

Leicester
City Council

Leicester's City-Wide Carbon Footprint Statement for 2020

January 2023

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1. Executive Summary

Leicester City Council has set an ambition to reach net zero carbon emissions in Leicester by 2030. From the baseline year of 1990 this equates to a reduction of 2,388 ktCO_{2e} over 40 years.

Each year a carbon footprint is produced for the city, this presents the total greenhouse gas emissions attributed to the city in terms of kilo-tonnes of carbon dioxide equivalent (ktCO_{2e}). This carbon footprint is based on figures provided the UK Government's Department for Business, Energy and Industrial Strategy (BEIS). In 2020 Leicester's city-wide carbon footprint was 1,209 ktCO_{2e}. It represents:

- a reduction of 1,179 ktCO_{2e} from the 1990 baseline figure, equal to 49.4%
- a reduction of 1,078 ktCO_{2e} from 2005, equal to 47.1%
- a reduction of 117 ktCO_{2e} from 2019, equal to 8.8%

Emissions per city resident (per capita) in 2020 were 3.4 tCO_{2e}, a fall from 3.7 tCO_{2e} in 2019, 7.6 tCO_{2e} in 2005 and 8.5 tCO_{2e} in 1990 respectively.

Emissions are split into sectors: Industrial; Commercial; Public Sector; Domestic; Transport; Land Use, Land Use Change & Forestry (LULUCF) and Agriculture. Emissions fell significantly across many of the sectors in 2020, with the Covid-19 pandemic and associated restrictions having a substantial impact on the figures. The greatest reductions were from commercial, public sector and transport emissions. Further details of the reasons for these changes are provided within this report where available.

These figures cover emissions from energy and fuels use, agriculture and land use change within the city. They do not include emissions generated outside the city as a result of its consumption of goods and services and the transport, treatment and disposal of its waste. Some separate figures are available for waste however, which estimate that emissions from this area are likely to be around 100 ktCO_{2e} a year. Whilst they are not part of this footprint, these areas are addressed in our Climate Emergency Action Plan.

2. Introduction

Leicester City Council declared a climate emergency in February 2019. This means that we are committed to playing our part in reducing carbon emissions to help prevent the impacts of climate change getting much worse and to meet the goals of the Paris Agreement on climate change. As part of our response to the climate emergency we have developed Leicester's Climate Emergency Strategy and Leicester City Council's Climate Emergency Action Plan, setting out our approach to these challenges and a wide-ranging programme of actions being undertaken by the council to address them.

Leicester's city-wide carbon footprint includes the greenhouse emissions produced by individuals and organisations in the city each year, expressed in kilotonnes (1000 tonnes) of carbon dioxide equivalent (ktCO₂e). This includes emissions of carbon dioxide (CO₂) and other greenhouse gases including methane (CH₄) and nitrous oxide (N₂O). The figures include emissions from use of gas, electricity and other fuels in buildings, use of fuels for transport, emissions and net reductions associated with land use and land use change and a small amount of agricultural emissions in the city.

The data in this report uses information produced by the UK Government's Department for Business, Energy and Industrial Strategy (BEIS).

This report compares the city's greenhouse emissions for 2020 with previous years. It identifies how emissions have changed in each sector and presents progress in reducing them. It also highlights where more work will be needed to reduce emissions in the future.

Reducing Leicester's carbon emissions will require action from everyone, including the council, residents, communities, businesses and national government.

3. Area Information

This carbon footprint covers the unitary authority area of Leicester, as administered by Leicester City Council.

4. Reporting Period

The carbon emissions within this report cover the 2020 calendar year, from 1st January to 31st December. This is the most recent year for which UK government-provided figures are available.

