Department for Business, Energy & Industrial Strategy

UK local authority greenhouse gas emissions estimates 2020

30 June 2022 **National Statistics**

This publication presents the latest estimates of end-user greenhouse gas emissions for local authority areas in the UK for 2005-2020. Previous versions of this publication only covered carbon dioxide (CO_2) emissions, but it has been expanded this year to also include estimates of methane (CH_4) and nitrous oxide (N_2O). Although in this report trends going back to 2005 are still presented for CO_2 emissions since estimates are not available before 2018 for some emission sources for these gases. Estimates of emissions in National Park areas have also been published as part of this release for the first time.

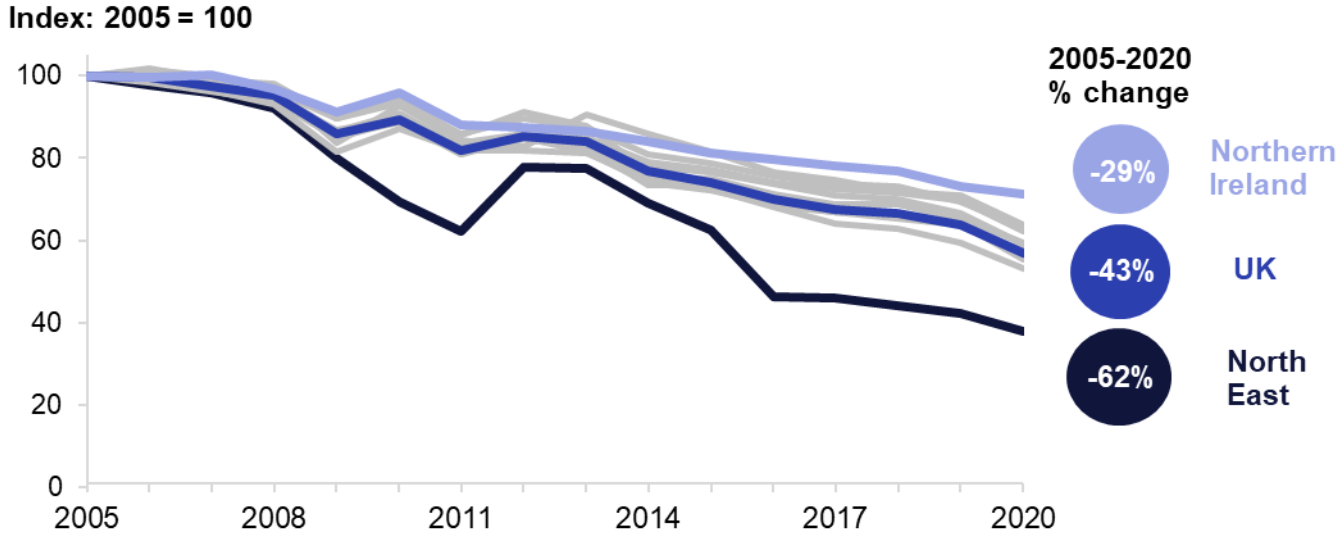
The main findings from the statistics are:

- Between 2019 and 2020, greenhouse gas emissions decreased in 371 out of the 374 local authorities in the UK (99%). This is consistent with the decrease in overall UK emissions in 2020, which fell by 9% largely due to reductions in road traffic and business activity as a result of the coronavirus (COVID-19) pandemic and the resulting restrictions.

- Overall in 2020, 28% of end-user greenhouse gas emissions assigned to local authority areas were attributed to transport, 25% to the domestic sector, 19% to industry, 12% to agriculture and 6% to the commercial sector. There are wide local variations, mainly because of the economy and geography of different local areas. The transport sector had the highest share of end-user greenhouse gas emissions in 41% of authorities, the domestic sector had the highest share in 33%, the agriculture sector in 15% and the industrial sector in 9% of authorities.

- Between 2005 and 2020 end-user CO_2 emissions fell by 29% in Northern Ireland, 36% in Wales, 44% in England and by 45% in Scotland. The North East of England was the region with the largest fall in emissions over this period at 62%, in part due to industrial closures.

Figure 1: End-user carbon dioxide emissions by region



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Introduction

This National Statistics publication provides the latest estimates of territorial greenhouse gas emissions for local authority and National Park areas for 2005-2020. 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, which can be found at the link below: https://www.gov.uk/government/collections/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics

This year we have included estimates of methane (CH_4) and nitrous oxide (N_2O) emissions in these statistics for the first time, in addition to the carbon dioxide (CO_2) emissions estimates which were published previously. Estimates of emissions within National Park areas have also been included in the statistics for the first time. For many emission sources of methane and nitrous oxide it has been possible to produce estimates going back to 2005 in line with the carbon dioxide estimates, but for landfill and agriculture, the two largest sources of non-CO_2 emissions, we only have estimates available from 2018. Emissions of fluorinated gases are also not available at a local authority level so are excluded from these statistics. In our latest UK territorial greenhouse gas emission statistics they accounted for around 3% of greenhouse gas emissions in the UK in 2020.

In accordance with international reporting and carbon trading protocols, emissions from each of the gases is weighted by its global warming potential (GWP)[1], so that total greenhouse gas emissions can be reported on a consistent basis. The GWP for each gas is defined as its warming influence relation to that of carbon dioxide over a 100-year period. Greenhouse gas emissions are then presented in carbon dioxide equivalent units (CO_2e).

