Department for Energy Security & Net Zero

UK local and regional greenhouse gas emissions statistics, 2005-2023

3 July 2025 **Accredited Official Statistics**

This publication presents the latest estimates of greenhouse gas emissions for local authority and Protected Landscape areas in the UK for 2005 to 2023. Emissions are reported against the areas where they occurred except for energy supply emissions that are distributed to sectors and locations based on where the "end-use" of the energy occurred and emissions from waste that have been distributed based on the waste arising in each area.

The main findings from the statistics are:

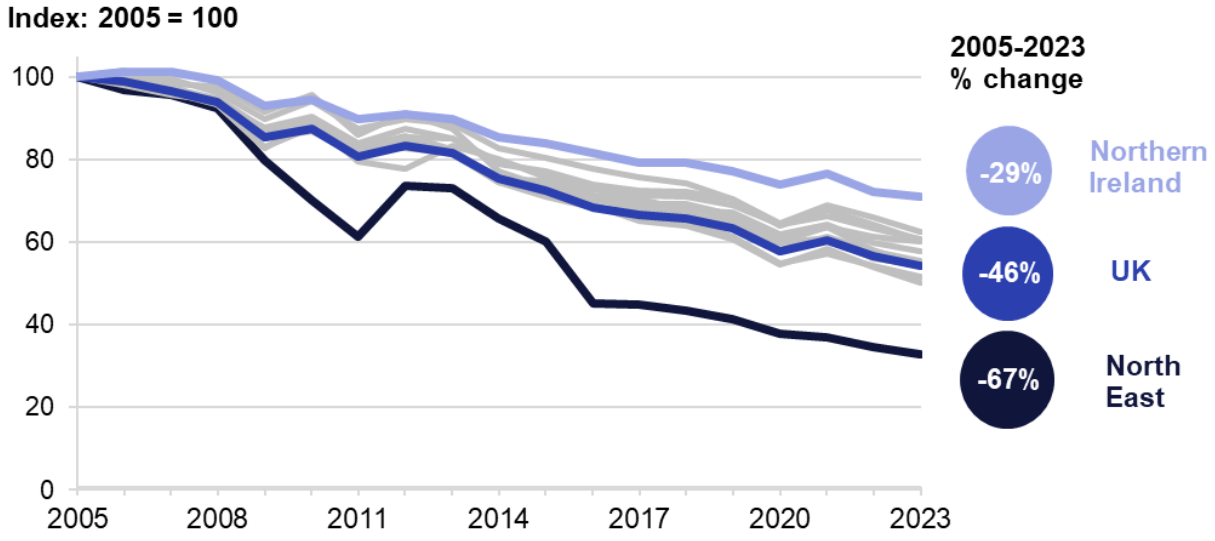
- Between 2022 and 2023, greenhouse gas emissions decreased in 94% (340) of the 361 local authority areas in the UK. This is consistent with the decrease seen in overall UK emissions in 2023. Most of the fall is the result of reduced emissions from electricity supply, reflective of higher electricity imports from France (unlike 2022 when the UK had higher than usual exports), a continued decrease in electricity demand, and an increased share of renewables to meet remaining demand.

- In 2023, 32% of emissions assigned to local authority areas were attributed to the transport sector, 22% to the domestic sector, 15% to the industry sector, 14% to the agriculture sector, and 8% to the commercial sector. The remaining 9% of emissions were from the waste sector, the public sector, and the land use, land use change and forestry sector.

- The scale and sources of emissions vary between local authority areas, mainly due to economic and geographical differences. The transport sector had the highest share of emissions in 58% of local authority areas, followed by the domestic sector (19%), agriculture (13%), industry (7%), the commercial sector (2%) and the waste sector (1%).

- Between 2005 and 2023, emissions fell by 29% in Northern Ireland, 40% in Scotland, 42% in Wales, and 46% in England. The North East of England was the region with the largest proportional fall in emissions over this period, at 67%, in part due to industrial closures.

Figure 1: Greenhouse gas emissions by region, 2005 to 2023



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Media enquiries: 020 7215 1000 **Public enquiries: 020 7215 8285** **Next publication: June 2026**

User engagement on local emissions data and reporting needs

The Department for Energy Security & Net Zero (DESNZ) is reviewing the local and regional greenhouse gas emissions statistics it publishes and will be seeking user views to inform its decision making. The objective of this engagement will be to understand use of local level emissions data and whether these statistics could be adapted to better meet user requirements.

Whilst decisions will necessarily be subject to the resources available, DESNZ are considering ways to modify the published materials to ensure they are:

- fit for purpose for current and future reporting of local level emissions,
- aligned with international best practice outlined in the GHG Protocol for Cities and Global Covenant of Mayors Common Reporting Framework.

A short survey will be launched over the summer to provide users with an opportunity to share information regarding their current and preferred future use of local level emissions data.

A link to the survey will be made available on GOV.UK alongside these statistics. If you would like to be informed when it is made available, or express any views about the statistics in the meantime, please email GreenhouseGas.Statistics@energysecurity.gov.uk.

Contents

Introduction

This Accredited Official Statistics publication provides the latest estimates of territorial emissions for local authority and Protected Landscape areas in the UK for 2005 to 2023. This report explains the background to the estimates, summarises the key results, and discusses some of the issues which need to be considered when using the data. Full details of the results and methodology are available in the accompanying tables and the technical report[1].

These statistics cover emissions of carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) within UK borders. Emissions of fluorinated gases are not available at a local authority level so are excluded from these statistics. In our latest UK-level territorial emission statistics for 2023 they accounted for 2% of total emissions[2]. Note that a significant proportion of landfill methane emissions in England in 2005-2009 could not be allocated to local areas so the landfill emissions estimates shown will be underestimates for some areas in the early part of the time series.

In accordance with international reporting, emissions from each gas are weighted by its global warming potential (GWP)[3], so that total greenhouse gas emissions can be reported on a consistent basis. The GWP for each gas is defined as its warming influence in relation to that of carbon dioxide over a 100-year period. Emissions are then presented in carbon dioxide equivalent (CO2e) units.

Emissions have been assigned to all 361 local authority areas in the UK. There are 296 local authorities in England, 32 in Scotland, 22 in Wales and 11 in Northern Ireland[4]. Estimates are also shown for the Protected Landscapes, covering 15 National Parks within Great Britain, the 38 National Landscapes in England and Wales, and the 8 Areas of Outstanding Natural Beauty (AONBs) in Northern Ireland.

In the statistics, most emissions are allocated to sectors and locations based on the point where the emission occurred, other than for emissions related to energy supply and waste. Energy supply emissions, e.g. from power stations and refineries, are allocated on an “end-user” basis where emissions are distributed to sectors and locations based on where the “end-use” of the energy occurred. Emissions from waste have been spatially distributed using an approach analogous to the fuel end-user basis, distributing UK total emissions from waste proportionally to the waste arising in each local area, rather than to the location of waste management facilities. For example, emissions from landfills are distributed based on estimates of biogenic waste arising in each area.

Except for the energy industry, emissions from the production of goods are assigned to where the production takes place. Therefore, emissions from the production of goods which are

[1] UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2023

[2] Final UK greenhouse gas emissions statistics, 1990 to 2023: https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-statistics-1990-to-2023

[3] The global warming potentials (GWPs) used are from Working Group 1 of the IPCC Fifth Assessment Report: Climate Change 2013 and shown in table 6.4 in our Final UK greenhouse gas emissions statistics, 1990 to 2023: https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-statistics-1990-to-2023

[4] The local authority areas shown in this publication are based on administrative boundaries as of 31 December 2024.

exported will be included, and emissions from the production of goods which are imported are excluded.

The UK compiles an annual inventory of its greenhouse gas emissions to monitor progress against its domestic and international targets. Disaggregated versions of the UK inventory are also produced for England, Scotland, Wales and Northern Ireland, along with maps estimating the geographical distribution of the sources of emissions. This publication combines data from the UK inventory with data from other sources, including local energy consumption statistics, to produce a nationally consistent set of emissions estimates for local authority and Protected Landscape areas.

The statistics are largely consistent with the UK inventory and with the Devolved Administration inventories, but there are some minor methodological differences which are explained later in this publication. If you are looking for emissions figures at UK or Devolved Administration level, you should use the UK[5] or Devolved Administration[6] inventories rather than this publication.

These statistics cover the period from 2005 to 2023. A consistent time series has been produced by re-calculating the 2005 to 2022 estimates to reflect the methodological changes used in calculating the 2023 estimates. This is important as it allows changes to be monitored over time.

Full details of the results and methodology are available in the data tables and supplementary reports published alongside this statistical release.

Use of the estimates

The purpose of these estimates is to assist those wishing to understand the sources and assess changes in greenhouse gas emissions from local areas. Local authorities are not mandated to have greenhouse gas emissions reductions targets, but some local authorities do have such targets. These statistics allow local authorities to track emissions trends in their areas over time, and measure progress against any targets they have. While local authorities are the main users of the statistics, other users include non-profit organisations, the Devolved Administrations, government departments, and academia.

It is important to be aware that circumstances vary greatly between authorities, and that local authorities have relatively little influence over some types of emissions. Therefore, these statistics should be interpreted with caution. However, when used with care, they can provide help in setting priorities. In particular, the dataset is sufficiently robust to set a baseline against which action on climate change can be monitored at a local level.

It should be noted that the results for regional level, which are also available from the dataset, are much more robust. Most of the difficulties in allocating data to local areas have little impact at the regional level. Problems of interpretation, such as economic activity or transport taking place across boundaries, still exist but are less acute at the regional level.

[5] Final UK greenhouse gas emissions statistics, 1990-2023:https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-statistics-1990-to-2023
[6] Greenhouse gas inventories for England, Scotland, Wales & Northern Ireland, 1990-2023: https://naei.energysecurity.gov.uk/reports/greenhouse-gas-inventories-england-scotland-wales-northern-ireland-1990-2023

There are some important limitations that users of these estimates should be aware of. These include:

- Unallocated electricity and landfill emissions, where electricity sales and waste sent to landfill within the sub-national dataset cannot be successfully allocated to specific local areas due to lack of information.
- A significant proportion of landfill methane emissions in England in 2005-2009 could not be allocated to local areas so the landfill emissions estimates shown will be underestimates for some areas in the early part of the time series.
- Road transport emission estimates rely on national road traffic estimates, and distribution of traffic on minor roads has had to be imputed at local level from regional level data.
- The local distribution of emissions from smaller emission sources are largely estimated from proxy information such as population or employment data.
- Some of the key sources used for mapping emissions do not cover the whole of the UK, and therefore alternative methods have had to be used for areas in Northern Ireland.

Further details on data quality and the methods used are available in the supplementary reports published alongside this statistical release.

2023 emissions

Emissions estimates for local authority areas and Protected Landscapes are categorised into the following broad source categories:

- Industry (including electricity-related emissions)
- Commercial (including electricity-related emissions)
- Public (including electricity-related emissions)
- Domestic (including electricity-related emissions)
- Transport
- Land use, land use change and forestry (LULUCF) (including removals of carbon dioxide from the atmosphere, so that net emissions from this sector can sometimes be negative)
- Agriculture (including electricity-related emissions)
- Waste (distributed based on the waste arising in each local area)

The level of sectoral detail available is constrained by the data available for local electricity and gas use. To estimate a more detailed breakdown would involve further general assumptions about energy use for different sectors, since local data is not available. However, further details - mostly in terms of fuel types - are shown in the accompanying technical report to provide additional insight into how the estimates are constructed.

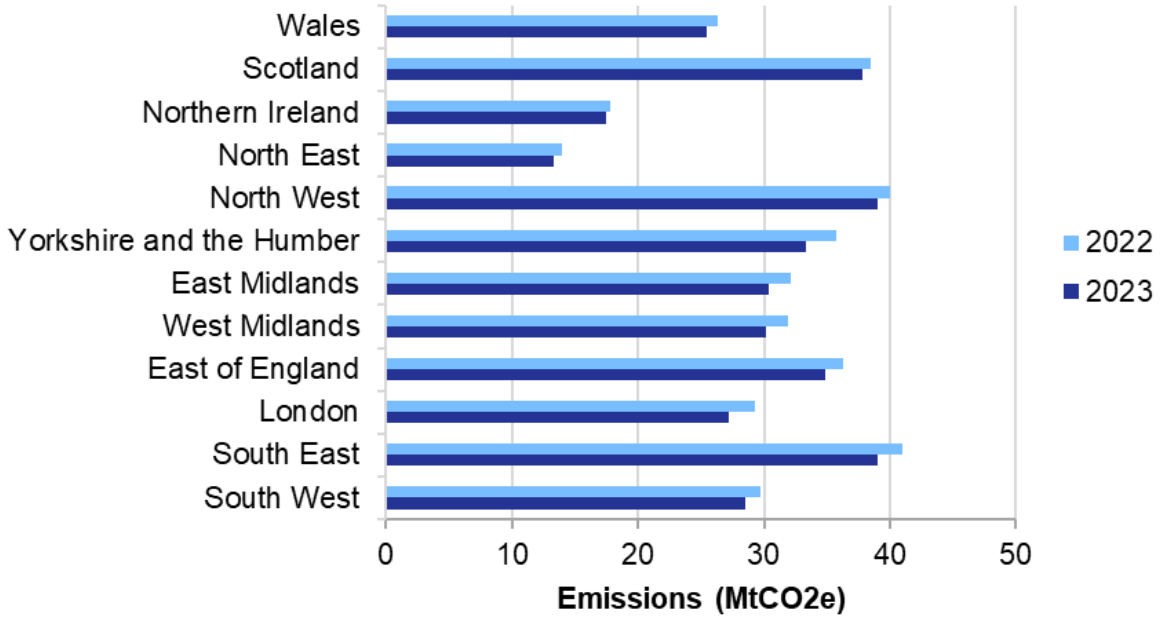
2023 emissions by region

Between 2022 and 2023, greenhouse gas emissions allocated to local authorities in the UK fell by 4%. Most of this decrease is the result of reduced emissions from electricity supply, reflective of higher electricity imports from France (unlike 2022 when the UK had higher than usual exports), a continued decrease in electricity demand, and an increased share of

renewables to meet remaining demand. Emissions from domestic gas use also saw a notable fall. High energy and other costs are likely to have been a factor in reduced gas use for heating domestic buildings.

Figure 2 shows a comparison of greenhouse gas emissions by region for 2022 and 2023. Between 2022 and 2023, all regions saw a decrease in emissions. London and Yorkshire and the Humber saw the largest decreases, each falling by 7%. Reductions in London were primarily driven by lower commercial sector and domestic sector emissions, whereas reductions in Yorkshire and the Humber were mainly due to lower emissions in the industry sector.

