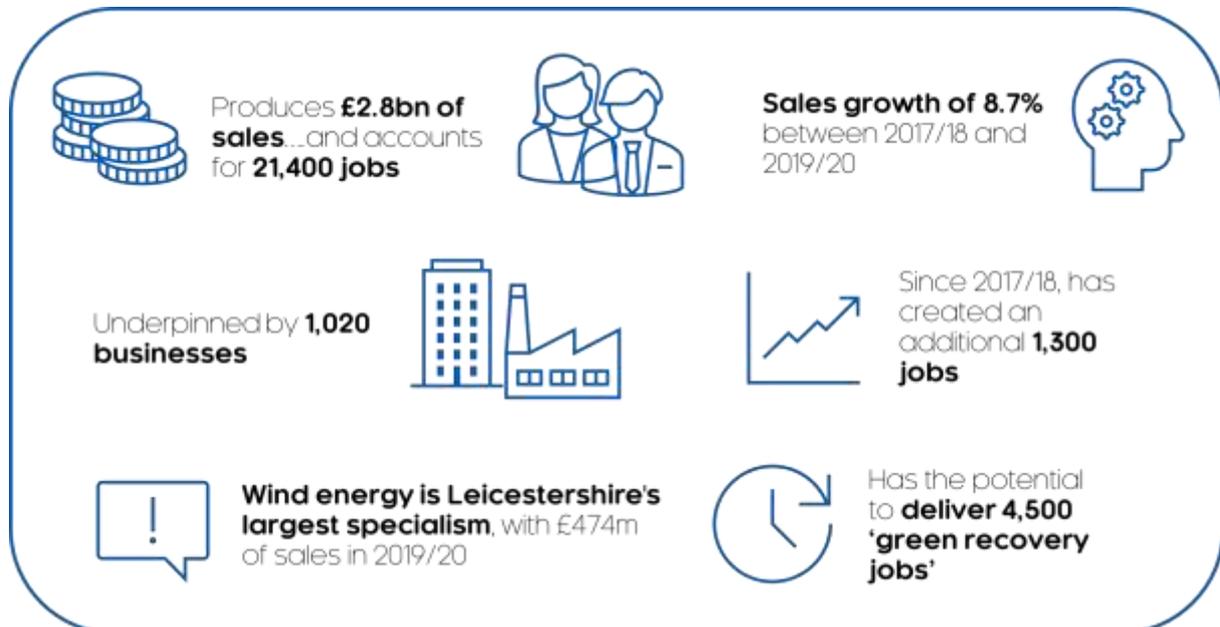


Sector profile: The Low Carbon sector in Leicester and Leicestershire



Source(s): See Economic and growth indicators.

Defining the Low Carbon sector

The low carbon sector covers all economic activities that reduce carbon or greenhouse gas emissions, including:

- **Energy sources and fuels:** renewable energy technologies, nuclear energy, waste to energy, alternative fuels
- **Environmental goods and services:** air pollution control; environmental consultancy; recovery and recycling; water supply and wastewater treatment; renewable energy consultancy
- **Low carbon activities:** carbon capture and storage; carbon finance; energy management and efficiency; low carbon vehicles; building technologies.

Market and economic outlook

Global market

The world emits around 50 billion **tonnes of greenhouse gases** each year (measured in carbon dioxide equivalents, CO₂eq). [According to analysis by McKinsey](#), the breakdown of global greenhouse gas emissions in 2016 shows that 73.2% of greenhouse gas emissions are from energy production (where 24.2% of emissions are from energy use in industry, 17.5% from energy use in buildings, and 16.2% from energy use in transport), 18.4% from Agriculture, forestry and land use, 5.2% from industry and 3.2% from waste.

Altogether, roughly 28 percent of global greenhouse-gas (GHG) emissions came from industry in 2014. Half of industry's CO₂ emissions result from the manufacture of the four industrial commodities—ammonia, cement, ethylene, and steel.

The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC), on climate change mitigation, adaptation, and finance, signed in 2016. The Paris Agreement's long-term temperature goal is to keep the rise in global average temperature to well below 2°C (3.6°F) above pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C (2.7°F), recognizing that this would substantially reduce the impacts of climate change. This should be done by reducing emissions as soon as possible and achieving a net-zero emissions in the second half of the 21st century. According to the International Energy Agency in 2015, an estimated \$13.5 trillion of public and private investment in the global energy sector alone will be required between 2015 and 2030 if the signatories to the Paris Agreement are to meet their national targets.