5. Summary of Change in Emissions

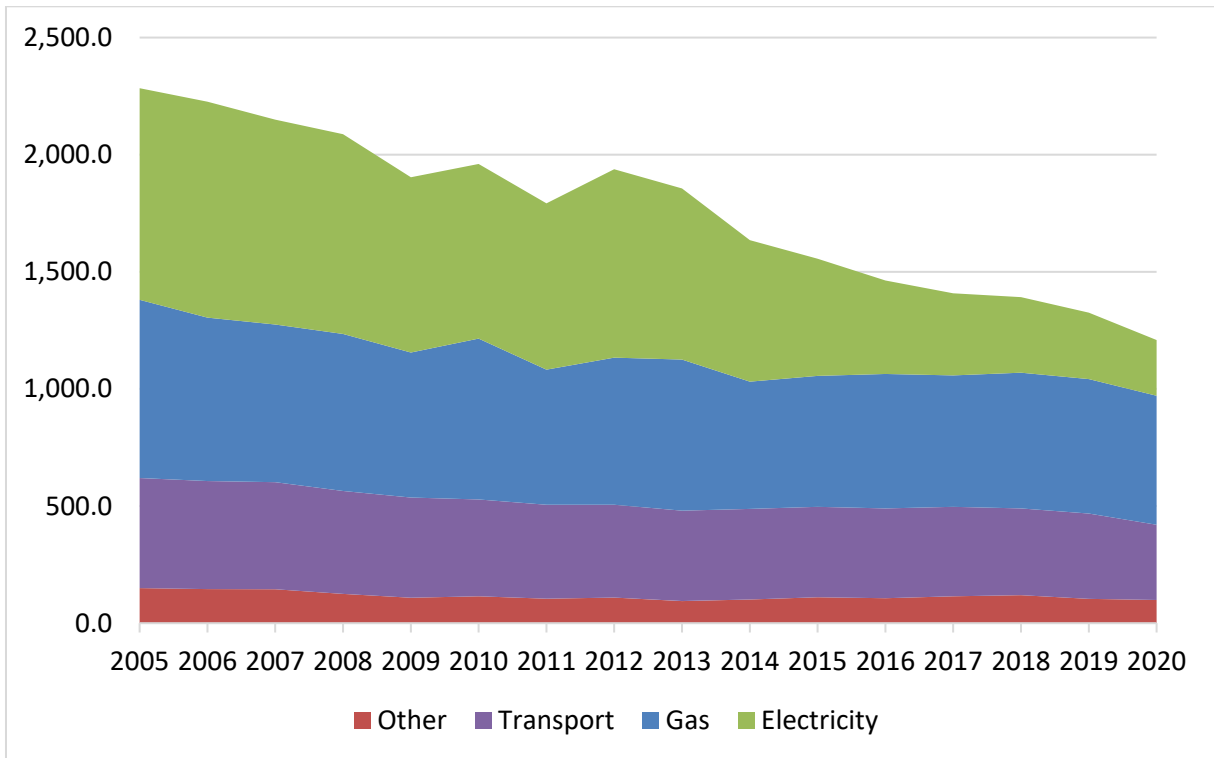
In 2020 Leicester's city-wide carbon emissions were 1,209 ktCO_{2e}. This is an 8.8% reduction on 2019 CO_{2e} emissions and a 49.4% reduction on the 1990 baseline. The first year for which emissions figures are available by sector is 2005, and these figures are used for comparison elsewhere in the report.

Between 1990 and 2020 Leicester's population has increased by 26.4%, from 280,100 to 354,000. Alongside the reduction in emissions seen, this has meant that emissions per capita (per person) have fallen from 8.5 tCO_{2e} per capita in 1990 to 3.4 tCO_{2e} per capita in 2019, a fall of 60%.