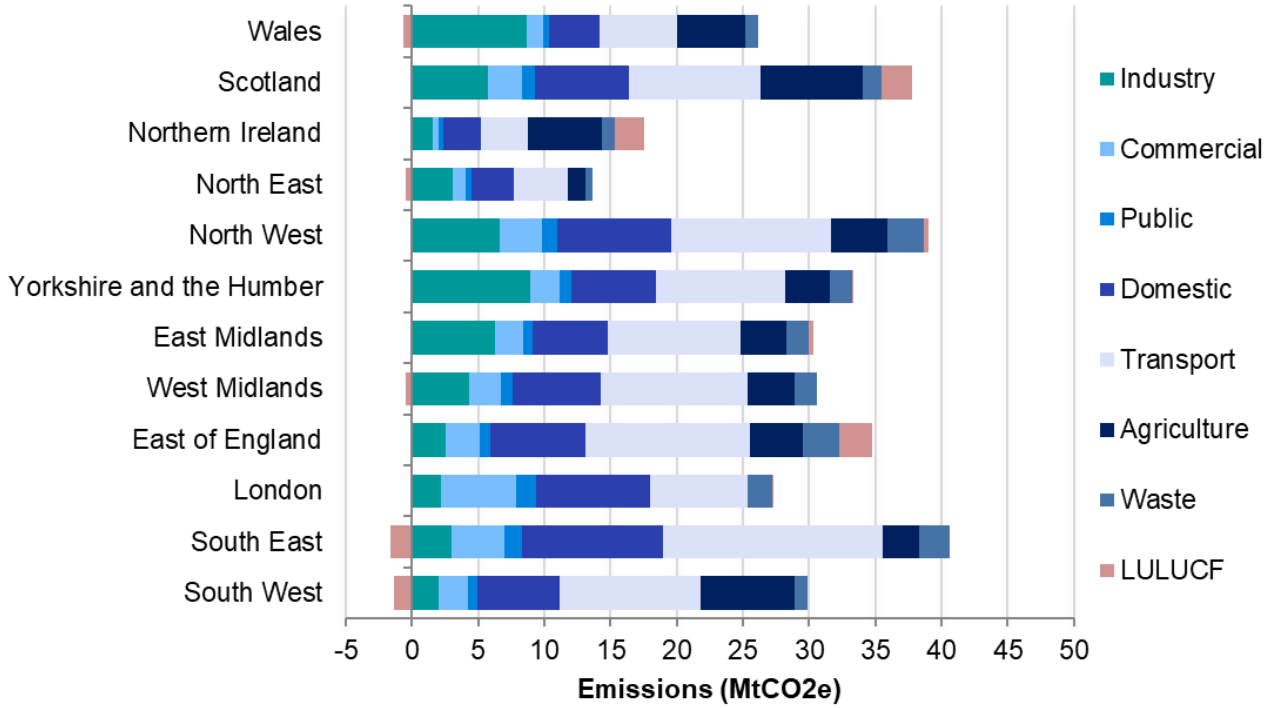
Figure 2: Greenhouse gas emissions by region, 2022 and 2023



Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Figure 3 shows emissions by region and sector. Results for individual local authority and Protected Landscape areas can be found in the data tables published alongside this statistics release. There is a great deal of variation between local areas. For example, a significant proportion of industry sector emissions are concentrated in a few areas, so the contribution of industry and commercial sector emissions for specific local areas may be different from regional averages.

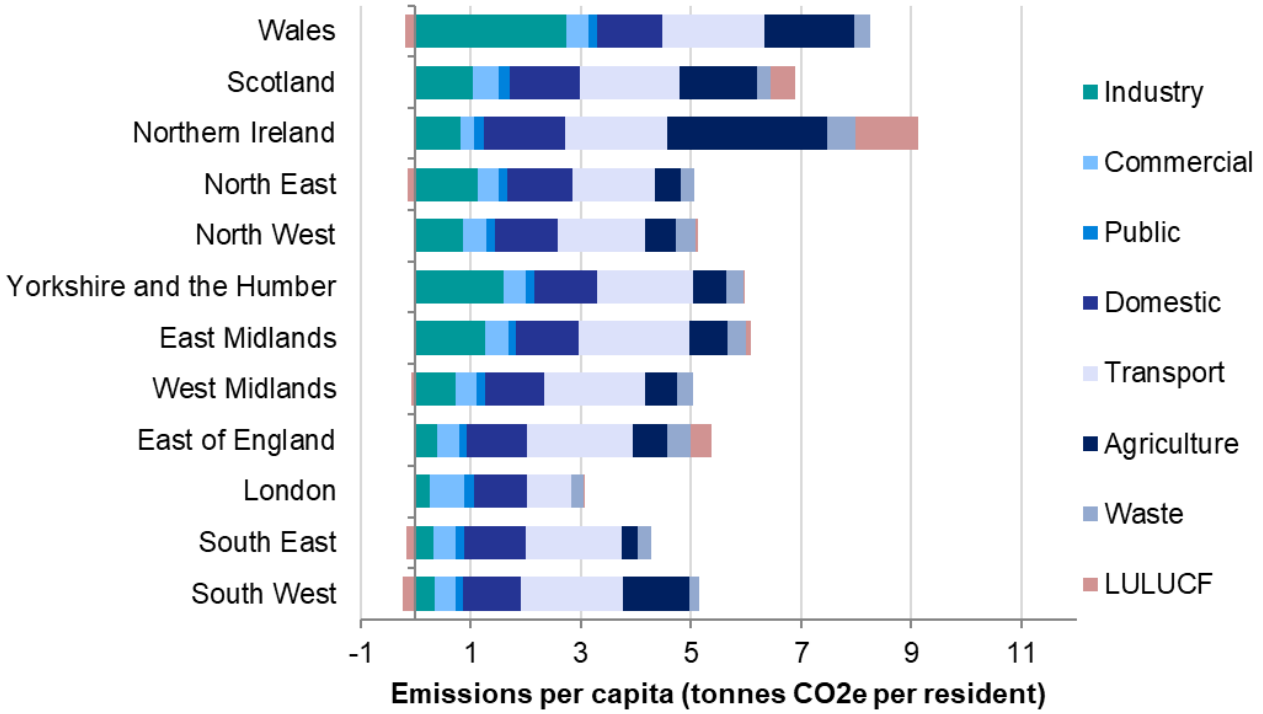
Figure 3: Greenhouse gas emissions by region and sector, 2023



Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Figure 4 shows annual emissions per capita to make some allowance for the different sizes of regions. However, it should be noted that whilst emissions per capita may be a useful measure for domestic sector emissions, emissions from other sources are driven by many factors other than resident population. Therefore, per capita measures of industry, commercial, public and transport sector emissions should be interpreted with caution.

Figure 4: Per capita greenhouse gas emissions by region and sector, 2023



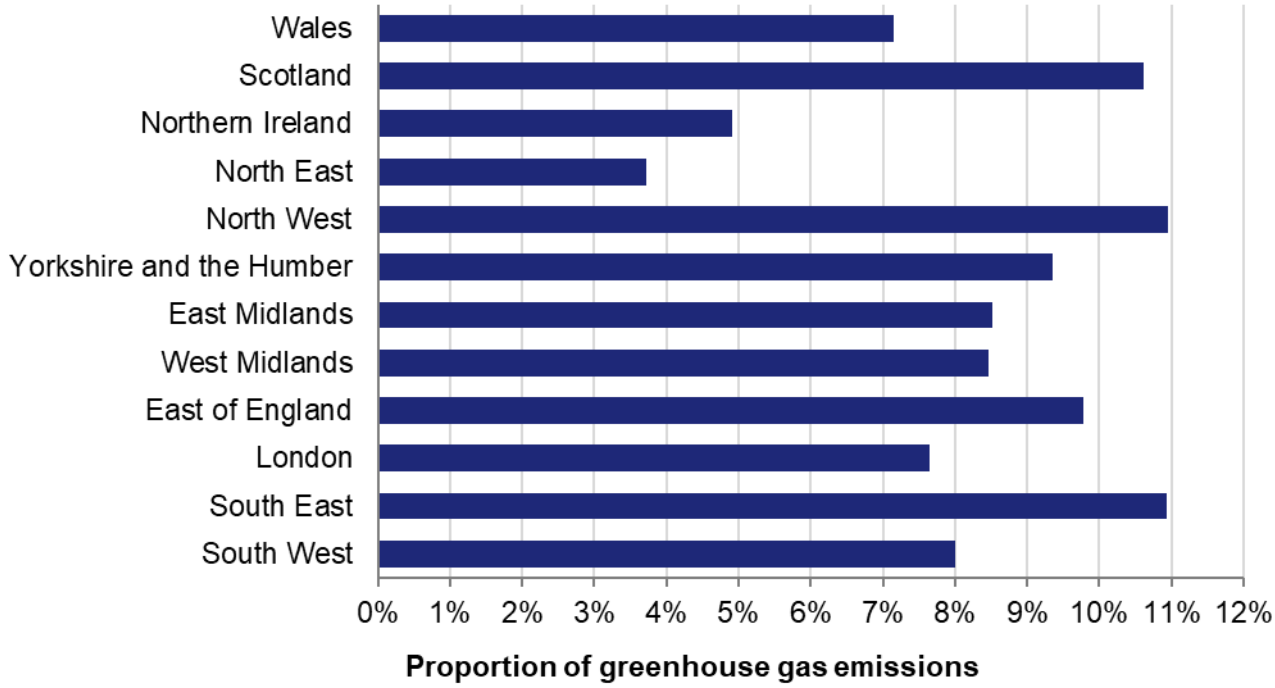
Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Emissions per capita allow for comparison between areas of different population size. Between 2022 and 2023, there was a 5% decrease in overall emissions per capita in the UK. Northern Ireland, Wales, and Scotland have the highest annual emissions per capita. Northern Ireland has notably higher per capita emissions from the agriculture and LULUCF sectors than the UK average, whereas Wales has considerably higher per capita industry sector emissions than any other region of the UK.

London has the lowest per capita emissions, due to its urban transport system and the high population density. Additionally, the greater proportion of residential areas means there are fewer industrial sites and less agricultural land, further contributing to low per capita emissions.

Figure 5 shows the split of total UK emissions by region. Emissions shares are highest in the South East and North West of England, each contributing around 11%. Meanwhile, emissions shares are lowest in the North East of England and Northern Ireland at 4% and 5% of total emissions respectively.

Figure 5: Proportion of greenhouse gas emissions in each region, 2023

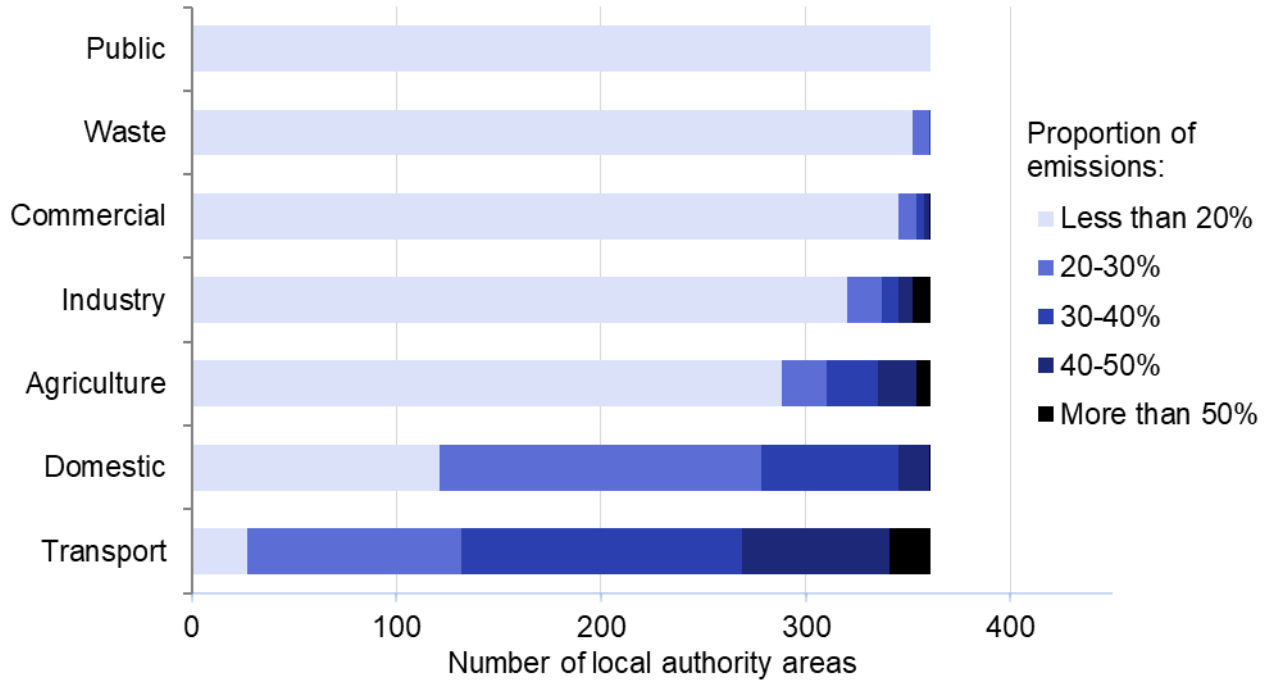


Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables
Note: Unallocated emissions are not shown in this figure.

2023 emissions by local authority

Figure 6 illustrates the share of greenhouse gas emissions for each sector across local authority areas, excluding LULUCF emissions since they can produce negative emissions totals. The proportion of emissions attributable to each sector differs considerably across local authorities. In 2023, there were 20 (6%) local authority areas where the transport sector accounted for over 50% of emissions, 9 (2%) where the industry sector did, and 7 (2%) where the agriculture sector did. The transport and domestic sectors both accounted for at least 20% of emissions in most areas, whilst the public, waste and commercial sectors rarely made up more than 20%.

Figure 6: Number of local authority areas by proportion of greenhouse gas emissions in each sector (excluding LULUCF), 2023



Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Figure 7 shows how annual emissions per capita varied between local authority areas in the UK in 2023. In general, emissions per capita are highest in industrial zones or rural areas with few residents. However, the local authority area with the highest emissions per capita in 2023 was the City of London, at 52 tonnes of CO2e (tCO2e) per person. This is due to its high level of commercial activity compared to the size of its resident population. The local authority with the second highest emissions per capita in 2023 was Neath Port Talbot, at 44 tCO2e. This is mainly due to high emissions from industrial sites. Meanwhile, built-up areas with dense populations tend to have the lowest per capita emissions. In 2023, the London boroughs Harrow, Hackney, and Lewisham had the lowest per capita emissions at 2 tCO2e per person.

Alternatively, Figure 8 shows emissions per kilometre squared (km^2) for each local area in the UK in 2023. Emissions per km^2 are highest in urban and industrial areas, whilst they are lowest in rural areas. In 2023, City of London had highest emissions per km^2, at 223 ktCO2e, followed by Westminster at 72 ktCO2e per km^2. Meanwhile, Argyll and Bute had the lowest emissions per km^2, at 0.04 $ktCO_2e$.