Key subsectors in low carbon and environmental goods and services, which will shape the global market in future years include:

- *Renewable energy generation and infrastructure* – will continue to be rolled out, ranging from wind turbines, to water and tidal energy generation, biomass energy, solar energy, heat recovery, geothermal energy, ground source heat and cooling, and integrated energy networks.
- *Green hydrogen production* - "Green hydrogen" made with wind and solar electricity could become the cheapest form of "transformative fuel". The hope is that hydrogen will prove an emissions-free alternative to coal and gas in industries that operate at incredibly high temperatures.
- *Energy storage* is a key growth sector – in order to store renewable energy to be portable or to be released on-demand. Battery technology and production is key.
- *Green buildings and retrofit* – remain a significant area for investment and contribution to energy conservation and reducing carbon emissions.
- *Sustainable transport* – whether private electric vehicles or mass transit and public transport systems.
- *Circular economy and resource efficiency* – whereby energy and material use is conserved via recycling, and reduced waste.
- *Sustainable farming and land management* – will increase in use and delivery, and will have to adapt with the changing climate.

A major challenge for advanced economies is the energy transition from fossil fuels to renewables, particularly in terms of electric heating, power and vehicles, for businesses and consumers.

UK market

The UK has a strong record of clean growth, cutting carbon emissions by 42% between 1990 and 2015, while experiencing a 67% increase in GDP during the same period, in contrast to the overall total G7 emissions reduction of 3% and GDP increase of 61%¹. This has been achieved through a variety of strategies including improved energy efficiency, increased recycling of waste products and improved automobile engine technology, with the

largest contribution in reduction of emissions from the decarbonisation of power.

[Government analysis shows](#) the UK now has the largest installed offshore wind capacity in the world.

[Ricardo Energy & Environment produced a report](#) for the Committee on Climate Change in 2016 which summarised the UK business opportunities of moving to a low carbon economy. The main opportunities were outlined as:

- Substantial investments by the UK over the last 15 years in energy and low carbon technology research, development and demonstration (RD&D).
- The UK currently has particular strengths in: electric vehicles, smart grids, transport, telematics, energy storage, off-shore wind, biofuels, and solar PV.
- The UK low carbon economy (LCE) could grow from around 2% of UK Total Output in 2015 to up to around 8% by 2030, and around 13% by 2050. This corresponds to a UK LCE market size of between £210 billion and £600 billion in 2030 and between £510 billion and £1,400 billion in 2050. The levels of UK employment associated with the LCE are between 1.0 and 2.2 million in 2030, and between 2.5 and 5.0 million in 2050.

Low Carbon and Covid-19

There was a sharp decline in air pollution during the first Covid-19 lockdown, though it has since recovered. During the first national lockdown in 2020, harmful emissions and air pollution were observed dropping significantly across the UK, largely a result of reduced traffic volumes, but also reduced industrial activity. [Research by the Centre for Cities](#) shows this drop was equally pronounced in Leicester; NO₂ concentrations dropped by some 30% on predicted levels during the first months of lockdown. The Centre did however note this was the 7th smallest drop out of 49 cities assessed in the UK, and by October, emissions had almost returned to pre-lockdown levels, with the Centre finding a particularly strong link between traffic volumes and emissions in the city.

Resultantly, the Centre for Cities concludes this has two implications: "First, human-made air pollution can be reduced if behaviour changes and, second, if there are no measures in place to keep the levels low, air pollution is likely to bounce back." Such conclusions will be important for attaining net zero post-Covid; though the Centre acknowledges Leicester performed comparatively well on key measures of air quality pre-Covid, in 2017 there were an estimated 216 deaths in the city attributable to poor air quality.

Green spaces and natural capital have been increasingly prioritised by residents during the pandemic. During the pandemic, many people have readdressed how they use and value natural capital and outdoor spaces. [Google mobility data](#) shows during Summer 2020, Leicestershire residents spent almost twice as much time at parks and outdoor attractions than they did pre-Covid, a trend that even persisted into the Winter (at rates above the national average). Land use data shows 23% of Leicestershire is undeveloped (non-agricultural), with approximately 2,200 km² of forest, open land, water and outdoor recreation in the county.