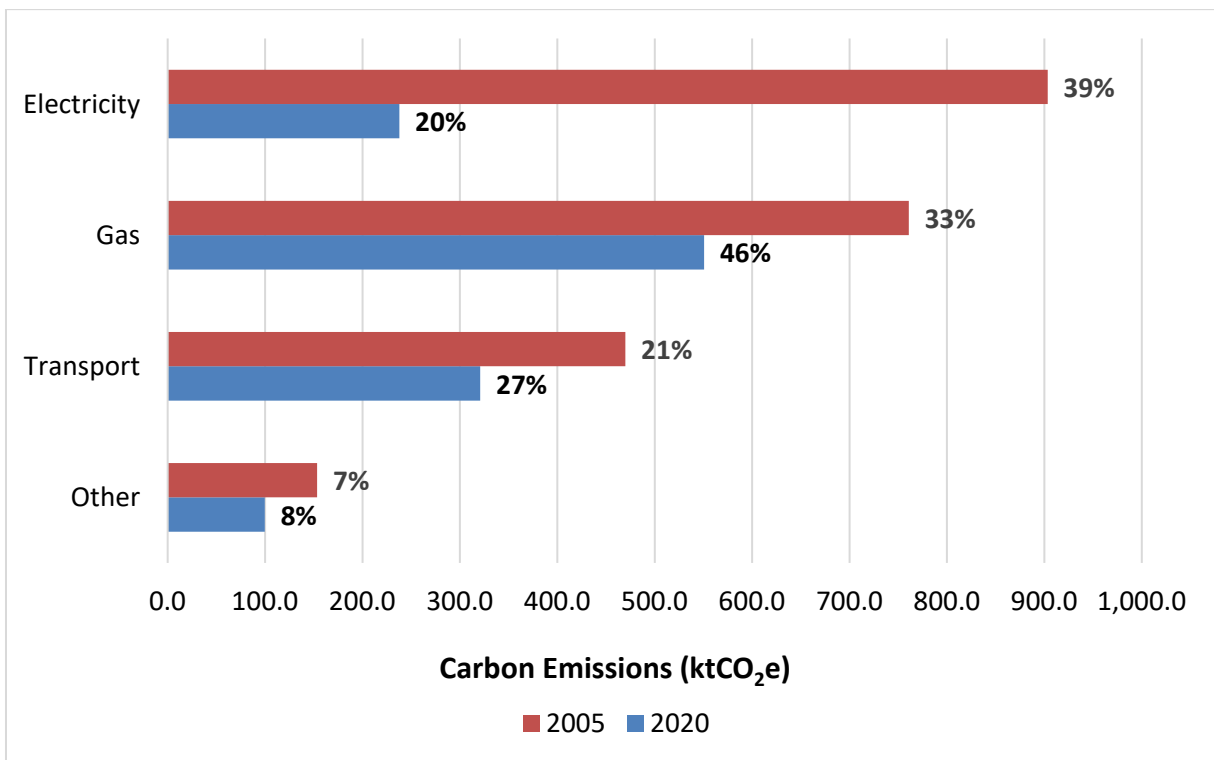
Whilst emissions have fallen by almost half since 1990, achieving the rapid rate of further emissions reductions needed to achieve carbon neutrality will require significant extra work and investment. This means that the ambition to make Leicester net zero carbon by 2030 will require far reaching and radical action in the city, with robust support from national government.

5.1 Changes by Fuel Source

Much of the overall progress made since 2005 is the result of a reduction in the carbon emissions produced per unit (known as the 'carbon intensity') when generating electricity in the UK. This is largely due the closure of coal-fired power plants and their replacement with renewables such as wind and solar power. Emissions from gas use for heating and from fuel use in transport have fallen much more slowly since 1990 and represent a growing proportion of Leicester's remaining emissions. Achieving net zero carbon by 2030 in Leicester will therefore require particularly urgent action to decarbonise heating and transport. The changes for each fuel source and the total amount and proportion of the footprint attributable to each of them are shown in Graph 1 and Graph 2 below.



Graph 1. Leicester's emissions by fuel source from 2005 to 2020.