Figure 7: Net greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)

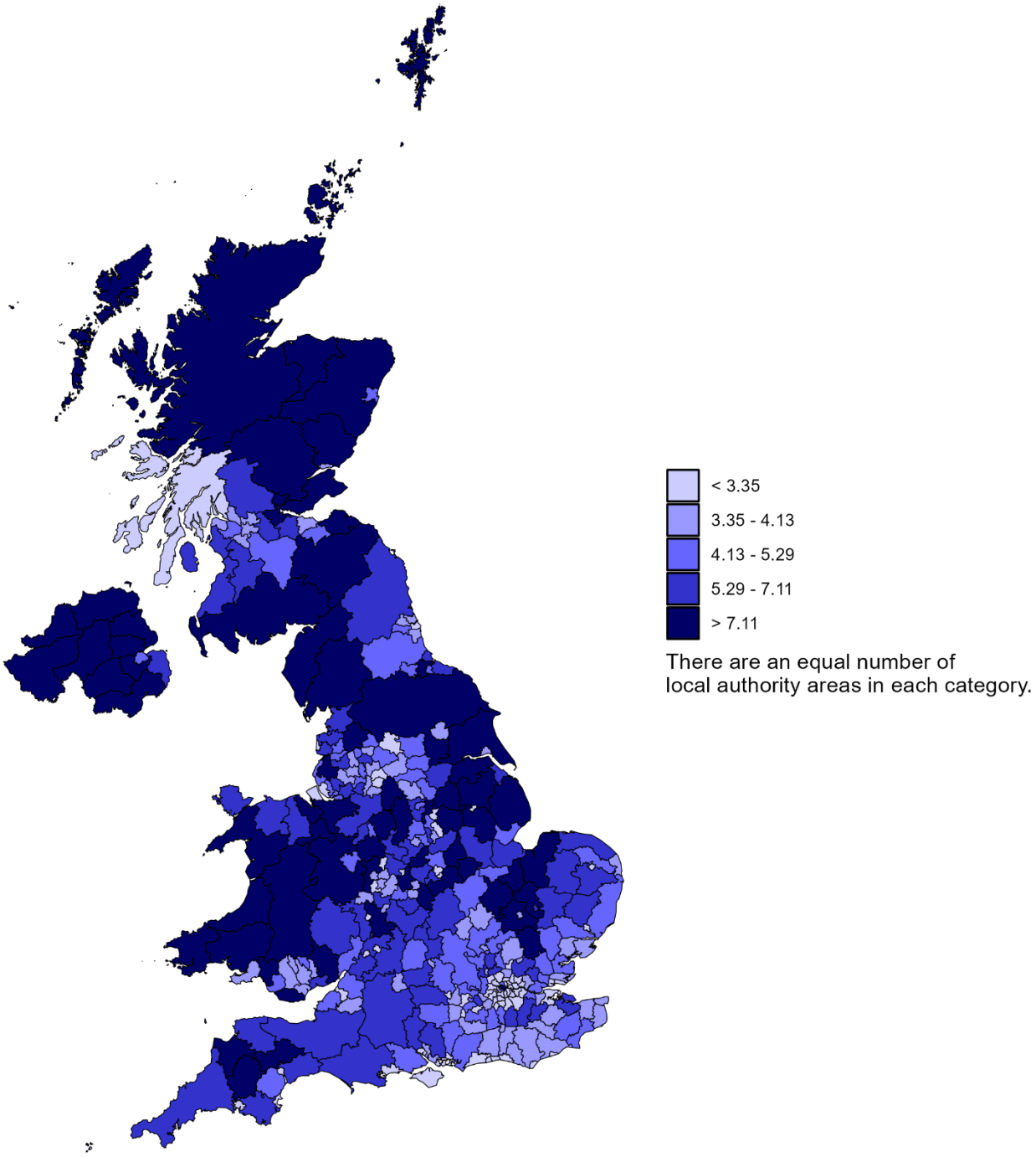
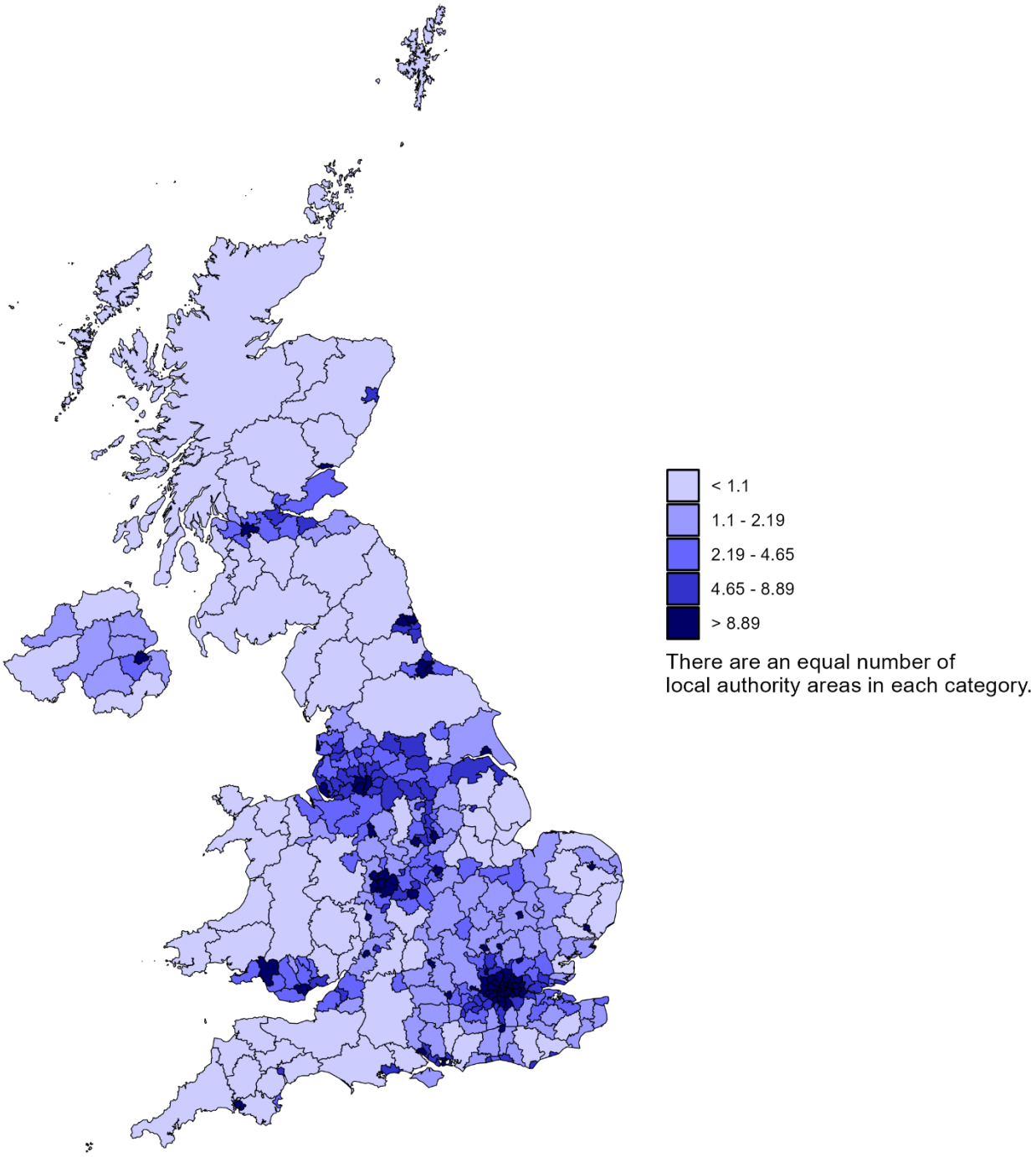


Figure 8: Net greenhouse gas emissions per km^2 by local authority area in 2023 (ktCO2e per km^2)



Domestic sector

The domestic sector accounted for 22% of greenhouse gas emissions in the UK in 2023. Between 2022 and 2023, domestic sector emissions fell by 6% across the UK. At the local level, they decreased in 353 (98%) of the 361 local authority areas in the UK. High energy and other costs are likely to have been a factor in reduced gas use for heating buildings. In 2023, 66% of domestic emissions arose from gas use, 23% from electricity use and 11% from other fuel consumption.

Between 2005 and 2023, domestic sector emissions decreased in all local authority areas. The local authority areas with the largest proportional decreases in domestic sector emissions over this period are the Isles of Scilly (65% fall), Shetland Islands (62% fall), and Argyll and Bute (60% fall). The Isles of Scilly, Shetland Islands, and many households in Argyll and Bute are not connected to the gas network, meaning electricity accounts for a larger proportion of energy use in these areas. Since electricity supply emissions have declined faster than those from gas use, the relative domestic sector emissions reductions in these areas are greater.

The domestic sector sees the least variation in emissions per capita between local authority areas of any sector. DESNZ publishes sub-national metered domestic energy consumption data[7,8] which have been used to estimate local authority area emissions from domestic gas and electricity consumption. Domestic emissions here represent emissions from energy consumption in and around the home, but not activities by private individuals elsewhere, such as personal travel. Table 1 shows the range of emissions per capita in the domestic sector across local authority areas in 2022 and 2023. There are more local authority areas in the lower categories than in 2022, reflecting the overall fall in domestic sector emissions.

Table 1: Breakdown of UK local authority areas by per capita greenhouse gas emissions from the domestic sector, 2022-2023

Number of local authorities, percentages

Tonnes of CO2e per capita	No. of local authority areas 2022	% of local authority areas 2022	No. of local authority areas 2023	% of local authority areas 2023
<1.0	23	6%	62	17%
1.0 to 1.5	318	88%	289	80%
1.5 to 2.0	20	6%	10	3%
Total	**361**	**100%**	**361**	**100%**

Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

In 2023, the domestic sector was the greatest contributor to emissions in 19% (68 of 361) of local authority areas. This sector can be influenced by the fuel types used, the type and condition of the housing (including its insulation), the average temperature (urban areas can be much warmer and therefore easier to heat than rural areas), average household size, type of household and the income and preferences of the occupiers.

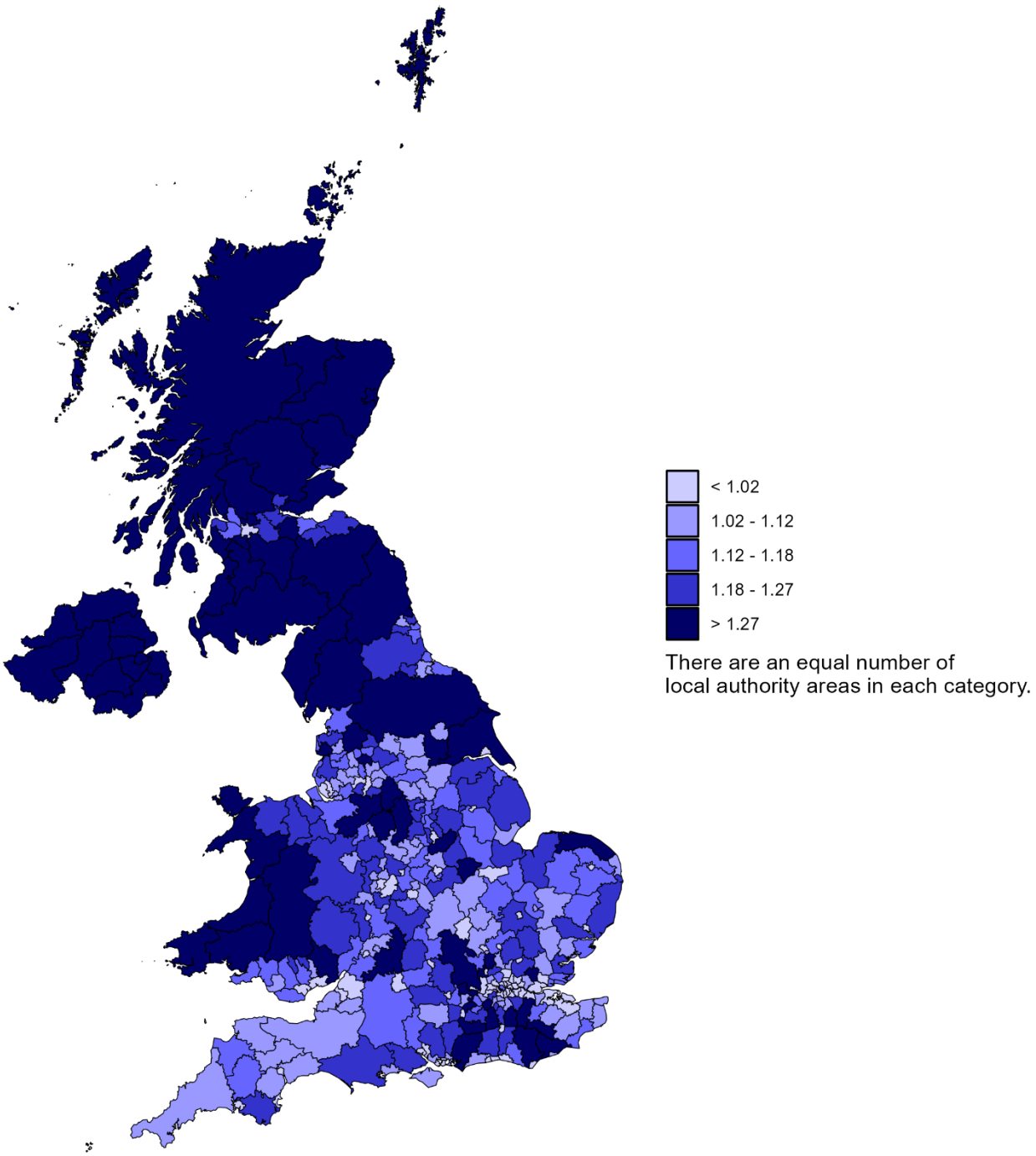
Figure 9 shows domestic sector emissions per capita in local authority areas in the UK in 2023. Emissions per capita were higher in Scotland, Northern Ireland, and Wales than in England. Higher emissions per capita in Northern Ireland are largely due to the limited availability of

[7] https://www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level

[8] For gas and electricity consumption estimates are available for local authorities, regions, Lower and Middle Super Output Areas, and at a postcode level.
Gas: https://www.gov.uk/government/collections/sub-national-gas-consumption-data
Electricity: https://www.gov.uk/government/collections/sub-national-electricity-consumption-data

natural gas in the area; this results in greater use of more carbon intensive fuels such as coal, burning oil and gas oil. Use of these fuel types is captured in the domestic 'other' category in the data tables that accompany this statistical release. Wales also has a higher proportion of emissions from the domestic 'other' category than the rest of the UK, though to a lesser extent than Northern Ireland.

Figure 9: Domestic sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)



Transport sector

The transport sector includes emissions from freight and passenger transport, both for private and business purposes. In 2023, it was the highest emitting sector and was responsible for 32% of all greenhouse gas emissions in the UK. Road vehicles are the largest source of emissions within the UK transport sector. Estimates are based on the distribution of traffic, therefore some of the emissions within each area represent through traffic, or part of trips into or out of the area, whether by residents or non-residents. In some areas this can be particularly significant, and this should be considered when looking at the statistics. The technical report shows how the road traffic estimates break down between major and minor roads, to help with consideration of this point. As the estimates are on an end-user basis, the transport emissions include a share of emissions from oil refineries.