The pandemic has triggered calls for a 'Green Recovery'. The popular term encompasses a potential package of environmental, regulatory and fiscal reforms to be used in the recovery from the economic shock of the pandemic, and is gaining increased international

policy momentum, with the United States 'Plan for Climate Change and Environmental Justice', the European Commission's 'European Green Deal', and the UK's 'Ten Point Plan for a Green Industrial Revolution' all published or progressed to an advanced stage during the pandemic.

The economic and environmental benefits of a 'Green Recovery' could be significant. [Analysis commissioned by the We Mean Business Coalition](#) has found a 'Green Recovery' stimulus package could not only help the economy recover but also set the UK on a low carbon trajectory more aligned with ambitions to become a net-zero economy by 2050. The research found implementation of 'Green Recovery' investments could boost income, employment and GDP in the UK more than 'return-to-normal' stimulus measures (e.g. a VAT cut), with the added benefit of reducing emissions along a 2050 net-zero trajectory – more than four times faster than a 'return-to-normal' stimulus .

Key organisations and R&D expertise in Leicester and Leicestershire

The low carbon sector in Leicester & Leicestershire contains many innovative, companies and world class research establishments and facilities. The universities of De Montfort, Leicester, and Loughborough are home to some renowned low carbon research centres, with strengths in energy, building technologies and low emission vehicles.

The University of Leicester is focused on four areas of sustainability, including climate change, resource efficiency, renewable energy and the built environment. The University offers a number of established services for business - CityScan – for measuring air pollution, RAFT - Real-time Air Fingerprinting Technology that measures trace constituents in air, and iTRAQ – which provides a dynamic traffic management system to optimise the road network.

Many low carbon firms and innovative start-ups are located on Loughborough University Science and Enterprise Park. Firms include Cenex, a not-for-profit consultancy specialising in the delivery of projects, supporting innovation and market development focused on low carbon vehicles; and CREST – which has over 1,200 m² of laboratories for the research and development of renewable energy technologies. Loughborough University works in partnership with the automotive industry to develop new technologies to reduce carbon emissions and provide clean energy solutions, energy access for those in poverty, and mobility solutions.

The Institute of Energy and Sustainable Development at De Montfort University undertakes research on low-carbon energy systems and infrastructure, including smart grid and demand response, building and industrial energy efficiency analysis, low carbon transport, and renewable energy integration. It also undertakes research on sustainable communities,

MIRA, based in South-West Leicestershire, is home to over 37 major test facilities and laboratories including crash, impact simulation, noise and vibration, vehicle and component environmental facilities, along with a full-scale aerodynamic wind tunnel. Combined with a 100km proving ground complex supported by 500 engineers and contained within a 1.75million sq ft Technology Park make the offering globally unique. MIRA are helping to develop the next generation of electric cars, braking systems, intelligent transport systems and driverless vehicle technologies.

The independent **Energy Technology Institute (ETI)** has also helped to position the LLEP area as a centre for renewable energy and energy research expertise.

EarthSense is an award-winning Leicester-based firm that provides air quality monitors and advanced pollution modelling and API, creates critical components in smart systems, informs major investments, assesses historic exposure and future risk. It does this through two main products – MappAir® - high resolution map of air pollution that uses advanced modelling techniques to provide insight into air pollution from global scales right down to street corners.; and Zephyr® - an award-winning compact and lightweight ambient air pollution monitor.

Economic and growth indicators

Table 1: Summary of key economic and growth indicators for the Low Carbon sector in Leicester and Leicestershire

	Value, 2019/20		
Sales (£m)	2,800		
Jobs	21,400		
Businesses	1,020		
Productivity (sales, £)	130,600		
	Value, 2017/18-19/20	% change p.a.	% change p.a. (UK average)
Sales growth (£m)	300	8.7%	18.1%
Jobs created	1,300	6.6%	16.7%
New businesses	40	4.0%	19.6%
Productivity growth	-	5.0%	3.8%

Source: Midlands Energy Hub.

Leicester and Leicestershire’s Low Carbon and Environmental Goods and Services (LCEGS) sector is worth £2.8bn in sales, according to the [Low Carbon Environmental Goods and Services Market Snapshot](#) published by the Midlands Energy Hub (see **Table 1** above) in December 2020.