Emissions have been assigned to all 374 local authorities in the UK: 309 of these are in England, 32 in Scotland, 22 in Wales and 11 in Northern Ireland. The statistics show emissions allocated on an “end-user” basis where emissions are distributed to sectors and locations according to the point of energy consumption (or point of emission if not energy related). 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 exported will be included, and emissions from the production of goods which are imported are excluded.

Emissions from waste management have been spatially distributed using an approach analogous to the fuel end-user basis, distributing UK total emissions from waste management proportionally to the waste arising in each local authority, 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 local authority.

The UK compiles an annual inventory of its greenhouse gas emissions to monitor progress against domestic and international targets such as the Kyoto Protocol. 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

[1] The global warming potentials (GWPs) used are from Working Group 1 of the IPCC Fourth Assessment Report: Climate Change 2007 and summarised in a table published on the following page: https://www.gov.uk/government/publications/uk-greenhouse-gas-emissions-explanatory-notes

publication combines data from the UK's greenhouse gas inventory with data from a number of other sources, including local energy consumption statistics, to produce a nationally consistent set of greenhouse gas emissions estimates at local authority level.

The statistics are largely consistent with the UK national greenhouse gas inventory and with the Devolved Administration (DA) greenhouse gas 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 DA level, you should use the UK[2] or DA[3] inventories rather than this publication.

These statistics cover the period from 2005 to 2020. A consistent time series has been produced by re-calculating the 2005 to 2019 estimates to reflect the methodological changes used in calculating the 2020 estimates. This is important as it allows changes to be monitored over time.

Full details of the results and methodology are available in the supplementary reports and files 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 emissions from local authority 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 their greenhouse gas emissions trends 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. For all these reasons, these statistics should be interpreted with caution. However, 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 authorities have little impact at 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 than at the local level.

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

- Unallocated electricity, where electricity sales within the sub-national dataset cannot be successfully allocated to specific local authorities due to lack of information.

[2] Final UK greenhouse gas emissions, 1990-2020
https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2020
[3] Devolved Administration Greenhouse Gas Inventories: https://naei.beis.gov.uk/reports/reports?report_id=1080

- 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 largely has to be 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 authorities in Northern Ireland.

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

2020 emissions

Estimates of greenhouse gas emissions have been produced for each local authority and National Park in the UK from the following broad source categories:

- Industry (including electricity-related emissions)
- Commercial (including electricity-related emissions)
- Public sector (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 management (distributed based on the waste arising in each local authority)

The level of sectoral detail is constrained by BEIS 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 Technical Report in order to provide additional insight into how the estimates are constructed.

2020 emissions by region

Figure 2 shows a summary of the end-user greenhouse gas emissions by region and sector. Results for individual local authorities can be found in the spreadsheet published alongside this statistics release. There is a great deal of variation between local authorities. In particular a significant amount of industrial emissions are concentrated in a few areas, so the contribution of industrial and commercial emissions for specific local authorities may be different from the regional averages.

The overall reduction since 2019 in end-user greenhouse gas emissions allocated to local authorities in the UK was 9.2%, largely as a result of the COVID-19 pandemic and the resulting restrictions. The largest overall reduction in emissions since 2019 was seen in the South East

(down 11.1%). This was largely due to a decrease in transport emissions following the reduction in road traffic.