Between 2022 and 2023, greenhouse gas emissions from the transport sector fell by 1% across the UK. At the local level, transport emissions decreased in 84% (305 of 361) of local authority areas. The transport sector was the largest emitting sector in 58% (211 of 361) of local authority areas in 2023.

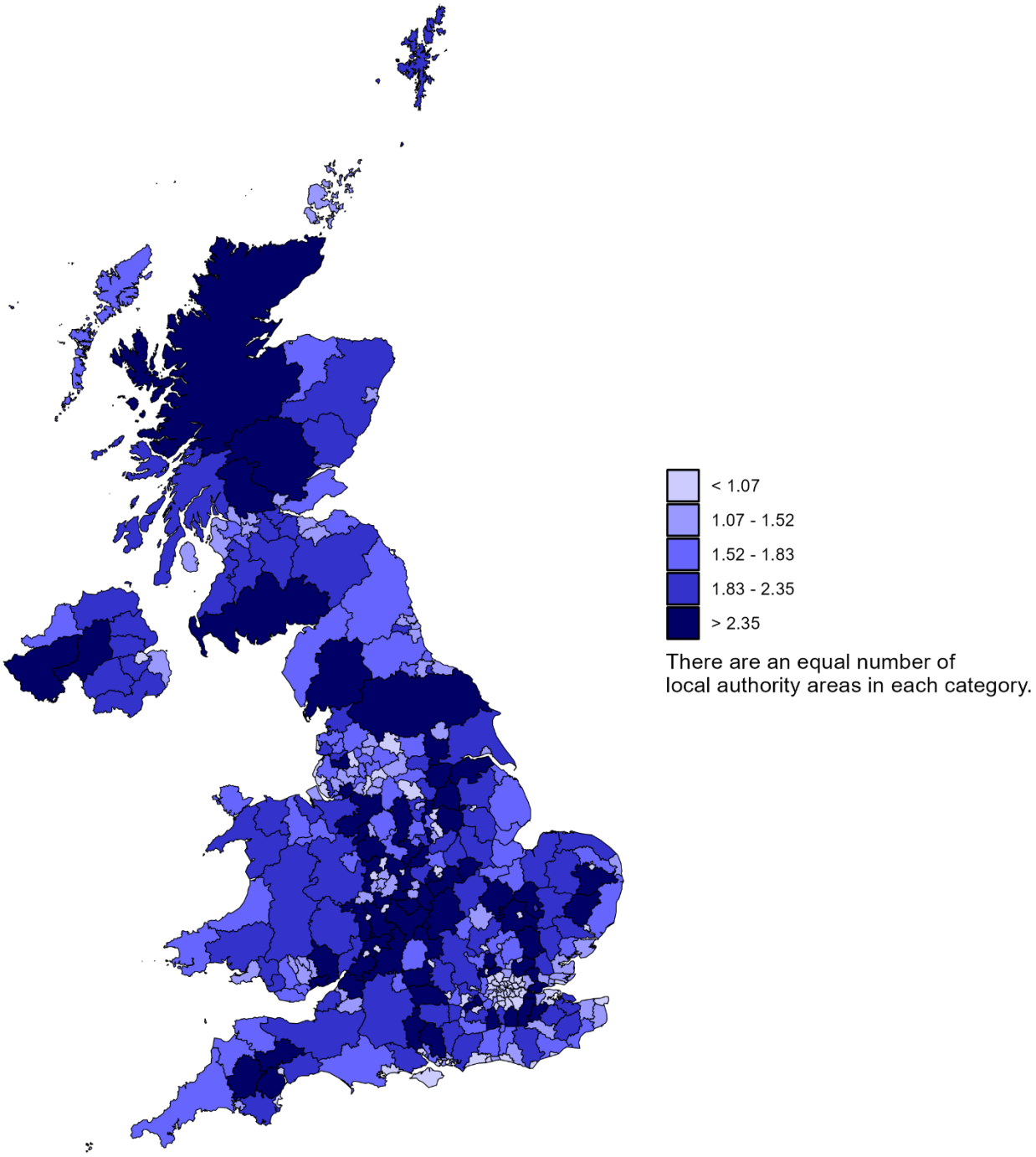
Between 2005 and 2023, 98% (353 of 361) of local authority areas have seen a reduction in transport emissions, with the City of London having the greatest decrease (59%) and South Cambridgeshire having the greatest increase (10%). Meanwhile, 96% (346 of 361) of local authority areas had lower transport emissions in 2023 than in 2019, the last year before the COVID-19 pandemic. Prior to the large fall in 2020 that resulted from COVID-19 pandemic restrictions, national transport emissions had decreased slightly since 2005, even though there had been an increase in both the number of passenger vehicles[9] and the vehicle kilometres travelled[10]. This was due to lower petrol consumption by passenger cars outweighing an increase in diesel consumption, and improvements in fuel efficiency of both petrol and diesel cars[11].

Figure 10 shows transport sector emissions per capita in local authority areas in the UK in 2023. There are a variety of factors that will affect the level of transport emissions in different areas such as the composition of the vehicle fleet and the level of road traffic for different vehicle types. Areas with higher emissions are more likely to be those with motorways and major roads carrying a lot of through traffic, while the areas with the lowest levels of emissions per capita are typically built-up highly populated areas with a high use of public transport.

Note that due to data availability, emissions resulting from the use of electricity and natural gas in road vehicles are not included in the transport sector, but will instead be included in the totals in the industry and commercial sectors.

[9] https://www.gov.uk/government/statistical-data-sets/tsgb09-vehicles
[10] https://www.gov.uk/government/statistical-data-sets/tsgb01-modal-comparisons
[11] https://www.gov.uk/government/statistical-data-sets/tsgb03

Figure 10: Transport sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)



Industry sector

The industry sector accounted for 15% of emissions in the UK in 2023. Between 2022 and 2023, industry sector emissions fell by 8% across the UK, largely due to reductions in emissions from electricity use and large industrial installations. At the local level, industry sector emissions decreased in 85% (306 of 361) of local authority areas. The industry sector was the largest emitting sector in 7% (24 of 361) local authority areas in 2023. Looking at longer term trends, all local authority areas have seen a reduction in emissions from industry since 2005.

Emissions from fuel use in large industrial installations have been mapped using the National Atmospheric Emissions Inventory (NAEI) database of point sources, which combines data from the UK Emissions Trading Scheme and EU Emissions Trading System with data reported by operators that are held in regulators' pollution inventories. In the data tables accompanying this publication, these data are included in the large industrial installations category to ensure that no sensitive fuel consumption data for specific sites is disclosed. This means that the industrial gas category in particular does not include all industrial gas consumption, as some is included in the large industrial installations category.

Emissions per capita in the industrial sector are higher in Wales than in the other countries of the UK. Emissions from this sector are heavily dependent on whether there are large industrial sites situated in an area, and some of the lowest industrial emissions per capita are in local authorities in London which have a higher population density and a greater proportion of residential areas meaning that industrial sites are less likely to be located there.

Commercial sector

Commercial sector emissions predominantly arise from the use of electricity and gas by businesses. It accounted for 8% of greenhouse gas emissions in the UK in 2023. Between 2022 and 2023, commercial sector emissions fell by 13% across the UK, mainly due to lower emissions from electricity and gas use. At the local level, commercial sector emissions decreased in 96% (346 of 361) of local authority areas. The commercial sector was the largest emitting sector in 2% (7 of 361) local authority areas in 2023.

Looking at longer term trends, all but one of the 361 local authority areas have seen a reduction in emissions from the commercial sector since 2005. This long-term fall is largely driven by the reduced emissions from electricity use, largely due to decreased coal use for electricity generation and increased use of renewables. The one authority that saw an increase is Slough, where commercial sector emissions increased by 52% between 2005 and 2023. This increase may be due to the large number of data centres that have been built there.

Public sector

The public sector accounted for 3% of greenhouse gas emissions in the UK in 2023. Between 2022 and 2023, public sector emissions fell by 10% across the UK, largely due to reductions in emissions from electricity and gas use. At the local level, public sector emissions decreased in 91% (327 of 361) of local authority areas between 2022 and 2023. The public sector was not the largest emitting sector in any local authority areas in 2023.

Looking at longer term trends, 99% (358 of 361) of local authority areas have seen a reduction in emissions from the public sector since 2005. This long-term fall is largely driven by the reduced emissions from electricity use, due to decreased coal use for electricity generation and increased use of renewables.

Figures 11, 12 and 13 show emissions per capita across local authority areas in the UK in 2023 for the industry, commercial and public sectors respectively.

Figure 11: Industry sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)

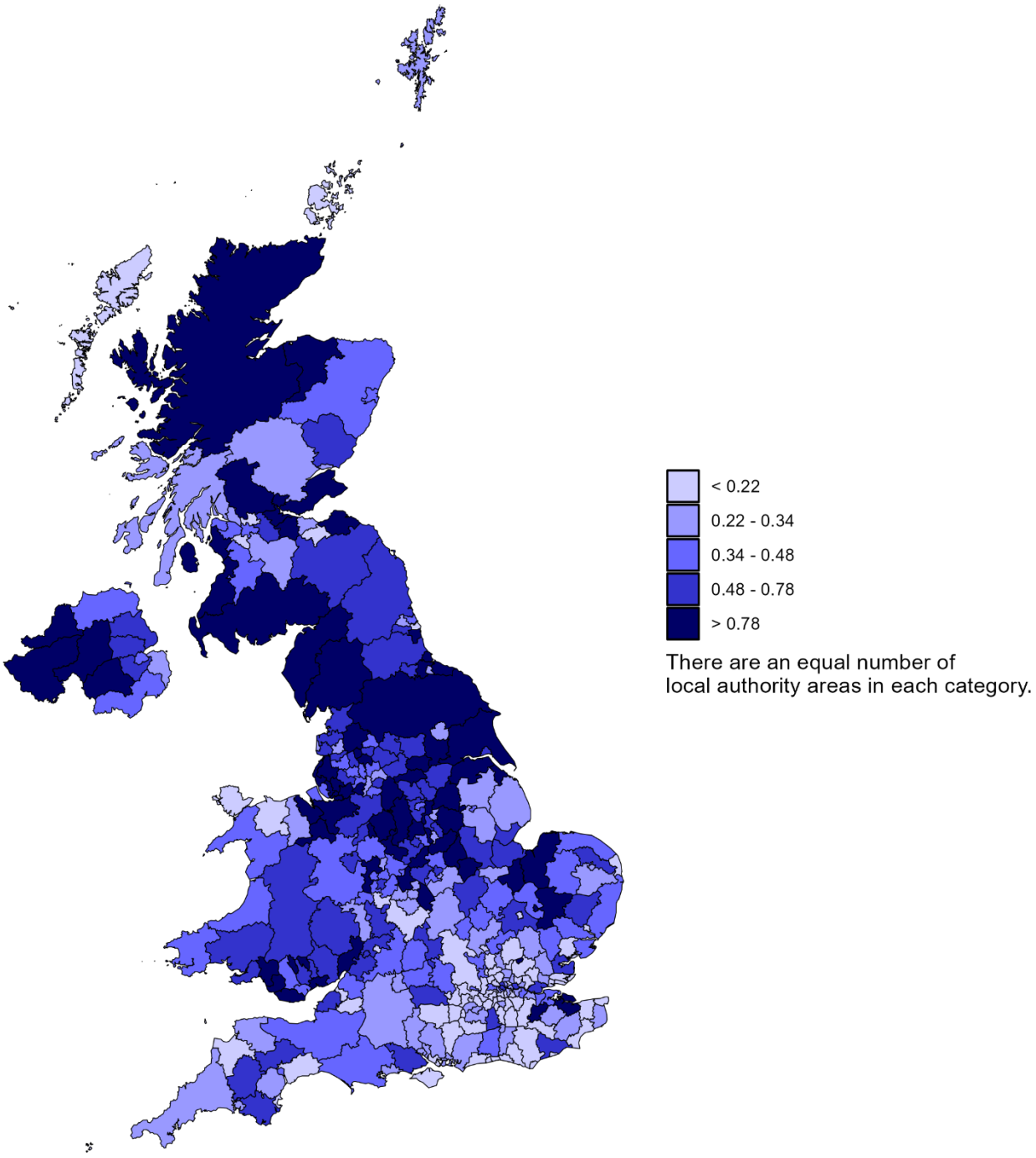


Figure 12: Commercial sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)