The sector has grown year on year in Leicester and Leicestershire, though at a slower rate than the national average. In 2017/18 total sales in the sector were worth £2.5bn and reached £2.8bn in 2019/20, equivalent to sales growth of 8.7%. This was a slower increase than the UK average (18.1%), though the report acknowledges London’s performance distorts this average.

The sector employs an estimated 21,400 people locally, up from 20,100 in 2017/18. Equivalent to an 6.6% rate of employment growth, this was slower than the UK average for

the same period (16.7%, though the above caveat regarding London also applies for employment).

There are 1,020 local companies active in the sector, up from 980 in 2017/18. Activity in the sector within Leicester and Leicestershire is made up by the following proportions: Renewable Energy 41%, Low Carbon 37%, and Environmental 22%.

Additional evidence and research

Additional indicators and research on the sector in Leicester and Leicestershire show:

- The LCEGS Market Snapshot reported £292m of LCEGS exports from Leicester and Leicestershire in 2019/20, 10% of the Midlands LCEGS exports. Export specialisms include Building Technologies (£41m of exports), Wind (£52m), Waste Management (£19m), Photovoltaic (£32m), Alternative Fuels (£40m), and Biomass (£22m)
- [BEIS estimates](#) the sector has helped reduce industrial CO₂ emissions by 31% in Leicestershire since 2005, a faster decrease than the East Midlands average (29%). Per capita emissions in Leicestershire in 2018 were 11% lower than the East Midlands average, but 4% higher than the UK average

Industry structure and specialisms

The four largest LCEGS specialisms in Leicester and Leicestershire account for 56% of total LCEGS sales locally, according to the [Low Carbon Environmental Goods and Services Market Snapshot](#), and include:

- **Wind** - £474m in sales; this includes control systems development and manufacture, drive train development, manufacture and systems integration, consulting houses and companies providing power firming systems and services, maintenance services and grid integration services
- **Building Technologies** - £394m; this includes head office functions, building systems design and consultancy and building systems providers and installers
- **Alternative Fuels** - £384m; this includes R&D functions, alternative fuel providers, designers and consultancy, process implementation, sales and accounting and application development specialists
- **Photovoltaic** - £296m; this includes head office functions, systems developers, providers and installers

The next seven largest specialisms account for 40% of total LCEGS sales in Leicester and Leicestershire and include:

- **Water & Waste Water Treatment** - £212m in sales; development and implementation by utilities along with supply, consultancy and implementation by independent consulting engineers
- **Biomass** - £211m; this includes systems development, supply, implementation and R&D

- **Waste Management** - £188m; this includes process development and new process implementation and consulting, public and private operations management and supply and installation of operational equipment
- **Recovery and Recycling** - £155m; this includes waste collection, glass stock processing and paper feedstock processing
- **Alternative Fuel Vehicle** - (£154m; include selling agencies, alternative fuel development companies and consulting and applications development for vehicle conversion specialists
- **Geothermal** - £122m; this includes branch office functions, design, international consultancy, lateral geothermal systems providers and installers at the domestic and small commercial level and vertical control systems developers and suppliers
- **Energy Management** - £61m; this includes registered gas engineers, measurement and control systems and fitting and maintenance

Sector prospects in Leicester and Leicestershire

Economic impact of a 'Green Recovery'

Some 4,500 'Green Recovery' jobs could be directly created in Leicester and Leicestershire by 2030 as a result of the interventions outlined in the UK Government's ['Ten Point Plan for a Green Industrial Revolution'](#), Cambridge Econometrics analysis shows.

The plan outlines how Government will 'build back better', support green jobs, and accelerate the UK's path to net zero post-Covid. Interventions outlined in the plan, summarised in [Table 2](#) below, will mobilise an estimated £12 billion of Government investment, and potentially 3 times as much from the private sector, to create and support up to 250,000 green jobs.

To estimate the impact of the plan in Leicester and Leicestershire, Cambridge Econometrics have allocated UK-wide employment benefits (from [Table 2](#)) to constituent regions and local areas depending on their current and expected expertise in such areas, proxied by associated indicators (e.g. to allocate green public transport employment benefits, public travel commuting patterns in local areas have been utilised).