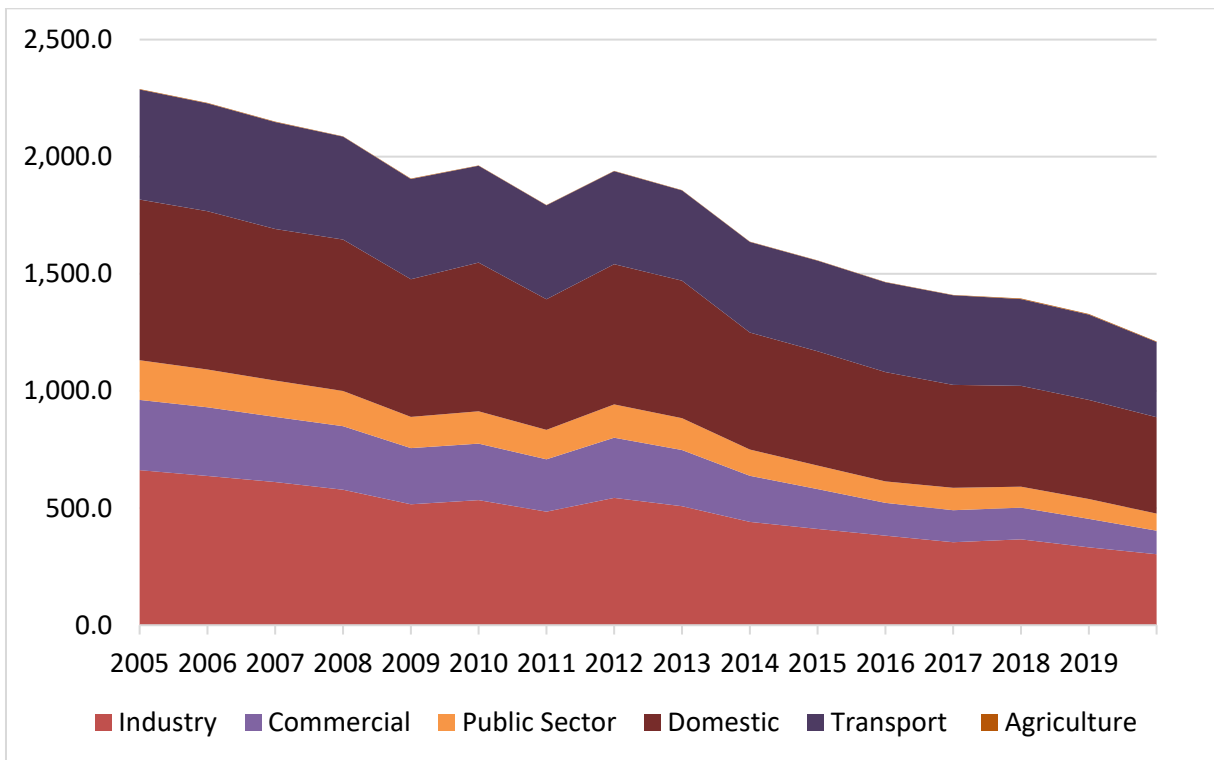
Graph 2. Leicester's emissions by fuel source and the proportion of the footprint attributable to them in 2020 in comparison to 2005.

During 2020 specifically the changes were significantly impacted by the Covid-19 pandemic and associated restrictions from March 2020 onwards. The largest reduction came from electricity usage, which is due to a combination of a fall in consumption and ongoing reductions in the carbon intensity of electricity. Emissions from transport also fell significantly, followed by those for gas and other sources.