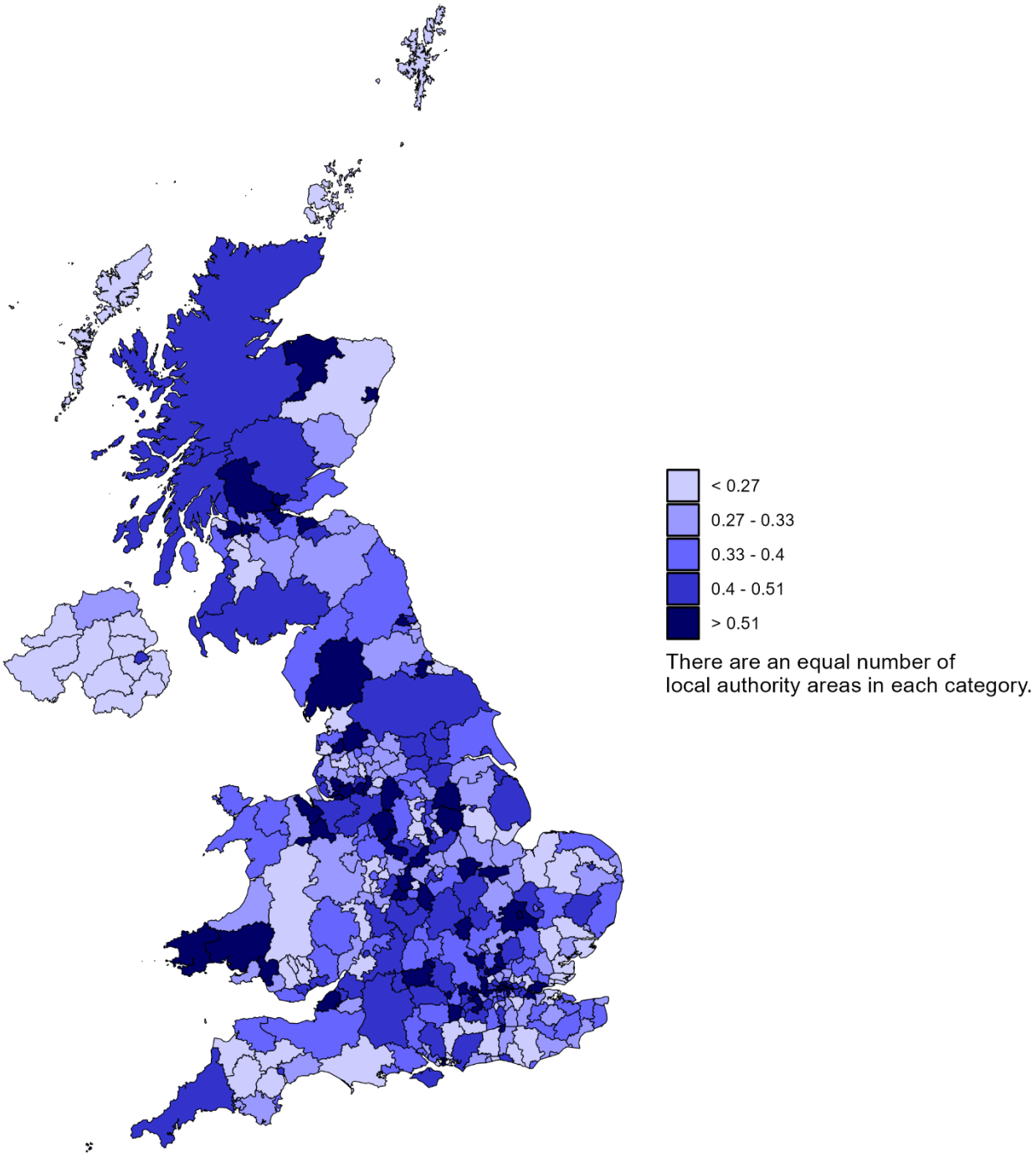
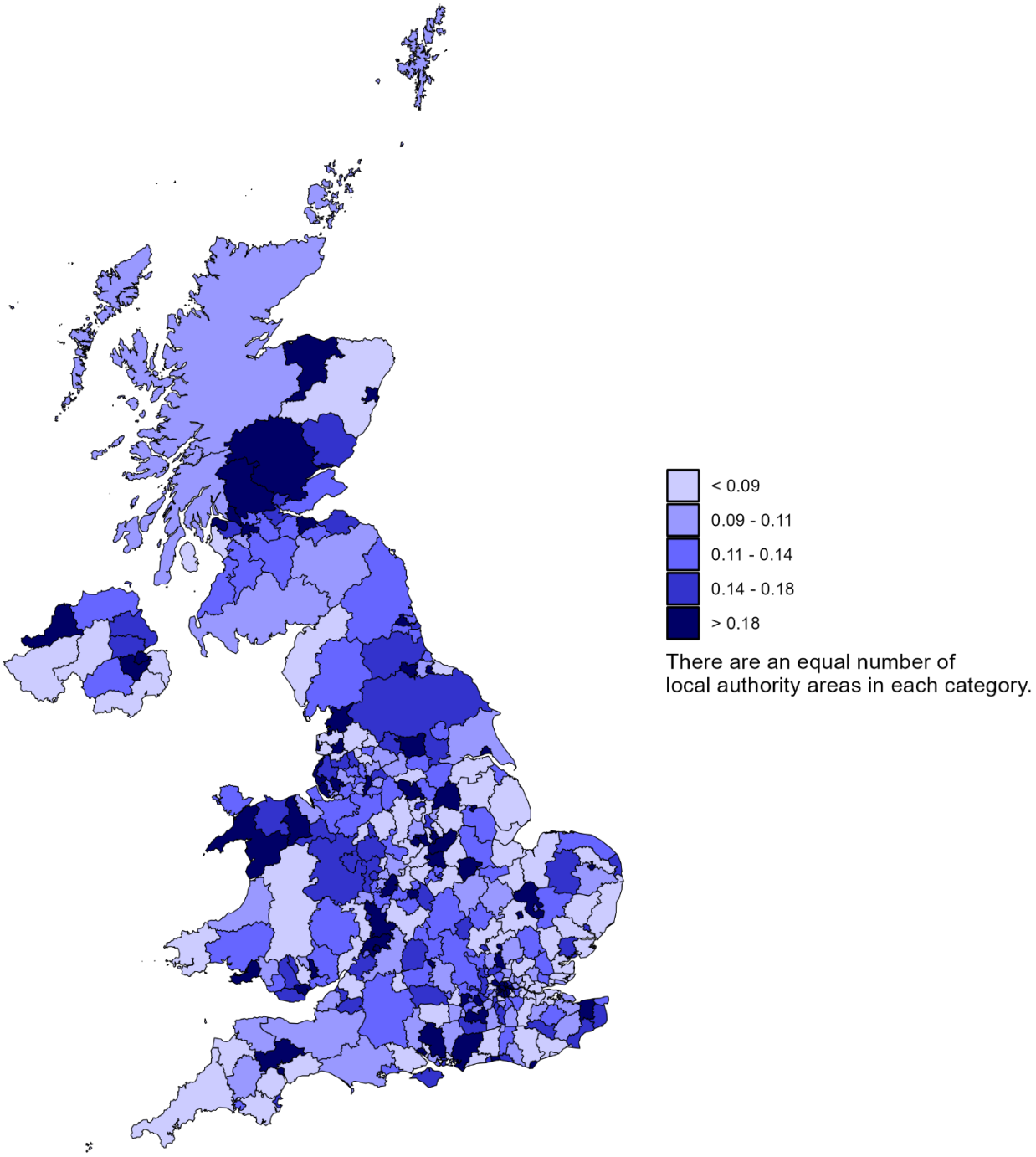


Figure 13: Public sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)



Agriculture sector

The agriculture sector accounted for 14% of greenhouse gas emissions in the UK in 2023. Emissions of methane (56%) and nitrous oxide (26%) dominate this sector. The most significant sources are emissions of methane from livestock, particularly cattle, and nitrous oxide emissions related to the use of fertilisers. Between 2022 and 2023, agriculture sector emissions fell by 1% across the UK, largely due to a reduction in livestock emissions, and despite increased emissions from agricultural machinery. At the local level, greenhouse gas emissions from agriculture decreased in 62% (223 of 361) of local authority areas between 2022 and 2023. The agriculture sector was the largest emitting sector in 13% (48 of 361) of local authority areas in 2023. Looking at longer term trends, 92% (333 of 361) local authority areas have seen a reduction in emissions from agriculture since 2005.

Waste sector

The waste sector accounted for 6% of greenhouse gas emissions in the UK in 2023, with methane accounting for 91% of all waste sector emissions. Most waste sector emissions are from landfill sites. Between 2022 and 2023, waste sector emissions fell by 0.5% across the UK, largely due to a continuation of gradual decreases in emissions from landfill sites.

At the local level, emissions from waste are allocated to areas based on where waste originates, rather than where the emissions occur. This is to enable understanding of the emissions resulting from waste produced in a local authority area, in a similar way to how emissions from energy supply are shown on an end-user basis in these statistics. Between 2022 and 2023, greenhouse gas emissions from the waste sector decreased in 46% (166 of 361) of local authority areas. The waste sector was the largest emitting sector in 1% (3 of 361) of local authority areas in 2023.

Note that a significant proportion of landfill methane emissions in England in 2005-2009 could not be allocated to local authorities so the landfill emissions estimates shown will be underestimates for some local authorities in the early part of the time series.

Figures 14 and 15 show emissions per capita across local authority areas in the UK in 2023 for the agriculture and waste sectors respectively.

Figure 14: Agriculture sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)

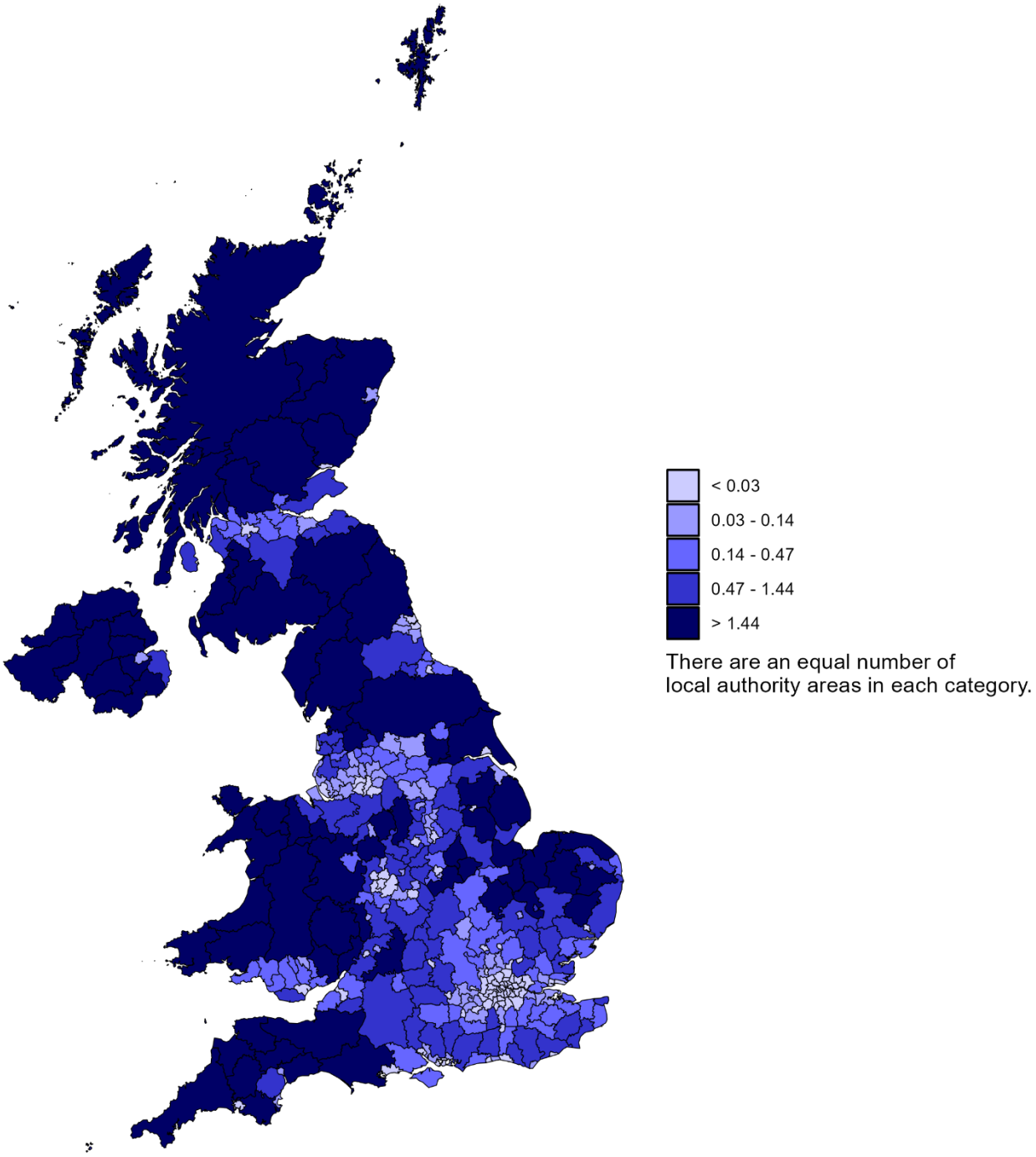
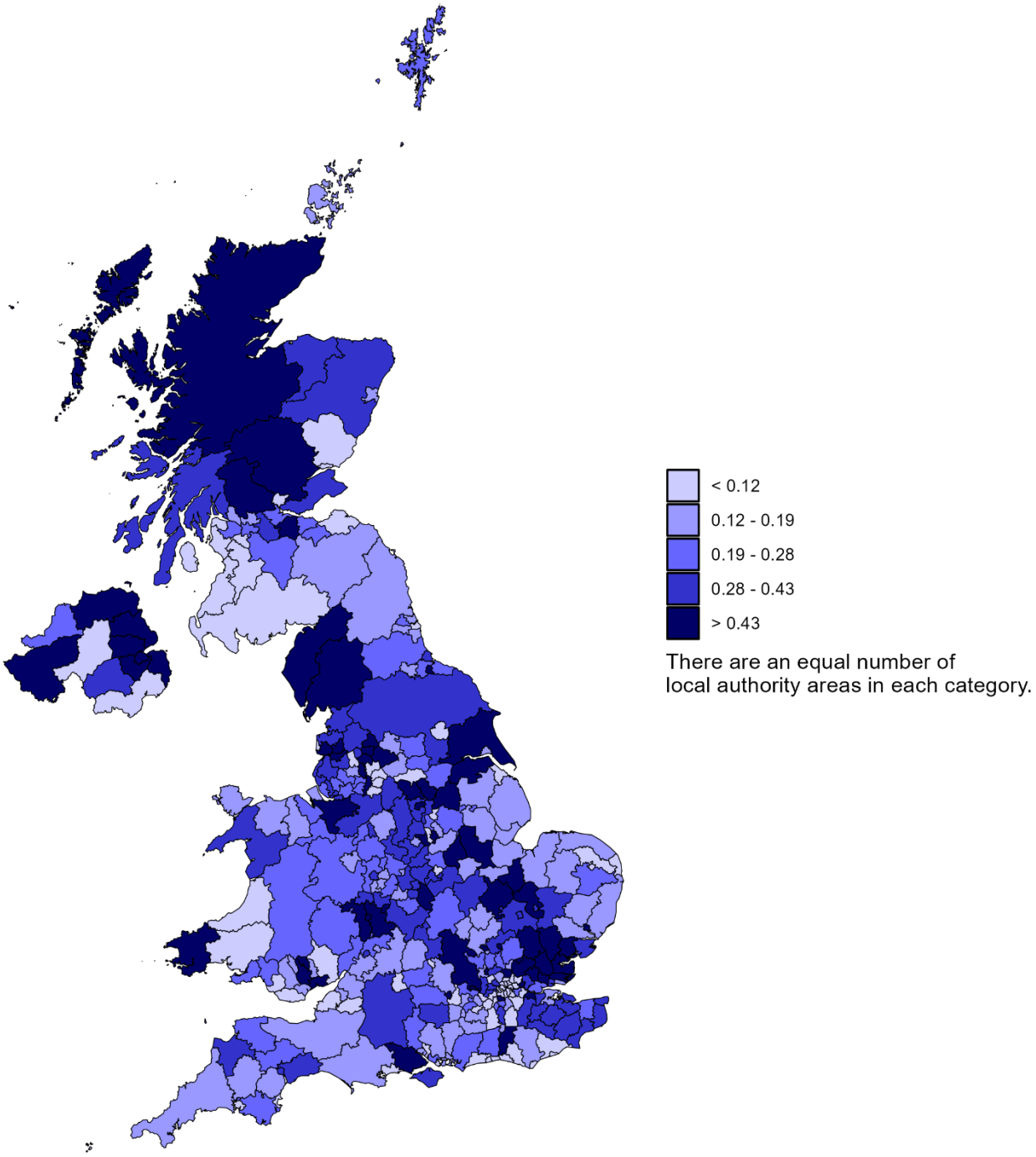


Figure 15: Waste sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)