Figure 2: End-user greenhouse gas emissions by region and sector, 2020

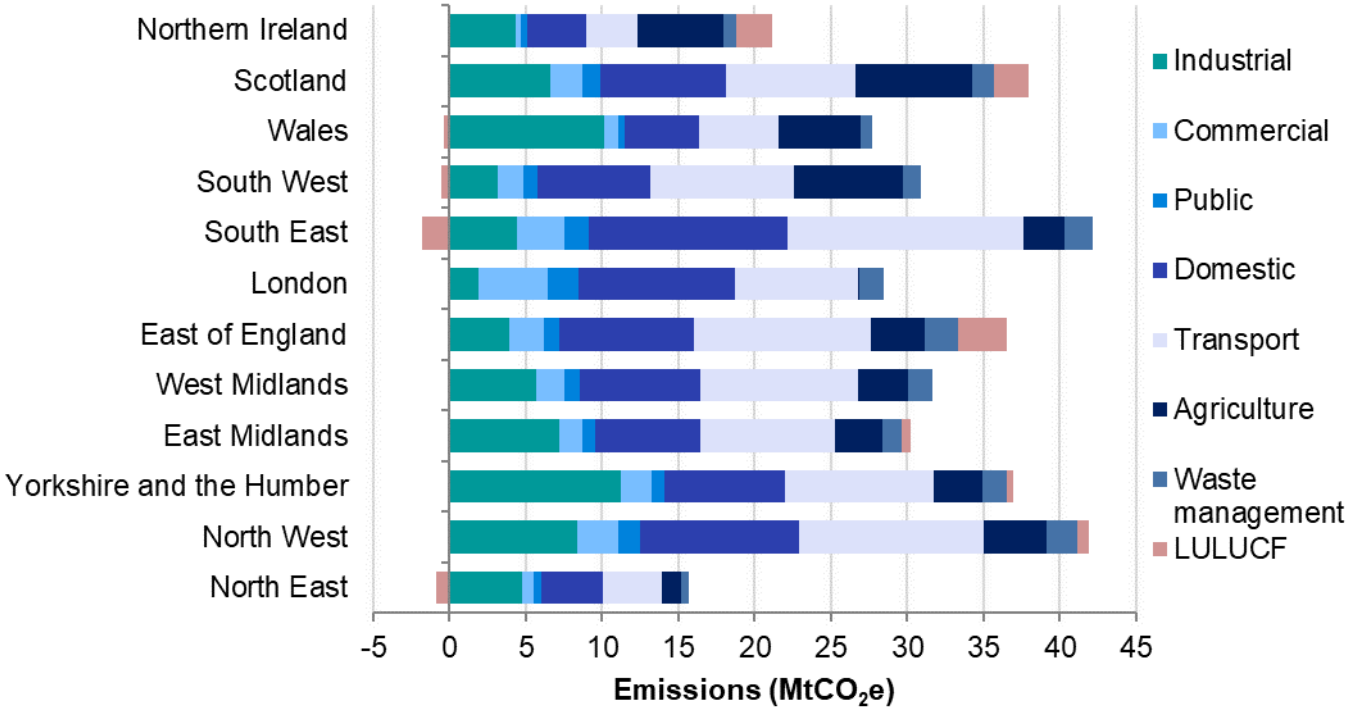


Figure 3 shows annual greenhouse gas emissions per capita to make some allowance for the different sizes of regions. However, it should be noted that while greenhouse gas emissions per capita may be a useful measure for domestic emissions, emissions from other sources are driven by many factors other than resident population. Therefore, industrial, commercial, public and transport emissions per capita should be interpreted with caution.

Emissions per capita allow comparison between areas of different population size. There was an overall reduction in end-user greenhouse gas emissions per capita in the UK of 9.6% in 2020, largely as a result of the COVID-19 pandemic and the resulting restrictions. Wales, Northern Ireland, and Scotland have the highest annual emissions per capita. This is mainly due to higher emissions per capita from the industrial and agriculture sectors, while in Northern Ireland the per capita emissions from the domestic and LULUCF sectors are also higher than the UK average.

London has the lowest per capita emissions, as the urban nature of the transport system and the high population density results in lower emissions than the UK average when total emissions, including non-domestic emissions, are spread across residents. Additionally, in London there are a greater proportion of residential areas which means that large industrial facilities are unlikely to be located there, which contributes to the low per capita emissions. Figure 4 shows how total emissions are split across the various regions. The highest emission totals are in the North West and South East of England, each accounting for around 11% of emissions in the UK, while the smallest emission totals are in the North East (4% of the UK total) and in Northern Ireland (6%).

Figure 3: Annual per capita end-user greenhouse gas emissions by region and sector, 2020