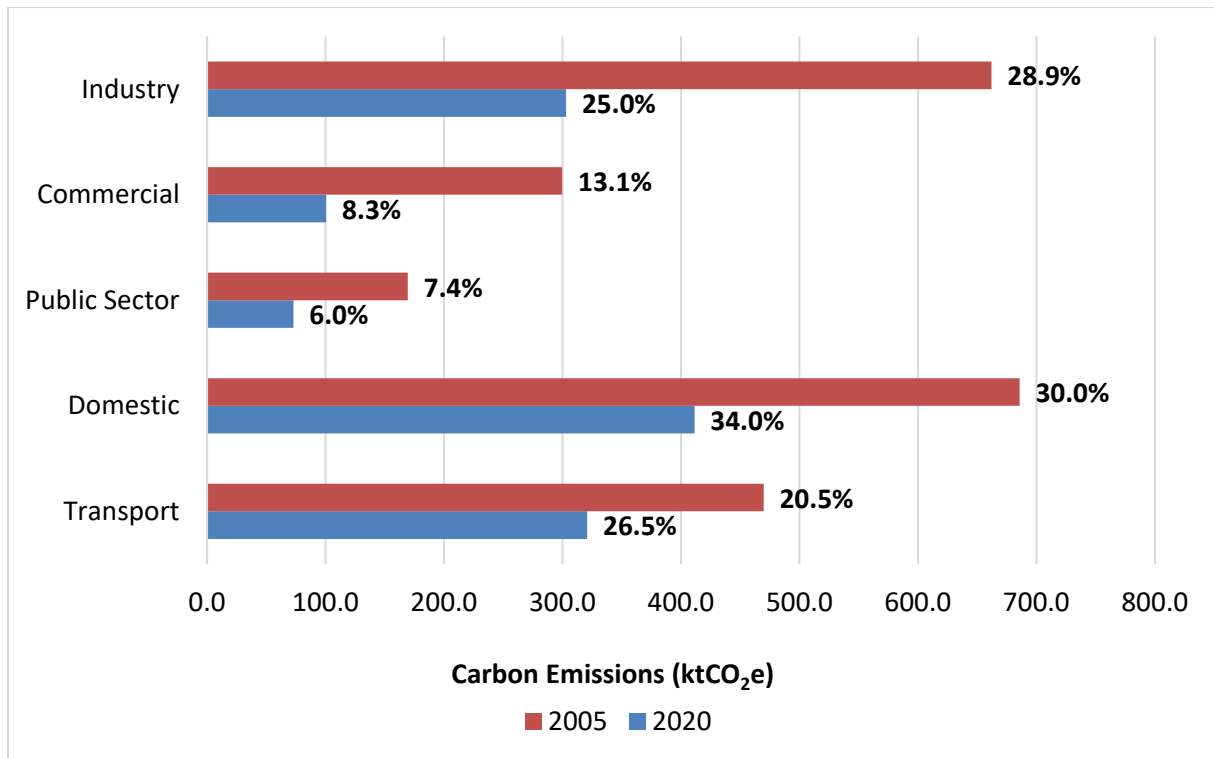
5.2 Sector Analysis

Leicester's city-wide emissions are divided into seven sub-sectors – Industrial, Commercial, Public Sector, Domestic, Transport, LULUCF and Agriculture. This allows trends to be monitored and the most CO₂e intensive sectors to be identified. A BEIS report accompanying the figures notes that a combination of direct data and proxy estimates were used to apportion emissions between the sectors. As such the figures for Leicester likely account for local factors to some degree but may not fully represent locally specific changes.

Since 2005 emissions have fallen most rapidly for commercial properties, followed by the public sector, industry, homes and then transport. The quantity of emissions offset by the LULUCF sector has also increased since 2005. Agriculture is the only sector where emissions have increased since 2005, however it's worth noting that these make up just 0.2% of the footprint. The differences between sectors are due to a number of factors, including the mix of fuels used within each, as shown in the previous section. The changes for each fuel source and the total amount and proportion of the footprint attributable to each of them are shown in Graph 3 and Graph 4 below.



Graph 3. Leicester's emissions by sector from 2005 to 2020.



Graph 4. Leicester’s emissions by sector and the proportion of the footprint attributable to them in 2020 in comparison to 2005.

Again, within each sector many of the changes seen in 2020 are directly connected to the impacts of the Covid-19 pandemic. This is likely to have been particularly impactful in Leicester, which spent longer in local lockdowns than any other UK city. These impacts included the temporary closure of the premises of many businesses and organisations, a move towards remote working and schooling and a significant reduction in transport use.

Further details of CO₂e emissions changes in each sector, both in the last year and from 2005 can be found below.