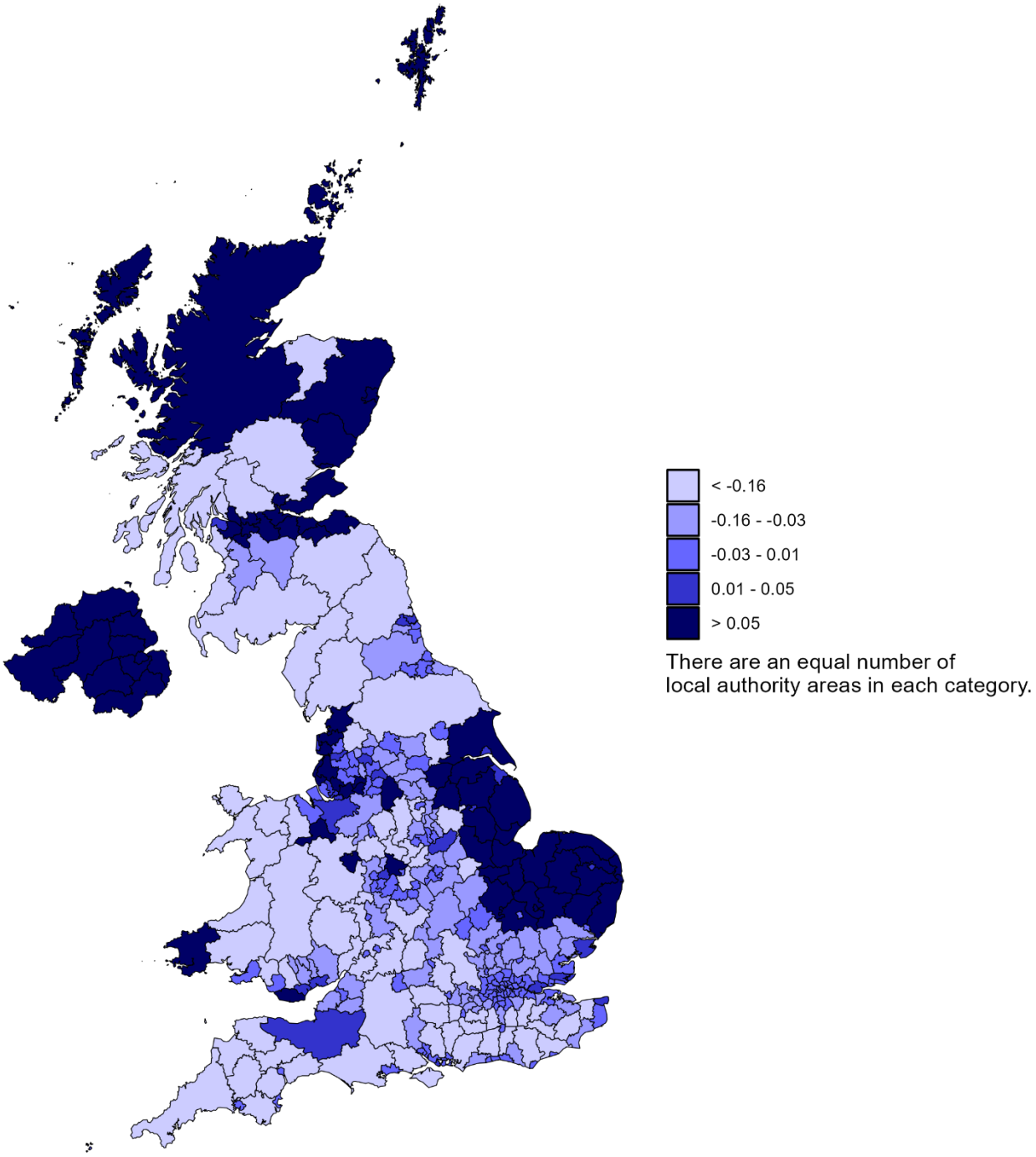
Land use, land use change and forestry (LULUCF) sector

The LULUCF sector consists of emissions and removals from forests, cropland, grassland, peatland, and settlements. It is the only sector that includes emission removals, although across the UK as a whole the sector is estimated to have been a net source of greenhouse gas emissions in almost every year from the start of the data series, with the one exception of 2015 when it estimated to have been a net sink. In general, peatland is the largest source of LULUCF emissions, while forestry is the dominant sink. Settlements and cropland mineral soils changes are estimated to have been net sources of emissions throughout the data series, while grassland mineral soils changes are estimated to have been a net sink.

While the LULUCF sector was a net source of emissions across the UK as a whole in 2023, we estimate that it was a net sink in 53% (191 of 361) of local authority areas. Between 2022 and 2023, LULUCF sector emissions rose by 0.6 million tonnes of CO2e (MtCO2e) across the UK, largely due to lower emissions sinks from forest land. Despite this overall rise, 75% (272 of 361) of local authority areas saw a decrease in LULUCF sector net emissions. Looking at longer term trends, 88% (317 of 361) of local authority areas have seen a reduction in net emissions from the LULUCF sector since 2005. The largest factor in this long-term fall has been a reduction in emissions from peatlands associated with ongoing management practices such as re-wetting.

Figure 16 shows LULUCF sector emissions per capita in local authority areas in the UK in 2023. There are clear regional trends in per capita emissions. In particular, in large parts of Wales, the North East, and the South East and South West it is a large net sink of emissions. In other parts of the UK, such as in Northern Ireland, Scotland, and parts of the East of England, LULUCF is a large net source of greenhouse gas emissions. Northern Ireland has the highest LULUCF emissions per capita, due to the clearing of land for the maintenance and creation of settlements and croplands.

Figure 16: Net LULUCF sector greenhouse gas emissions per capita by local authority area in 2023 (tCO2e per capita)



Local authority areas with large changes in emissions since 2022

Between 2022 and 2023, greenhouse gas emissions decreased in 94% (340 of 361) of local authority areas. For most local authorities this was largely due to a reduction in emissions from electricity and gas use. Emissions from electricity generation decreased due to lower gas use in UK power stations, reflecting higher electricity imports from France (unlike 2022 when the UK had higher than usual exports), a continued decrease in UK electricity demand, and an increased share of renewables to meet remaining demand. Meanwhile, high energy and other costs are likely to have been a factor in reduced gas use, particularly for heating buildings. Some local authority areas will have had specific local factors affecting them such as changes in industrial emissions following closures or expansions of large industrial sites in those areas. The 21 local authority areas that saw a rise in emissions in 2023 did so because of a range of factors across different sectors. There are also local authorities where the LULUCF sector provides a large emissions sink, giving them a small net emissions total that can be subject to large percentage changes when other sources of emissions change.

Table 2 shows some examples of local authority areas that had particularly big increases or decreases in emissions and the sub-sector that made the largest contribution to this change in each case. The largest falls between 2022 and 2023 were seen in Southwark (28%), West Suffolk (18%), and Redcar and Cleveland (17%). The largest contributors to the fall in Southwark were reductions in landfill and commercial emissions. Meanwhile, the largest contributors to the fall in West Suffolk were reductions in industry sector gas use and landfill emissions, whereas the largest contributors to the fall in Redcar and Cleveland were reductions in large industrial installations and industry gas use emissions.

Meanwhile, Highland (25%), Stevenage (17%), and City of London (16%) saw the largest increases in emissions from 2022 to 2023. The largest contributors to the increase in Highland was a reduction in the net emissions sink provided by forestry. Meanwhile, the largest contributors to the increases Stevenage and City of London were higher landfill emissions.

Table 2: Local authority areas that had the largest changes in greenhouse gas emissions between 2022 and 2023

Percentages

Local authority area	Percentage change	Sub-sector most responsible for changes in that area
Southwark	-28%	Landfill
West Suffolk	-18%	Industry gas
Redcar and Cleveland	-17%	Large industrial installations
City of London	16%	Landfill
Stevenage	17%	Landfill
Highland	25%	Net emissions: forestry

Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

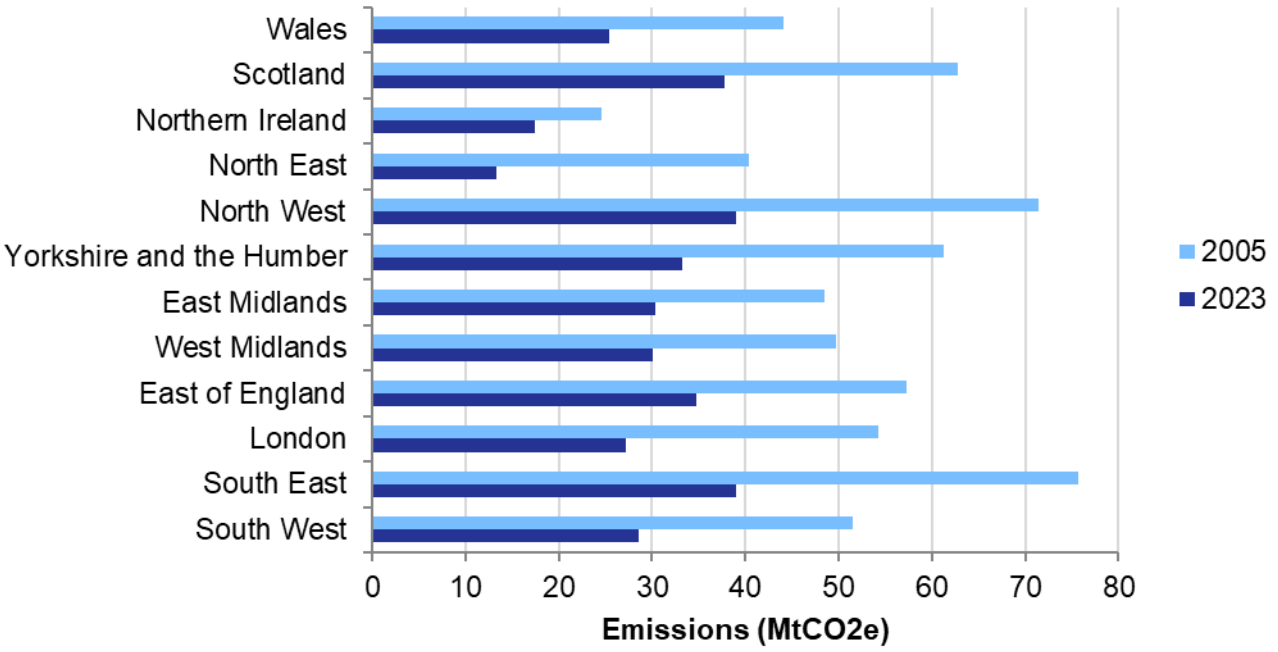
Greenhouse gas emissions trends since 2005

When the local authority area emissions are aggregated, estimated total greenhouse gas emissions decreased by around 46% between 2005 and 2023 (the earliest year for which data are available at local authority level) – falling from 657 million tonnes of CO2e (MtCO2e) to 356 MtCO2e. Whilst emissions have decreased over time there have been periods of fluctuation, with emissions increasing between 2009 and 2010 (largely due to exceptionally cold weather in 2010 and relatively low emissions in 2009 as a consequence of economic factors), between 2011 and 2012 (largely due to variations in temperature) and between 2020 and 2021 (largely due to the easing of COVID-19 restrictions and variations in temperature). For information on the drivers of trends at national level, see the latest UK territorial greenhouse gas emission statistics.

Regional trends since 2005

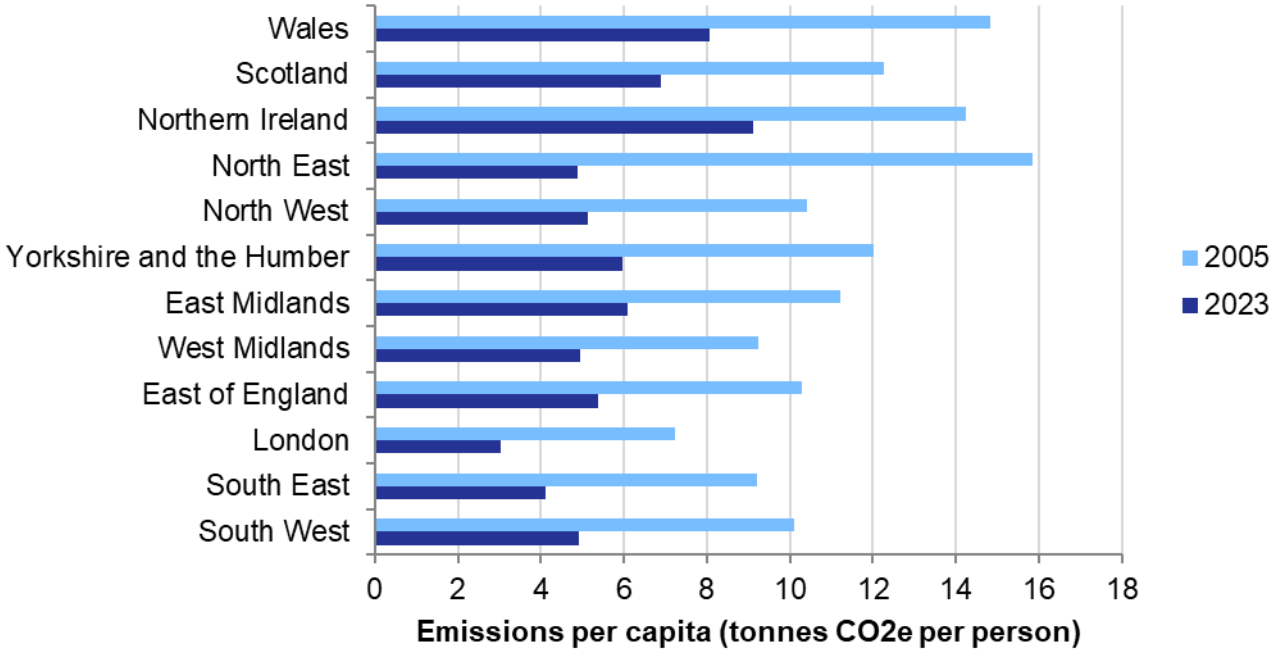
Figures 17 and 18 show how total greenhouse gas emissions and annual greenhouse gas emissions per capita in 2005 and 2023 compare for each region and country in the UK. Emissions have decreased in all regions since 2005. The largest percentage decrease in emissions (67%) and the largest decrease in per capita terms of 10.9 tCO2e per person were seen in the North East. The smallest decrease in percentage terms (29%) was seen in Northern Ireland and in per capita terms (4.2 tCO2e per person) was seen in London.

Figure 17: Greenhouse emissions by region, 2005 and 2023



Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Figure 18: Annual greenhouse emissions per capita by region, 2005 and 2023



Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Table 3 shows how total greenhouse gas emissions and greenhouse gas emissions per km^2 in 2005 and 2023 compare for each region and country in the UK. The highest emissions per km^2 are generally in urban areas and areas with large industrial sites. At the regional level, the largest emissions per km^2 were in London at 17.1 ktCO2e per km^2 in 2023.