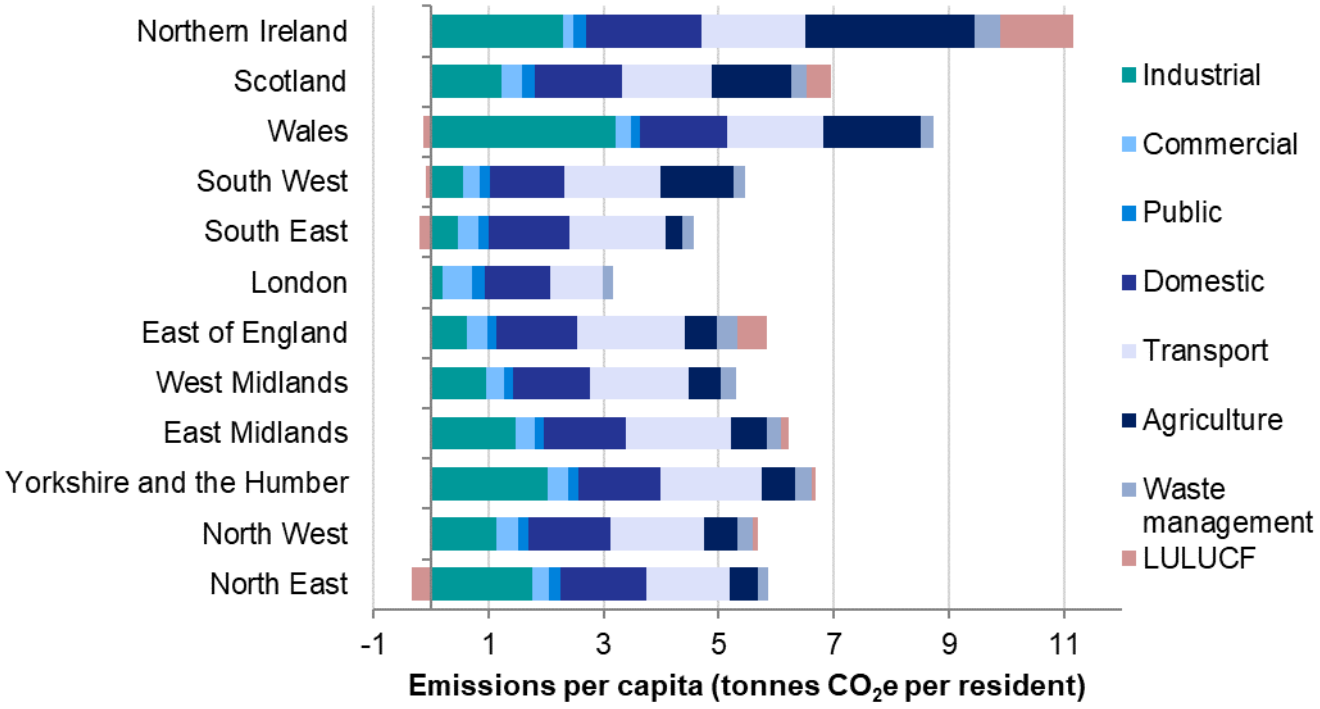
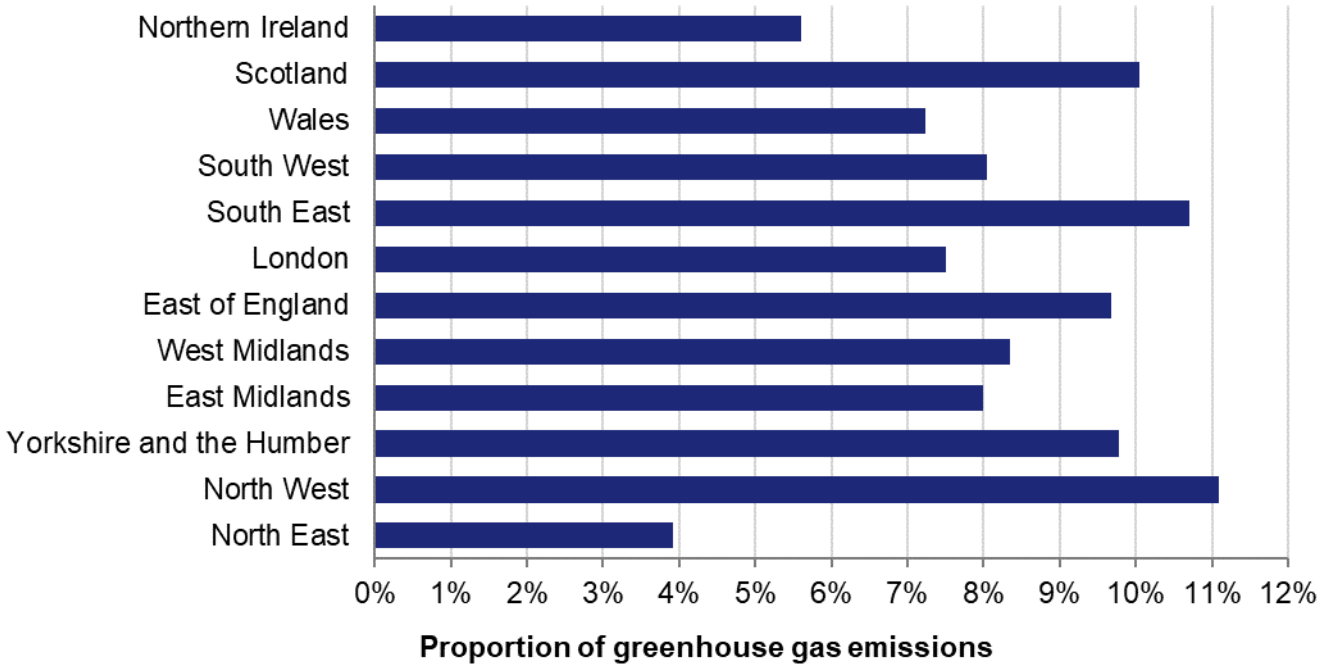


Figure 4: Proportion of UK end-user greenhouse gas emissions in each region: 2020



Note: Unallocated emissions are not shown in this figure.

2020 emissions by local authority

As the map in Figure 6 on the next page shows, annual emissions per capita can vary noticeably between regions in the UK. When looked at on this basis, the local authority areas with the highest emissions per capita are a mixture of those with large industrial sites and those with relatively low populations compared to the size of the area or the activities that take place there that produce emissions. The latter group are often in more rural areas, although the local authority with the highest greenhouse gas emissions per capita in 2020 was the City of London, with 53.4 tCO_2e per person, which has a very high level of commercial activity compared to its resident population. Conversely, the areas with the lowest emissions per capita are typically built-up areas with high resident populations, with the lowest level of emissions in 2020 being in Hackney, which had emissions of 2.1 tCO_2e per person.

Emissions can also be looked at relative to the area of each local authority, as shown in Figure 7. On this basis the local authorities with the highest emissions per km^2 of area are a mixture of built-up city areas and those with large industrial sites, while the authorities with the lowest emissions per km^2 are in more rural areas. The City of London is also the local authority with the highest emissions on this basis, with greenhouse gas emissions of 185.5 tCO_2e per km^2, while the authority with the lowest figure was Highland with emissions of 0.1 tCO_2e per km^2.

Figure 5 shows for each sector the number of local authorities with different proportions of greenhouse gas emissions coming from that sector. The proportion of emissions attributable to each sector differs considerably across the local authorities. In 2020 there were 13 local authorities (3%) where industry accounted for over 50% of emissions, 10 (3%) where transport did, and 9 (2%) where agriculture did.