5.3 Industrial emissions

| | 2005 | 2019 | 2020 | Change on 2019 | Change on 2005 |
|--------------------------------|--------------|--------------|--------------|----------------|----------------|
| Industry Electricity | 317.5 | 95.1 | 78.7 | -17.2% | -75.2% |
| Industry Gas | 201.0 | 140.6 | 131.7 | -6.3% | -34.5% |
| Large Industrial Installations | 5.0 | 1.8 | 1.4 | -23.9% | -72.4% |
| Industry 'Other' | 138.6 | 95.0 | 91.2 | -4.0% | -34.2% |
| Industry Total | 662.1 | 332.5 | 303.0 | -8.9% | -54.2% |

Table 1. Leicester's industrial carbon emissions for 2005, 2019 and 2020.

Industrial emissions in 2020 were 303 ktCO_{2e}. They have fallen by 8.9% since 2019 and 54.2% since 2005. Emissions from large industrial installations fell fastest during the year, likely due to specific changes at the small number of sites contributing to this category. Electricity-related emissions also fell rapidly within this sector, due to a combination of the impacts of the Covid-19 pandemic and ongoing decarbonisation of the electricity grid in the UK. As in other sectors, increased energy efficiency in buildings may also be reducing emissions, but it is not possible to separate this out from other causes.

Emissions from gas and other fuels fell more slowly, with emissions factors for these fuels not changing significantly. The figures also reflect the fact that the pandemic restrictions did not come into place until mid-March 2020, after the main heating season was over. Met Office figures also show that 2020 was a relatively warm year, which will have reduced heating need. Emissions from the sector fell more slowly than commercial and public sector emissions, which is likely to be a result of industrial premises being more likely to stay open during restrictions, with remote working not generally possible.

5.4 Commercial emissions

| | 2005 | 2019 | 2020 | Change on 2019 | Change on 2005 |
|-------------------------------|-------|-------|-------|----------------|----------------|
| Commercial Electricity | 225.8 | 61.9 | 44.3 | -28.4% | -80.4% |
| Commercial Gas | 73.2 | 59.4 | 56.0 | -5.7% | -23.4% |
| Commercial 'Other' | 0.8 | 0.5 | 0.3 | -53.2% | -69.6% |
| Commercial Total | 299.8 | 121.8 | 100.6 | -17.4% | -66.5% |

Table 2. Leicester's commercial carbon emissions for 2005, 2019 and 2020.

Commercial emissions in 2020 were 100.6 ktCO_{2e}. They have fallen by 17.4% since 2019, and 66.5% since 2005. There has been a particularly large fall in electricity-related emissions for 2020. This is because of the major impacts of the pandemic on this sector, including business closures and the move to home working, alongside the continued reduction in carbon emissions from electricity.

The smaller fall in emissions from gas use is, as with industry, likely to be due to the timing of social distancing and lockdowns in the UK, with the winter of 2020 unaffected and relatively warm conditions in the year. Emissions from other fuel use have fallen even more drastically. The reasons for this change are unclear, but it should be noted that this is a very small part of the total and may represent changes at a small number of sites.

5.5 Public Sector emissions

| | 2005 | 2019 | 2020 | Change on 2019 | Change on 2005 |
|----------------------------------|-------|------|------|----------------|----------------|
| Public Sector Electricity | 98.0 | 31.0 | 24.7 | -20.4% | -74.8% |
| Public Sector Gas | 69.5 | 53.1 | 48.2 | -9.3% | -30.7% |
| Public Sector 'Other' | 1.8 | 0.4 | 0.0 | -100.0% | -100.0% |
| Public Sector Total | 169.4 | 84.5 | 72.9 | -13.7% | -57.0% |

Table 3. Leicester's public sector carbon emissions for 2005, 2019 and 2020.

Public sector emissions were 72.9 ktCO_{2e} in 2020, having fallen by 13.7% on 2019 and 57% on 2005. These emissions include organisations such as the local NHS

trust, the city council, universities and schools, the emergency services and central government offices. As in other areas emissions from electricity use fell fastest over the year, with many public organisations seeing significant changes in how they operated and used their buildings.

As with the other sectors reviewed above there was a smaller but still significant reduction in gas-related emissions. Alongside the impacts of the pandemic and the warm conditions, projects to improve energy efficiency in various public sector buildings may also be driving some of these changes. Already very small, emissions from other fuels appear to have declined to zero for this sector, and the reason for this is not immediately clear.