Table 3: Total greenhouse gas emissions and greenhouse gas emissions per km^2 by region and country, 2005 and 2023

MtCO2e, tCO2e

Region/country	2005		2023		Difference between 2005 and 2023 per km^2 (ktCO2e)
	Total emissions (MtCO2e)	Per km^2 (ktCO2e)	Total emissions (MtCO2e)	Per km^2 (ktCO2e)	
UK	657	2.6	356	1.4	-1.2
Wales	44	2.1	25	1.2	-0.9
Scotland	63	0.8	38	0.5	-0.3
Northern Ireland	25	1.7	18	1.2	-0.5
England	510	3.8	276	2.1	-1.8
North East	40	4.7	13	1.5	-3.1
North West	71	4.8	39	2.6	-2.2
Yorkshire and the Humber	61	3.9	33	2.1	-1.8
East Midlands	48	3.1	30	1.9	-1.1
West Midlands	50	3.8	30	2.3	-1.5
East of England	57	2.9	35	1.8	-1.1
London	54	34.1	27	17.1	-17.0
South East	76	3.9	39	2.0	-1.9
South West	51	2.1	29	1.2	-0.9

Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Local authority trends since 2005

As shown in Table 4, there is more variation in trends at the local authority level than at the regional level. Emissions for many local authority areas are heavily influenced by activities at industrial sites, and changes at a single site can have a big impact on emissions trends.

Between 2005 and 2023, all 361 local authority areas saw a decrease in total greenhouse gas emissions. This reflects the decrease in overall emissions in the UK during this period, driven mainly by reductions in emissions from power stations and industrial combustion. The reduction from power stations is driven by change in the fuel mix used for electricity generation with a large reduction in the amount of coal, which is a carbon intensive fuel, and increasing use of renewables. The reduction in industrial combustion is largely driven by the closure or reduced activity of industrial plants, a notable portion of which occurred during 2009, likely due to economic factors.

From 2005 to 2023, the largest percentage decrease:

- in total emissions was in Redcar and Cleveland (down 93%), due to the closure of several large industrial installations over this period.
- in emissions from the industry sector was in Redcar and Cleveland (down 96%), due to the closure of several large industrial installations over this period.
- in emissions from the commercial sector was North Ayrshire (down 84%), due to reductions in emissions from electricity use and from gas consumption.
- in emissions from the public sector was Newport (down 87%) due to reductions in emissions from electricity use.
- in emissions from the domestic sector was in the Isles of Scilly (down 65%), due to reductions in emissions from electricity consumption.
- in emissions from the transport sector was in the City of London (down 59%), due to a decrease in emissions from road transport.
- in emissions from the agriculture sector was in Redcar and Cleveland (down 79%), due to a decrease in emissions from agricultural electricity use.

From 2005 to 2023, the largest percentage increase:

- in emissions from the commercial sector was in Slough (up 52%), due to an increase in emissions from electricity use.
- in emissions from the public sector was in Armagh City, Banbridge and Craigavon (up 9%), due to an increase in emissions from gas consumption.
- in emissions from the transport sector was in South Cambridgeshire (up 10%), due to an increase in emissions from road transport.
- in emissions from the agriculture sector was in Portsmouth (up 63%), due to an increase in emissions from livestock. However, in absolute terms, this equates to a small increase in emissions (1.1 ktCO2e).

No local authority areas showed an increase in total, industry sector, or domestic sector emissions. The largest changes in the waste sector and the LULUCF are not shown. For the waste sector, a significant proportion of landfill emissions in 2005 could not be allocated to local authority areas. Meanwhile, the LULUCF sector is a net sink of emissions in some local authority areas.

Table 4: Breakdown of size of decrease in greenhouse gas emissions between 2005 and 2023

Change in emissions since 2005	Number of local authority areas
Decrease of more than 55%	36
Decrease of 50%-55%	53
Decrease of 45%-50%	75
Decrease of 40%-45%	78
Decrease of 35%-40%	51
Decrease of 30% to 35%	31
Decrease of 0-30%	37

Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Table 5 shows the local authority areas that have experienced the largest percentage decreases in greenhouse gas emissions since 2005, and the sub-sector that made the largest contribution in each case. All of the local authority areas with the largest decreases in emissions since 2005 were driven by closures in large industrial installations.

In some local authority areas, LULUCF sinks significantly impact emissions trends. A large sink can lead to much lower total net emissions than the non-LULUCF emissions total, meaning that changes in emissions from other sectors lead to a larger percentage change in total emissions. This is true for New Forest and Northumberland, where notable sinks have led to larger overall emission reductions.

Table 5: Local authority areas that had the largest decreases in greenhouse gas emissions between 2005 and 2023

Percentage

Local authority area	Percentage decrease	Sub-sector most responsible for decrease
Redcar and Cleveland	93%	Large industrial installations
Gravesham	78%	Large industrial installations
New Forest	73%	Large industrial installations
Northumberland	69%	Large industrial installations
Stockton-on-Tees	66%	Large industrial installations

Source: Table 1.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Carbon dioxide emissions within the scope of influence of local authorities

Alongside the full dataset, we have also published a “subset dataset” which represents carbon dioxide emissions within the scope of influence of local authorities. This can be found in table 2.1 in the data tables accompanying this publication. This subset dataset was originally used to report progress against National Indicator 186 under the Department for Communities and Local Government’s Local Area Agreements, and while the National Indicator Set was

discontinued in 2011, publication of the subset dataset has continued to allow local authorities to use it to monitor their progress in reducing emissions in their local area.

Unlike the full dataset, the subset dataset excludes emissions that local authorities do not have direct influence over. The emissions that are removed from the full dataset are:

- Motorways – all emissions from the "Transport (motorways)" sub-sector have been removed.
- EU Emissions Trading System (EU ETS) and UK Emissions Trading Scheme (UK ETS) sites – these emissions have been removed from the "Large industrial installations" sub-sector, with the exception of energy suppliers (e.g. power stations), whose emissions are indirectly included via the end-user estimates for electricity use. Note that not all the emissions from the "Large industrial installations" sector are produced by EU and UK ETS installations, hence the fact that there are emissions remaining in this sector in the subset.
- Diesel railways – all emissions from the "Diesel Railways" sector have been excluded.
- Land use, land use change, and forestry – all emissions belonging to the "LULUCF Net Emissions" sector have been excluded.

The effect of excluding these emissions is greater in local authority areas where these sources contribute a larger share of total emissions. Table 6 shows the local authority areas with the largest decreases in emissions within the scope of influence of the local authority between 2005 and 2023. No authorities saw an increase over this period. None of the local authority areas that had the largest decreases in overall greenhouse gases in Table 5 in the previous section feature in Table 6. This is because the decreases in those local authority areas were mostly driven by the large industrial installations sub-sector, large aspects of which are considered to be outside the scope of influence of local authorities, or occurred in areas with large LULUCF sinks, which are considered to be entirely outside the scope of influence of local authorities.

Table 6: Local authority areas that had the largest increases or decreases in CO2 emissions within the scope of influence of the local authority between 2005 and 2023

Percentage

Local authority area	Percentage change	Sub-sector most responsible for change
City of London	-74%	Commercial electricity
Tower Hamlets	-62%	Commercial electricity
North East Lincolnshire	-61%	Industry gas
Westminster	-60%	Commercial electricity
Neath Port Talbot	-60%	Industry electricity

Source: Table 2.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Between 2022 and 2023, 98% (355 out of 361) of local authority areas saw a decrease in emissions within the scope of influence of local authorities. Table 7 shows the local authority areas with the biggest percentage changes to emissions within their scope of influence between 2022 and 2023. Most of the local authority areas shown in Table 7 do not appear in Table 2, as the drivers of some of the largest emissions changes (such as the opening or

closing of large industrial installations) may be outside the scope of influence of local authorities.

Table 7: Local authority areas that had the largest increases or decreases in CO2 emissions within the scope of influence of the local authority, 2022-2023

Percentage

Local authority area	Percentage change	Sub-sector most responsible for change
West Suffolk	-20%	Industry gas
City of London	-14%	Commercial electricity
Isles of Scilly	-12%	Transport ‘other’
Cheshire West and Cheshire	3%	Industry 'other'
North Somerset	4%	Commercial gas
Fife	7%	Industry 'other'

Source: Table 2.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Emissions within Protected Landscapes

Protected Landscapes consist of the UK National Parks, National Landscapes and Areas of Outstanding Natural Beauty (AONBs). These estimates have been produced following the same methodologies as the local authority area estimates as far as possible, and where there are differences these are given in the technical report that accompanies this publication.

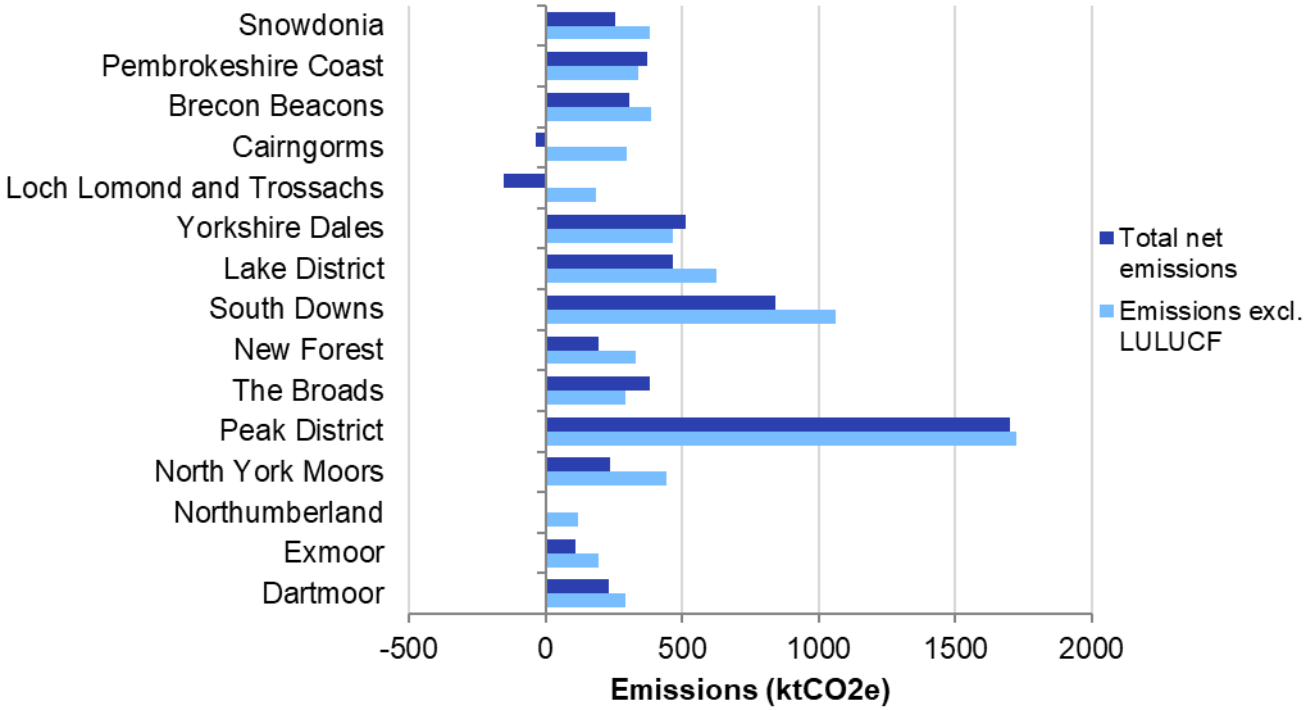
There are 15 National Parks in the UK, of which 10 are in England, 3 in Wales and 2 in Scotland. There are 38 National Landscapes in England and Wales (which were known as AONBs until 2023) and 8 AONBs in Northern Ireland.

Protected Landscapes are more rural than many other areas of the country so have different characteristics when compared to most local areas. Relative to their size, they have lower levels of greenhouse gas emissions than more built-up areas. In 2023, average emissions per km^2 were 0.2 ktCO2e across the National Parks and 0.6 ktCO2e across the National Landscapes & AONBs. In comparison, the average emissions per km^2 across all local authority areas in the UK in 2023 was 1.4 ktCO2e.

However, Protected Landscapes have higher emissions relative to the size of their populations, averaging 12.4 tCO2e per capita in 2023 in National Parks and 10.7 tCO2e per capita in National Landscapes and AONBs. Meanwhile, the UK average was 5.2 tCO2e per capita in 2023. The LULUCF sector is also more prominent in the emissions in Protected Landscapes, both as a source and as an emission sink in different areas.

Figure 19 shows the net greenhouse gas emission totals in 2023 in the 15 National Parks, both including and excluding LULUCF. The Peak District has the largest total emissions, 64% of which were from the industry sector. LULUCF acts as a net emissions sink in 12 of the 15 National Parks, and in the Cairngorms and in Loch Lomond and Trossachs results in the total net emissions being negative.

Figure 19: Net greenhouse gas emissions in National Parks including and excluding LULUCF, 2023



Source: Table 6.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Reconciliation with the UK inventory

Local area estimates are designed to be as consistent as possible with the national inventory for the UK. However, some differences are unavoidable.

Several emission sources included in the UK inventory are not included in the local area estimates. Excluded sources are principally linked to aviation and shipping.

A small proportion of the gas and electricity consumption allocated to the domestic sector in these estimates is attributed to commercial buildings in the UK inventory. This is because it is not possible to distinguish between domestic customers and smaller businesses in the meter point consumption data used in these local estimates.

Table 8 shows a summary of the reconciliation between the UK inventory and the local authority area estimates. The different elements of this reconciliation should be interpreted as follows:

- **"Excluded"** are the sectors that have been deliberately excluded from the local area allocation, as it would not have been appropriate to include them, or in the case of fluorinated gases because data are not available to be able to estimate emissions at a local area level.

- **"Unallocated methodological differences"** are differences which have become apparent due to the different methodological approaches used in deriving the UK Inventory and local area estimates. These include gas and electricity consumption

which cannot be allocated to local authorities due to confidentiality concerns at high emitting sites or incomplete address information for individual meters, some landfill emissions for which data are not available showing which local authorities the waste originated in, and harvested wood products.

- **"Methodological differences"** are the methodological differences that have caused discrepancies between the national inventories and the local authority and Protected Landscape estimates. These are explained after the UK reconciliation table.

Table 8: Reconciliation of 2023 local authority area emissions estimates with UK inventory

MtCO2e

	Details	Totals
Emissions allocated to local authority areas		**356.4**
Unallocated methodological differences:		
Large electricity users with unknown location	0.6	
Unallocated consumption	-0.9	
Total unallocated		-0.3
Total UK emissions (local level method)		**356.1**
Excluded from local allocation:		
Domestic shipping	4.6	
Domestic aviation	1.3	
Military transport	1.6	
Exports	6.6	
International aviation and shipping	3.6	
Fluorinated gases	7.0	
Total excluded		24.8
Methodological differences:		
Industrial sector	13.6	
Commercial sector	-5.3	
Public sector	1.3	
Agriculture sector	-0.5	
Domestic sector	-4.5	
Transport sector	-0.6	
Waste sector	0.2	
LULUCF sector	0.0	
Total methodological differences		4.1
UK total greenhouse gas emissions		**385.0**

Source: Tables 1.1 and 4.1, UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 Excel data tables

Main differences between the local authority and Devolved Administrations datasets

This section of the report describes where there are unavoidable differences between the methodologies used in the estimation of emissions for these local authority greenhouse gas emissions statistics, and for the Devolved Administration emissions datasets that show emission estimates for the four countries of the UK[12].