Figure 5: Sectoral breakdown of emissions: Number of UK local authorities by proportion of greenhouse gas emissions in each sector (excluding LULUCF), 2020

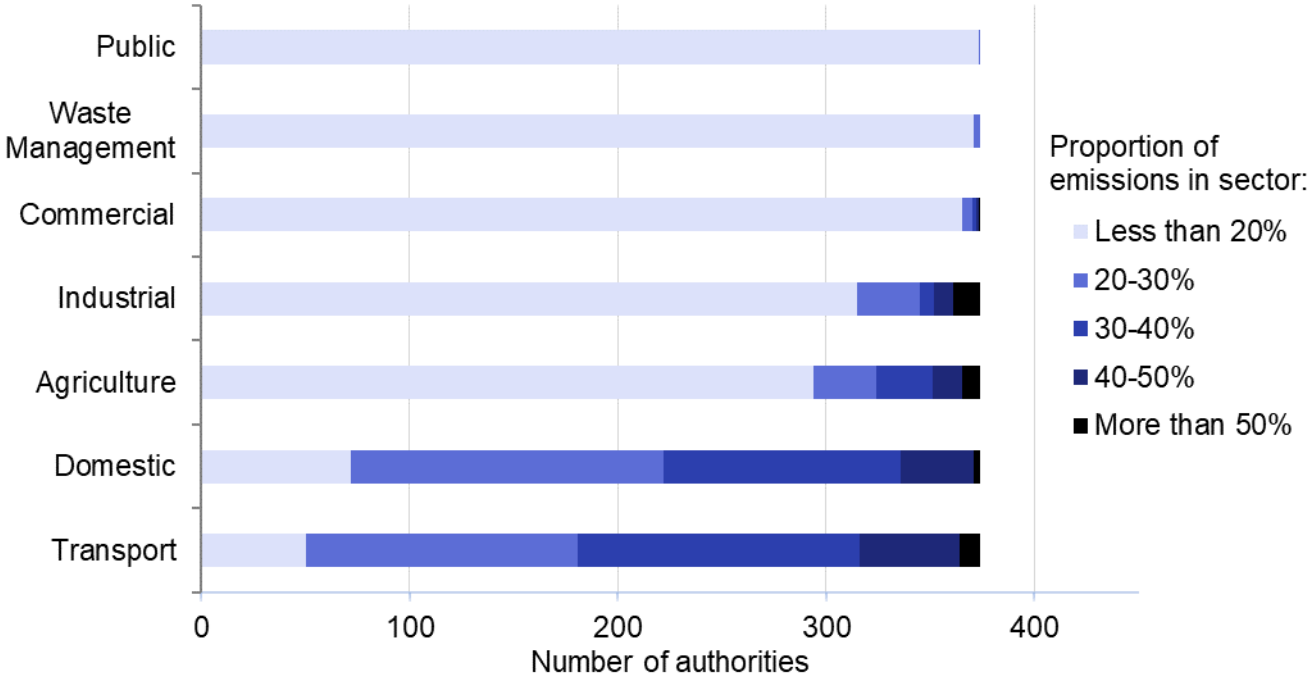


Figure 6: Net emissions of greenhouse gases per capita by local authority (tonnes CO_2e per capita) in 2020