5.6 Domestic emissions

| | 2005 | 2019 | 2020 | Change on 2019 | Change on 2005 |
|-----------------------------|-------|-------|-------|----------------|----------------|
| Domestic Electricity | 261.5 | 95.0 | 89.9 | -5.4% | -65.6% |
| Domestic Gas | 416.5 | 320.7 | 314.3 | -2.0% | -24.5% |
| Domestic 'Other' | 7.9 | 7.4 | 7.3 | -1.5% | -8.0% |
| Domestic Total | 685.9 | 423.1 | 411.5 | -2.8% | -40.0% |

Table 4. Leicester's domestic carbon emissions for 2005, 2019 and 2020.

Domestic carbon emissions were 411.5 ktCO₂e in 2020, falling much more slowly than other sectors this year by just 2.8% on 2019, and are 40% lower than in 2005. As with other areas, electricity emissions fell the fastest, however this is entirely the result of the decarbonisation of grid electricity, with electricity consumption actually increasing for 2020. This is again a result of the pandemic, with lockdowns and remote working and schooling keeping many people at home much more than usual.

Gas and other fuel emissions also declined slightly for the year, again reflecting the different impacts of pandemic-related restrictions on homes. Also, as with other sectors, these emissions were likely less impacted than those from electricity use by the pandemic, with restrictions not coming in until mid-March. As noted above, relatively warm conditions during the year may also have reduced heating need.

5.7 Transport emissions

| | 2005 | 2019 | 2020 | Change on 2019 | Change on 2005 |
|------------------------------|--------------|--------------|--------------|----------------|----------------|
| Road Transport (A roads) | 222.8 | 148.3 | 120.5 | -18.8% | -45.9% |
| Road Transport (Minor roads) | 234.7 | 203.5 | 190.4 | -6.5% | -18.9% |
| Diesel Railways | 8.7 | 7.9 | 6.1 | -22.9% | -29.7% |
| Transport 'Other' | 3.7 | 4.3 | 3.9 | -9.4% | +5.5% |
| Transport Total | 469.8 | 364.1 | 320.8 | -11.9% | -31.7% |

Table 5. Leicester's transport carbon emissions for 2005, 2019 and 2020.

Transport emissions were 320.8 ktCO_{2e} in 2020, having decreased by 11.9% compared to 2019 and 31.7% compared to 2005. This is a much larger reduction than in previous years, with significant reductions across all of the categories. The largest percentage fall was for railways, as a result of drastically reduced number of rail services and passengers for much of the year.

Emissions from travel on A-roads also fell rapidly, as travel decreased during pandemic restrictions, with emissions from travel on minor roads falling more slowly. This continues a pattern of a faster decline in A-road emissions since 2005, although the exact reason for these changes is not clear. Emissions from other types of transport also fell during the year.

5.8 Land Use, Land Use Change and Forestry

| | 2005 | 2019 | 2020 | Change on 2019 | Change on 2005 |
|---|------|------|------|----------------|----------------|
| Net Emissions: Forest land | -2.9 | -3.2 | -3.2 | -0.1% | +9.9% |
| Net Emissions: Cropland | 1.8 | 1.7 | 1.7 | -0.6% | -6.6% |
| Net Emissions: Grassland | -1.4 | -1.9 | -1.8 | -2.6% | +25.8% |
| Net Emissions: Wetlands | 0.0 | 0.0 | 0.0 | n/a | n/a |
| Net Emissions: Settlements | 1.0 | 0.8 | 0.8 | +1.9% | -26.1% |
| Net Emissions: Harvested Wood Products | 0.0 | 0.0 | 0.0 | n/a | n/a |
| Net Emissions: Indirect N₂O | 0.05 | 0.03 | 0.03 | -0.8% | -28.1% |
| LULUCF Net Emissions | -1.4 | -2.5 | -2.5 | -2.1% | +76.1% |

Table 6. Leicester's land use, land use change and forestry carbon emissions for 2005, 2019 and 2020.