[12] https://naei.energysecurity.gov.uk/greenhouse-gases/devolved-administration-greenhouse-gas-emissions

The following section sets out where and why these differences occur.

Gas and electricity consumption data

The definitions used for domestic and industrial and commercial consumers differ between the two datasets. In the local authority greenhouse gas dataset, the split is as defined by the DESNZ sub-national energy consumption dataset which are not fully consistent with the national energy data presented in Digest of UK Energy Statistics (DUKES)[13]. The Devolved Administration greenhouse gas inventories, however, are based on electricity consumption statistics for each country which are available in the electricity generation and supply section of the DESNZ Energy Trends[14] publication and are fully consistent with DUKES data for major power producers. These two underlying datasets are not fully consistent and therefore result in differences between the local authority dataset and the Devolved Administration inventories for gas and electricity use, as described below.

Unallocated gas and electricity consumption data

In the sub-national energy datasets, some gas data cannot be allocated to local authority areas, due to reasons of confidentiality. In part, these gaps in the emissions estimates are filled through the point source database (mentioned above). However, in doing so, this introduces some uncertainty. In the Devolved Administration inventories though, there is no unallocated consumption; point source data is supplemented by employment and other surrogate data to allocate all the national fuel use between the four countries.

In the local authority dataset, some electricity consumption data cannot be allocated to local authorities. This is due to both commercial confidentiality concerns for high-consuming sites, and where address information is incomplete. In these instances, these data are therefore assigned to the ‘unallocated’ category. The Devolved Administration inventories, on the other hand, report emissions against a wider geographical coverage, effectively negating the data disclosure concerns, and hence there is no need to exclude specific emissions from them.

Unallocated LULUCF data

Harvested wood products can be allocated to particular countries but not to particular local authorities. Within the local authority greenhouse gas dataset, these emissions/removals are therefore assigned to the 'unallocated' category. These are the differences which can be seen in each of the reconciliation tables (4.1 to 4.5). All other LULUCF estimates are fully consistent across UK, Devolved Administration and local authority data.

Use of additional gas data for Northern Ireland

Both datasets include consideration of gas consumption data supplied by Northern Ireland energy suppliers, which shows a large growth in gas use within Northern Ireland from 2006 onwards. The Devolved Administration inventory approach includes estimates for the fuel-switching from oil and solid fuels that this growth in gas use has displaced. In the local authority greenhouse gas data these estimates of fuel switching have not been possible, given

[13] For the definitions used in DUKES see DUKES 2024:
https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2024
[14] https://www.gov.uk/government/collections/energy-trends

the greater level of detail required by the data, and the UK emissions distribution grids have been used solely.

Distribution of 'other fuels' across countries

There are some areas where emissions allocation methods differ between the two datasets due to the availability of data.

In the iron and steel sector, the methodology used for the local authority greenhouse gas emissions assumes that all emissions from the iron and steel sector from industrial processes, process gases and solid fuels occur at large point sources. Emissions from the consumption of oil in the iron and steel sector are mapped using a combination of point sources and area sources (as described in the technical report). In the Devolved Administration inventories, fuel use data supplied by the Iron and Steel Statistics Bureau (ISSB) is used, since it is available on a country basis.

For domestic solid fuel combustion, the Devolved Administration inventory estimates use the energy modelling work based on the 2021 census and the 2023 Defra Solid Fuel Survey[15], which also underpins the local authority estimates. This results in more consistent reporting between local authority greenhouse gas emissions and the Devolved Administration inventory emissions. However, some differences remain for solid and liquid fuels due to different compilation methods and fuel aggregations; the local authority greenhouse gas dataset takes a more bottom-up approach to disaggregating smokeless solid fuels according to the location of smokeless zones, for example.

Point sources

There are also some differences between the estimates of emissions at large point sources and those in the national totals. An explanation for these differences is provided in the technical report.

Methodological improvements since last year and revisions to the data for 2005 to 2023

In the production of the 2023 estimates, new data were introduced, together with some improvements to the underlying methodology. To ensure that the data for 2005 to 2022 are consistent with the data now available for 2023, the estimates for these years have been revised to incorporate both the new data and the improvements in the underlying methodology. For some local authority areas, these revisions have resulted in noticeable changes to the emissions estimates in the earlier years for some sectors. More information and specific examples are given in the technical report.

Distribution grid improvements

Several distribution grid improvements were implemented this year, including census updates and new non-road mobile machinery (NRMM) grids for the ‘transport ‘other’’ category. Due to

[15] https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21760

the latest Scotland Census occurring in 2022, census Output Area (OA) geographies across the UK were only available for the first time this NAEI year (2023). This update affects how data at an OA level is distributed to a 1x1 km grid level. In turn, these 1x1 km grids are combined with local authority area boundaries to allocate national emissions to local authority areas where required.

To align with the NAEI, new grids were generated for specific NRMM categories. These improved grids, such as the seaports grid, allocate emissions less generally when compared to the previous employment-based industry grid used to allocate NRMM.

Land use, land use change and forestry

There have been several methodological updates to the LULUCF sector this year. The more notable revisions include:

- Several updates to the forest carbon accounting model, including improved early growth estimates, incorporation of carbon from branches on dead trees into the soil, increases in the decay rate of dead branches and updates to the calculation of the anaerobic conditions soil water availability modifier.
- Updates to rewetting data, including new forest to wetland data for Northern Ireland (this is the first year for which this data has been available). Split of rewetted fen to grassland and wetland for the first time.

Details of the methodologies used to estimate the land use, land use change and forestry emissions are outlined in the *Mapping greenhouse gas emissions and removals for the land use, land-use change & forestry sector* report that accompanies this publication.

Large industrial installations

There is a programme of continuous improvement and revisions have been made to the point source data for 2005-2022 in a few instances where additional data have become available, or where other changes (such as changes to the methodology of the UK Greenhouse Gas inventory) have an impact on the point source data. Most point source data, however, will be unchanged from the values used in the previous version of these statistics.

Accompanying tables

The following tables are available in Excel and ODS format on the UK local and regional greenhouse gas emissions statistics collection page on GOV.UK:

Local authority greenhouse gas emissions

Table 1.1	Local authority territorial greenhouse gas emissions estimates 2005-2023
Table 1.2	Local authority territorial carbon dioxide (CO2) emissions estimates 2005-2023
Table 1.3	Local authority territorial methane (CH4) emissions estimates 2005-2023
Table 1.4	Local authority territorial nitrous oxide (N2O) emissions estimates 2005-2023

Emissions within the scope of influence of local authorities

Table 2.1	Local authority territorial carbon dioxide (CO2) emissions estimates within the scope of influence of local authorities 2005-2023 - Subset dataset (Excludes large industrial sites, railways, motorways, land-use, livestock and soils)

Sector scope

Table 3.1	Scope of the local authority emission sectors used in these statistics
Table 3.2	Intergovernmental Panel on Climate Change (IPCC) sectors from the UK Greenhouse Gas Inventory which are covered by the local authority greenhouse gas emission statistics

Reconciliation of national totals in local authority greenhouse gas emissions statistics with those in national end user inventories

Table 4.1	Reconciliation of 2023 local authority territorial greenhouse gas emissions estimates with full end user UK Greenhouse Gas Inventory, by fuel and sector
Table 4.1 Notes	Notes on the methodological differences and differences in categorisation between local authority estimates and UK estimates in table 4.1
Table 4.2	Reconciliation of 2023 local authority territorial greenhouse gas emissions estimates with end user inventory for England, by fuel and sector
Table 4.3	Reconciliation of 2023 local authority territorial greenhouse gas emissions estimates with end user inventory for Scotland, by fuel and sector
Table 4.4	Reconciliation of 2023 local authority territorial greenhouse gas emissions estimates with end user inventory for Wales, by fuel and sector
Table 4.5	Reconciliation of 2023 local authority territorial greenhouse gas emissions estimates with end user inventory for Northern Ireland, by fuel and sector

Pollution inventory

Table 5.1	Pollution Inventory 'by source' emissions, not consistent with local authority emissions by end-user

National Park greenhouse gas emissions

Table 6.1	National Park territorial greenhouse gas emissions estimates, 2005-2023
Table 6.2	National Park territorial carbon dioxide (CO2) emissions estimates, 2005-2023
Table 6.3	National Park territorial methane (CH4) emissions estimates, 2005-2023
Table 6.4	National Park territorial nitrous oxide (N2O) emissions estimates, 2005-2023

National Landscape and Area of Outstanding Natural Beauty greenhouse gas emissions

Table 7.1	National Landscape and Area of Outstanding Natural Beauty territorial greenhouse gas emissions estimates, 2005-2023
Table 7.2	National Landscape and Area of Outstanding Natural Beauty territorial carbon dioxide (CO2) emissions estimates, 2005-2023
Table 7.3	National Landscape and Area of Outstanding Natural Beauty territorial methane (CH4) emissions estimates, 2005-2023
Table 7.4	National Landscape and Area of Outstanding Natural Beauty territorial nitrous oxide (N2O) emissions estimates, 2005-2023

Technical information

The full set of data tables and methodology documents that accompany this statistics release can be found at: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2023.

Several supplementary reports are also available for local authority area emissions. These are for users to refer to if they want more information on the methodology for producing the estimates:

- **2005-2023 UK local and regional greenhouse gas emissions technical report**
  - A report detailing the methodology used to produce the local and regional emissions estimates.

- **Employment based energy consumption mapping in the UK**
  - A report detailing the methodology used to map emissions from smaller industrial and commercial sources.
- **Mapping greenhouse gas emissions and removals for the land use, land use change & forestry (LULUCF) sector**
  - A report detailing the methodology used to produce local and regional LULUCF emissions estimates.

The following user guidance is available for sub-national emissions: Sub-national emissions statistics: Frequently asked questions.

Further information on UK greenhouse gas emissions statistics can be found at: https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions-statistics.

This statistical release and the related data tables are part of the National Atmospheric Emissions Inventory (NAEI) produced for the Department for Energy Security & Net Zero and the Devolved Administrations by Ricardo. For further information on the UK Greenhouse Gas Inventory, see the NAEI website: https://naei.energysecurity.gov.uk/.

Given the number of local authorities and Protected Landscapes, this statistical release does not provide a detailed explanation of all revisions to the historical data series or the year-on-year changes for each area. However, explanations of the reasons for any changes are available on request; any such requests should be sent to the following email address: GreenhouseGas.Statistics@energysecurity.gov.uk.

Further information

Future updates to these statistics

The next UK local and regional greenhouse gas emissions estimates, covering the period 2005-2024, will be published in June 2026.

In February 2026, DESNZ will publish final 1990-2024 UK territorial greenhouse gas emissions estimates by source sector. A summary of any planned methodology changes will be published in advance of that in January 2026.

In March 2026, DESNZ will publish a breakdown of 1990-2024 UK territorial greenhouse gas emissions with energy supply emissions on an end-user basis to supplement the source sector breakdown and provisional estimates of UK territorial greenhouse gas emissions for 2025 will be published.

In June 2026, DESNZ will publish estimates of 1990-2024 UK territorial greenhouse gas emissions by Standard Industrial Classification to supplement the source sector breakdown.

Related statistics

Devolved Administration Greenhouse Gas Inventories

Greenhouse gas emissions inventories are available for England, Scotland, Wales and Northern Ireland on the NAEI website: https://naei.energysecurity.gov.uk/greenhouse-gases/devolved-administration-greenhouse-gas-emissions.

Final UK greenhouse gas emissions statistics

This publication provides the latest estimates of UK greenhouse gas emissions by source sector (published in February each year) and by end user (published in March): https://www.gov.uk/government/collections/uk-territorial-greenhouse-gas-emissions-statistics

Provisional UK greenhouse gas emissions statistics

Published in March each year, this publication provides initial estimates of the previous year's greenhouse gas emissions: https://www.gov.uk/government/collections/uk-territorial-greenhouse-gas-emissions-statistics

Sub-national energy consumption statistics

Several publications are produced by DESNZ estimating energy consumption by local authority, which are used in the production of the UK local authority greenhouse gas emissions estimates:

- Electricity consumption statistics for Great Britain and for Northern Ireland: https://www.gov.uk/government/collections/sub-national-electricity-consumption-data,
- Gas consumption statistics for Great Britain and for Northern Ireland: https://www.gov.uk/government/collections/sub-national-gas-consumption-data,

- Road transport fuel consumption statistics for the United Kingdom: https://www.gov.uk/government/collections/road-transport-consumption-at-regional-and-local-level,
- Residual fuel (non-electricity, non-gas, non-road transport fuels) consumption for the United Kingdom: https://www.gov.uk/government/collections/sub-national-consumption-of-other-fuels,
- Total final energy consumption statistics for the United Kingdom: https://www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level.

Revisions policy

The DESNZ statistical revisions policy sets out the revisions policy for these statistics, which has been developed in accordance with the UK Statistics Authority Code of Practice for Statistics.

User engagement

Users are encouraged to provide comments and feedback on how these statistics are used and how well they meet user needs. Comments on any issues relating to this statistical release are welcomed and should be sent to: GreenhouseGas.Statistics@energysecurity.gov.uk

The DESNZ statement on statistical public engagement and data standards sets out the department's commitments on public engagement and data standards as outlined by the Code of Practice for Statistics.

Accredited Official Statistics designation

Accredited official statistics are called National Statistics in the Statistics and Registration Service Act 2007.

These accredited official statistics were independently reviewed by the Office for Statistics Regulation (OSR) in June 2014 and had their accreditation reviewed in September 2018. They comply with the standards of trustworthiness, quality and value in the Code of Practice for Statistics and should be labelled 'accredited official statistics'.

Our statistical practice is regulated by the OSR.

OSR sets the standards of trustworthiness, quality and value in the Code of Practice for Statistics that all producers of official statistics should adhere to.

You are welcome to contact us by emailing GreenhouseGas.Statistics@energysecurity.gov.uk with any comments about how we meet these standards.

Alternatively, you can contact OSR by emailing regulation@statistics.gov.uk or via the OSR website.

Pre-release access to statistics

Some ministers and officials receive access to these statistics up to 24 hours before release. Details of the arrangements for doing this and a list of the ministers and officials that receive pre-release access to these statistics can be found in the DESNZ statement of compliance with the Pre-Release Access to Official Statistics Order 2008.

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This publication is available from: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2023.

If you need a version of this document in a more accessible format, please email GreenhouseGas.Statistics@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.