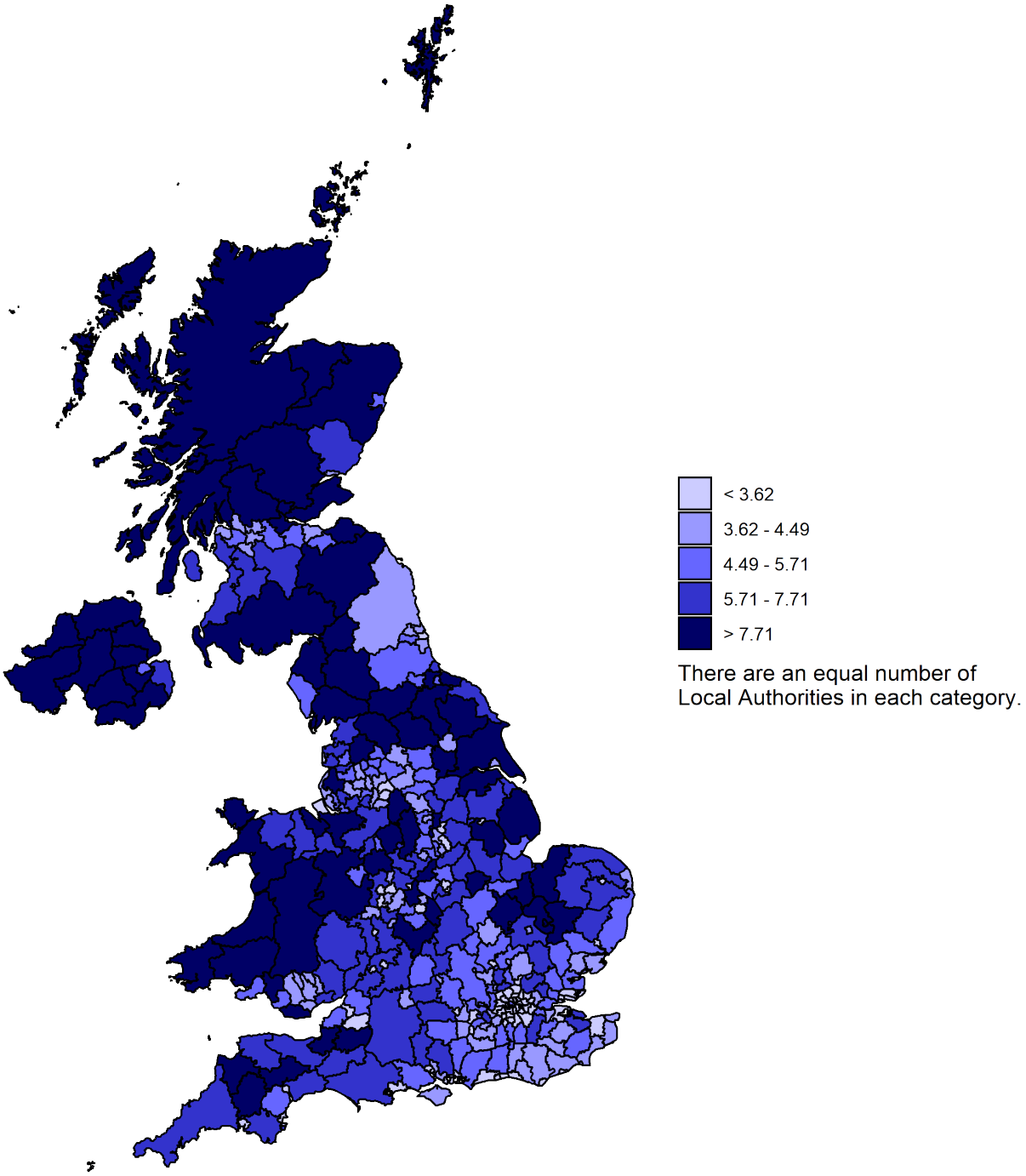
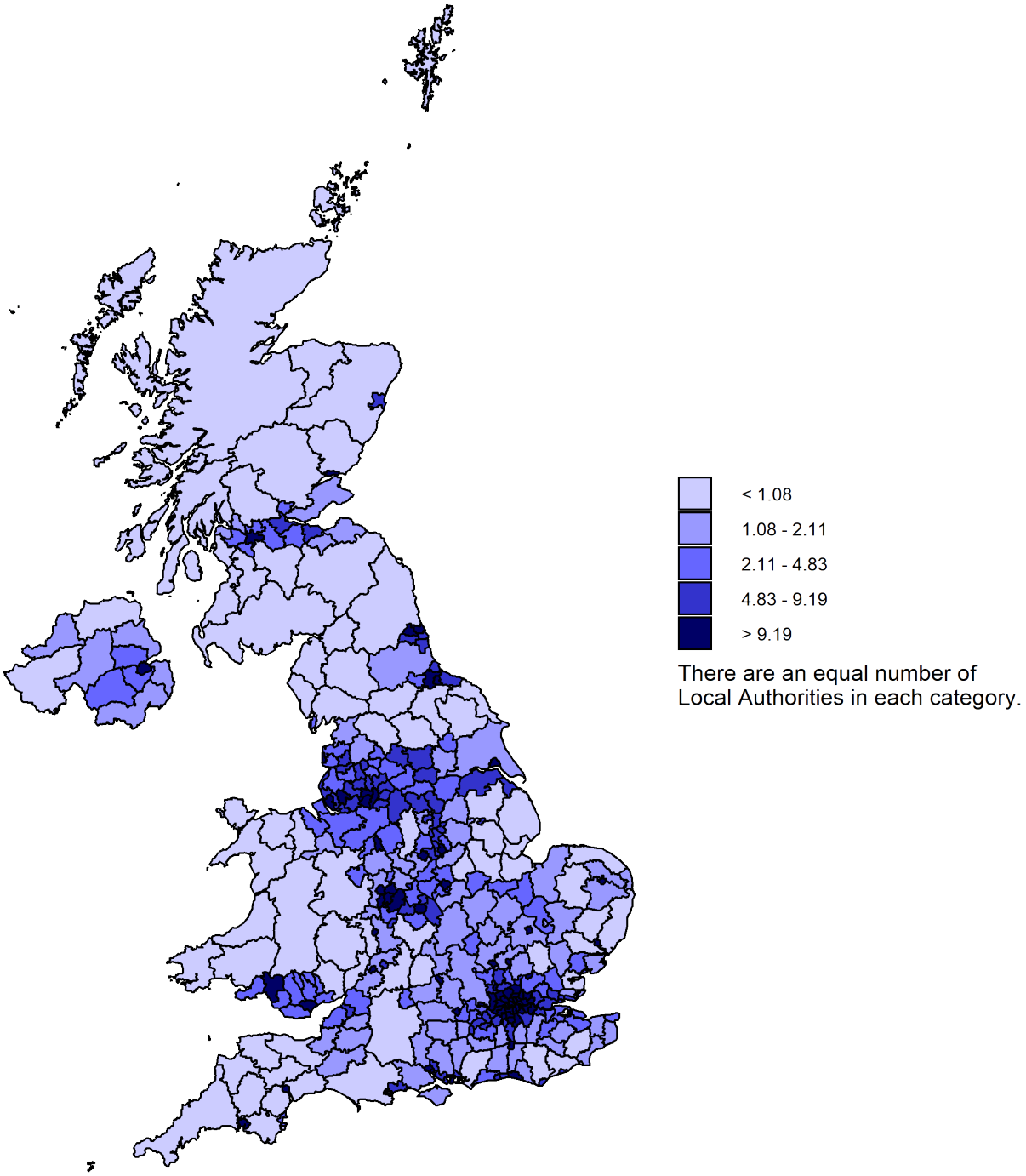


Figure 7: Net emissions of greenhouse gases per km^2 by local authority (tonnes CO_2e per km^2) in 2020



Domestic sector

In 2020, domestic sector greenhouse gas emissions were lower than in 2019 in 319 of the 374 local authorities (85%), while they increased in 55 (15%). The main driver for this was a

decrease in the use of coal and gas for electricity generation, which led to a decrease in emissions for domestic electricity, and the use of gas for heating decreased due to the warmer weather than in 2019[4]. In 2020, about 65% of domestic end-user emissions arose from gas use, 23% from electricity and 12% from consumption of other fuels.