Applying this approach shows a potential 4,500 'Green Recovery' jobs could be directly created by the plan in Leicester and Leicestershire by 2030, whilst thousands more will likely be supported indirectly within the local low carbon supply chain (due to the impacts which accrue indirectly due to investments undertaken as part of the plan).

The scale of the direct jobs impact by policy area in Leicester and Leicestershire has been estimated as follows:

- Green Finance and Innovation - 1,600 direct jobs by 2030
- Greener Buildings - 900 direct jobs by 2030
- Investing in Carbon Capture, Usage and Storage - 700 direct jobs by 2030
- Accelerating the Shift to Zero Emission Vehicles - 500 direct jobs by 2030
- Driving the Growth of Low Carbon Hydrogen - 400 direct jobs by 2030
- Protecting Our Natural Environment - 300 direct jobs by 2030
- Jet Zero and Green Ships - 100 direct jobs by 2030
- Green Public Transport, Cycling and Walking - 100 direct jobs by 2030

Table 2: UK Government's Ten Point Plan for a Green Industrial Revolution

Ambition	Government description	Potential employment benefit (by 2030)
Advancing Offshore Wind	1. Offshore wind: Producing enough offshore wind to power every home, quadrupling how much we produce to 40GW by 2030, supporting up to 60,000 jobs.	60,000
Driving the Growth of Low Carbon Hydrogen	2. Hydrogen: Working with industry aiming to generate 5GW of low carbon hydrogen production capacity by 2030 for industry, transport, power and homes, and aiming to develop the first town heated entirely by hydrogen by the end of the decade.	8,000
Delivering New and Advanced Nuclear Power	3. Nuclear: Advancing nuclear as a clean energy source, across large scale nuclear and developing the next generation of small and advanced reactors, which could support 10,000 jobs.	10,000 (at peak)
Accelerating the Shift to Zero Emission Vehicles	4. Electric vehicles: Backing our world-leading car manufacturing bases including in the West Midlands, North East and North Wales to accelerate the transition to electric vehicles, and transforming our national infrastructure to better support electric vehicles.	40,000
Green Public Transport, Cycling and Walking	5. Public transport, cycling and walking: Making cycling and walking more attractive ways to travel and investing in zero-emission public transport of the future.	3,000 (by 2025)
Jet Zero and Green Ships	6. Jet Zero and greener maritime: Supporting difficult-to-decarbonise industries to become greener through research projects for zero-emission planes and ships.	5,200
Greener Buildings	7. Homes and public buildings: Making our homes, schools and hospitals greener, warmer and more energy efficient, whilst creating 50,000 jobs by 2030, and a target to install 600,000 heat pumps every year by 2028.	50,000
Investing in Carbon Capture, Usage and Storage	8. Carbon capture: Becoming a world-leader in technology to capture and store harmful emissions away from the atmosphere, with a target to remove 10MT of carbon dioxide by 2030, equivalent to all emissions of the industrial Humber today.	50,000
Protecting Our Natural Environment	9. Nature: Protecting and restoring our natural environment, planting 30,000 hectares of trees every year, whilst creating and retaining thousands of jobs.	20,000 (to 2027)
Green Finance and Innovation	10. Innovation and finance: Developing the cutting-edge technologies needed to reach these new energy ambitions and make the City of London the global centre of green finance.	"hundreds of thousands" (300,000 in exports and domestic industry)

Source: HM Government.

Skills needs and challenges

The skills mix required by the sector is expected to evolve in the future, to include soft skills, technical skills such as data analytics, as well as knowledge of new technologies as they emerge – [according to research on the low carbon energy sector by UCKES](#).

As part of this research, they expect that almost half (49%) of the East Midlands low carbon energy workforce will require higher-level (QCF4+, typically STEM-based) qualifications by 2024, up from just a third a decade ago. The sector also has the potential to continue providing good, well-paid opportunities for those without higher-level qualifications, particularly through vocational and technical training routes.

Attraction and retention issues (given an aging workforce) could however exacerbate already high skills shortages in the sector; the LCEGS Market Snapshot estimated skills shortages were equivalent to 8.6% of employees (though this was in line with the Midlands average of 8.7%), with significant skills gaps reported in the following occupations:

- Production Engineers - 34.5% of all roles in Leicester and Leicestershire (Midlands average 35.7%)
- Power Distribution Engineers - 30.1% of all roles (29.8%)
- Technicians - 22.0% of all roles (22.2%)