Land Use, Land Use Change and Forestry (LULUCF) within city boundaries continues to provide a net reduction in emissions of -2.5 tCO_{2e}, a 2.1% lower reduction than in 2019, but a 76.1% greater reduction than in 2005. The reduction is small in relation to the total footprint due to the urban nature of Leicester, and the limited changes in land use within the city. Unlike other sectors it is not expected that the Covid-19 pandemic will have had major impacts on these figures.

Two areas account for a net reduction in emissions, forest land and grassland, with three other areas acting as net emitters: cropland, settlements and indirect N₂O emissions. There are no local emissions for two other categories, wetlands and wood products. These changes are likely to reflect changing use of land in the city, and the way this land is managed.

5.9 Agriculture

| | 2005 | 2019 | 2020 | Change on 2019 | Change on 2005 |
|--------------------------|------------|------------|------------|----------------|----------------|
| Agriculture Electricity | 0.7 | 0.3 | 0.2 | -19.1% | -66.7% |
| Agriculture Gas | 0.6 | 0.3 | 0.5 | +44.8% | -18.6% |
| Agriculture 'Other' | 0.6 | 0.6 | 0.6 | +0.1% | -1.5% |
| Agriculture Livestock | 0.0 | 1.0 | 1.0 | -1.3% | n/a |
| Agriculture Soils | 0.0 | 0.4 | 0.4 | -11.6% | n/a |
| Agriculture Total | 1.9 | 2.6 | 2.7 | +1.3% | +42.1% |

Table 7. Leicester's agriculture carbon emissions for 2005, 2019 and 2020.

Emissions from agriculture remain a very small part of the footprint, at 2.7 ktCO₂e in 2020, a 1.3% increase on 2019. This is a 42.1% increase on 2005, however this is largely due to the fact that two categories have been added to this sector. Apart from the contribution of grid decarbonisation to the fall in electricity emissions, the reasons for the changes in the categories are unclear.

5.10 Carbon Emissions Per Person

Dividing the city's emissions by the number of residents is another way of showing how emissions have fallen. Since the 1990 and 2005 baselines Leicester's population has increased significantly. As the city's carbon emissions have fallen in this time, emissions per capita (per person) have therefore fallen faster than for the city as a whole.

In 2020 Leicester's carbon emissions per capita were 3.4 tCO₂e, compared to 7.6 tCO₂e in 2005 and 8.5 tCO₂e in 1990. This current figure is similar to other cities of a similar size to Leicester, and below the national average of 5.4 tCO₂e. Leicester's emissions per capita have fallen by 55% since 2005, which is also in line with the other cities and ahead of the national average reduction of 42.3%.

6. Approach

This report uses figures published by the UK Government's Department for Business, Energy & Industrial Strategy (BEIS) for local authorities in the UK. More details about

these figures, and how they are calculated is available here: [UK local authority and regional carbon dioxide emissions national statistics - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics)

7. Boundary & Scope

The figures in this report cover emissions from fuel and energy, agriculture and land use change within the city (including generation and transmission of electricity), and do not cover the following areas:

- Emissions from areas outside of local authority influence, including aviation, shipping and waste.
- Emissions generated by the production of goods and services elsewhere, that are consumed within the city.

8. Baseline Year

A baseline year of 1990 is used for the overall emissions from the city. A second baseline year of 2005 is also used for the more detailed discussion of trends, as this is the first year for which figures split by sector and source are available.

9. Targets

Following Leicester City Council's declaration of a climate emergency a new ambition was declared, for the city and council to reach net zero emissions by 2030 or as soon as possible, subject to the necessary support from national government.

10. Contact Details

This report was prepared by Aidan Davis, Sustainability Officer, on behalf of Leicester City Council.

For further information about Leicester City Council's climate action, please visit: <https://www.leicester.gov.uk/your-council/policies-plans-and-strategies/environment-and-sustainability/climate-emergency/>

If you wish to contact us, please email: sustainability@leicester.gov.uk