Looking at longer term trends, national emissions of CO_2 from the domestic sector have decreased since 2005 and the same is true for all local authorities. The local authorities with the largest decreases in domestic sector end-user emissions since 2005 are Isles of Scilly (59%), Shetland Islands (55%) and Argyll and Bute (50%), having each reduced their emissions from domestic electricity by around two thirds. The larger falls in these areas are also partly because other local authorities have higher levels of domestic gas consumption, from which emissions have generally fallen more slowly than for electricity. Whereas the Isles of Scilly and Shetland Islands do not have a gas network, and Argyll and Bute has a high proportion of properties without a gas supply.

Emissions per capita for the domestic sector have the least variation between local authorities and are dominated by gas and electricity consumption. BEIS publishes sub-national metered domestic energy consumption data[5,6] which have been used to estimate emissions for the domestic sector for all local authorities related to 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 greenhouse gas emissions per capita in this sector across local authorities. There are slightly more local authorities in the lower categories than in 2019.

Table 1: Breakdown of UK local authorities by annual greenhouse gas emissions per capita in the domestic sector, 2019-2020

Number of local authorities, percentages

Tonnes of CO_2e per person	No. of LAs 2019	% of LAs 2019	No. of LAs 2020	% of LAs 2020
<1.0	7	2%	8	2%
1.0 to 1.5	209	56%	240	64%
1.5 to 2.0	150	40%	116	31%
2.0 to 2.5	8	2%	10	3%
Total	374	100%	374	100%

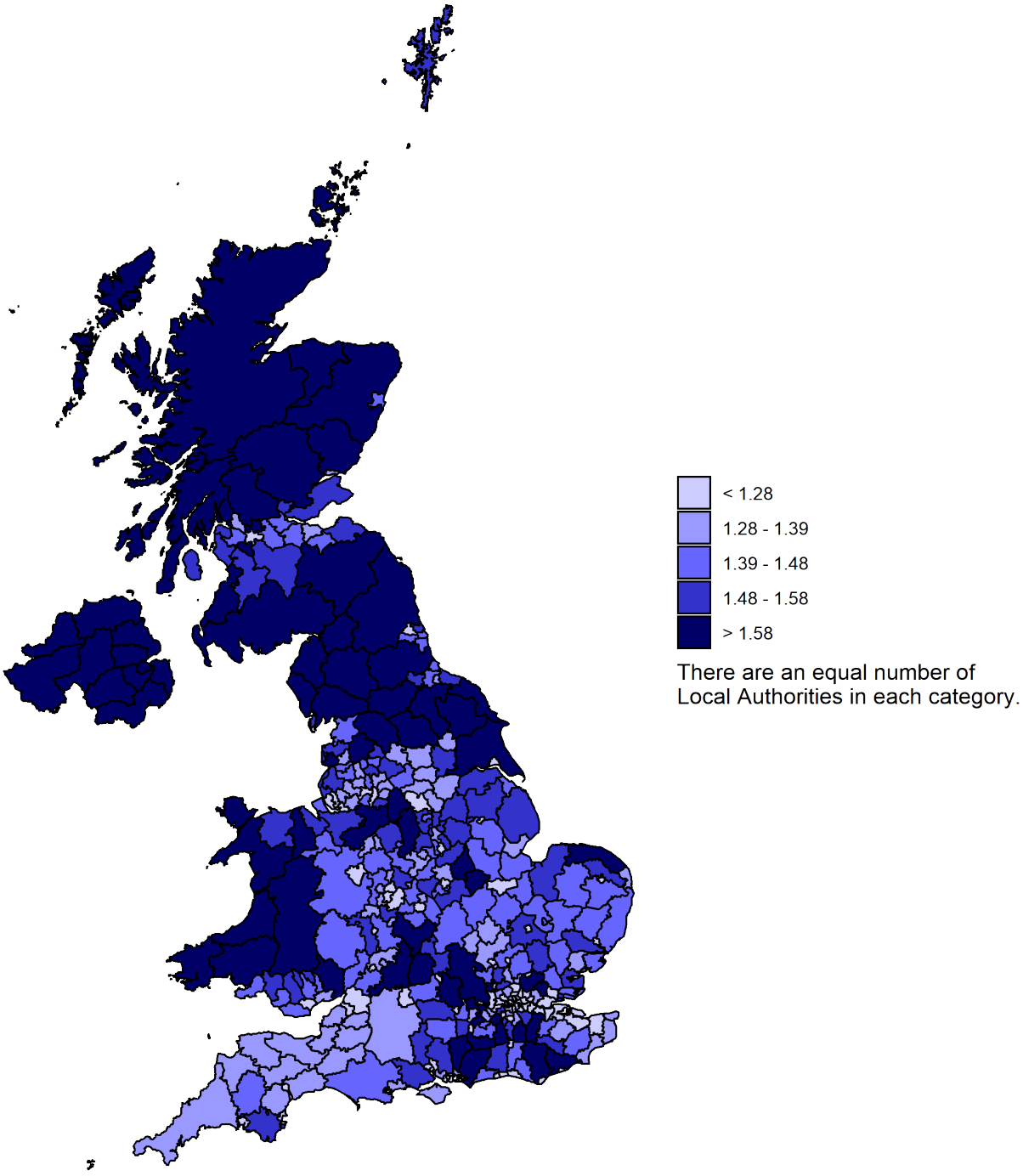
For 33% of local authorities (123 of 374) the domestic sector was the greatest contributor to end-use emissions in 2020. This sector can be influenced by the fuel types used, the type and condition of the housing (including its insulation), the average temperature (urban areas can be much warmer and therefore easier to heat than rural areas), average household size, type of household and the income and preferences of the occupiers.

As Figure 8 shows, in 2020, for the domestic sector, emissions per capita were higher in Scotland, Northern Ireland, and Wales than in England. Per capita emissions are high in Northern Ireland predominantly because there is limited availability of natural gas in this area; this results in the combustion of more carbon intensive fuels instead, such as coal, burning oil

[4] https://www.gov.uk/government/statistics/energy-trends-section-7-weather
[5] https://www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level
[6] 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

and gas oil, which are assigned to the domestic ‘other fuels’ sector. Wales also has a higher proportion of emissions from ‘other fuels’ than the rest of the UK, though to a lesser extent than Northern Ireland.

Figure 8: Domestic greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020



Transport sector

Transport emissions include freight and passenger transport, both for private and business purposes. The estimates are made on the distribution of traffic, therefore some of the emissions within an authority represent through traffic, or part of trips into or out of the area, whether by residents or non-residents. In some authorities this can be particularly significant, and this should be considered when looking at either totals or per capita estimates. 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.

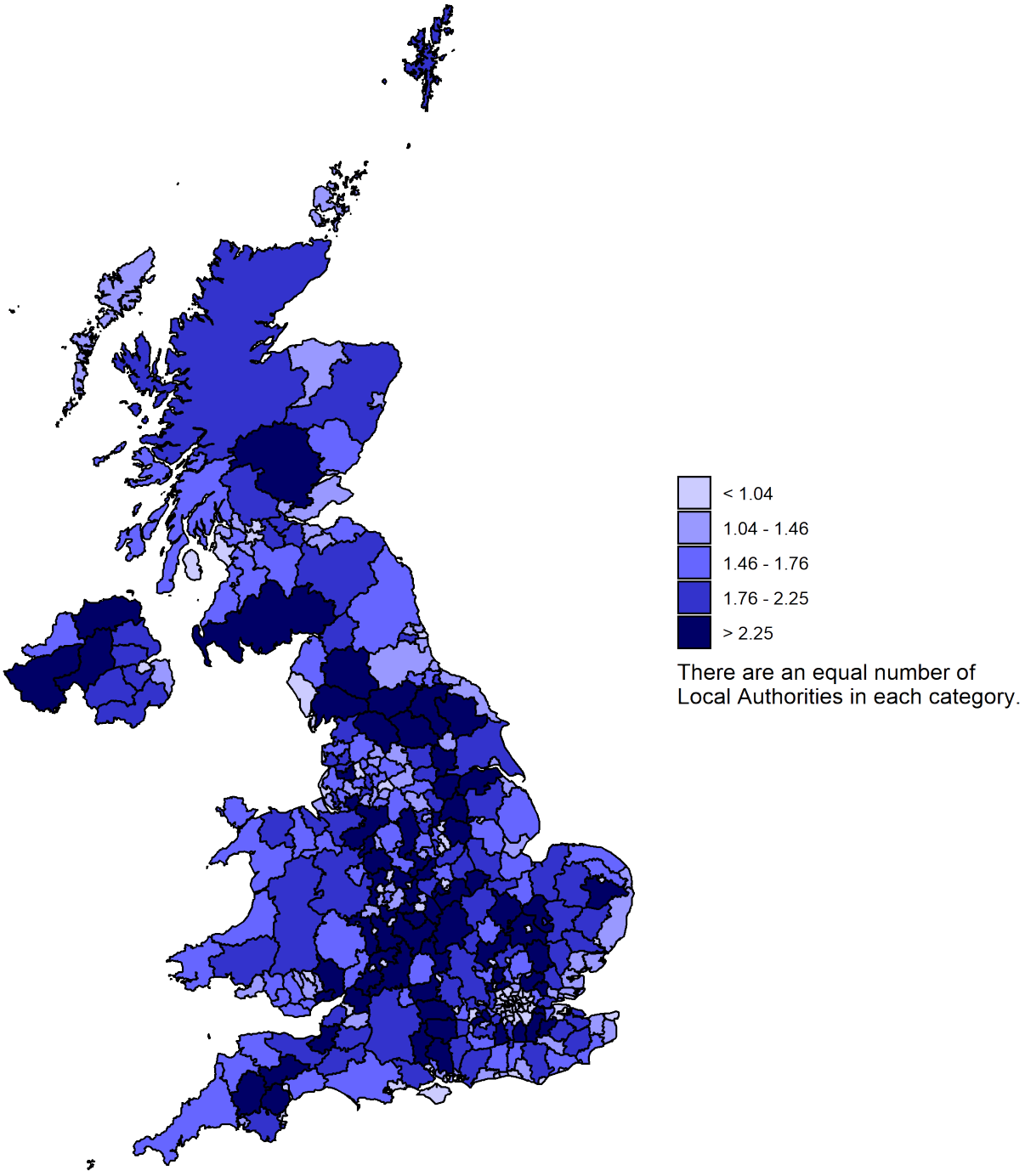
At a national level, transport greenhouse gas emissions saw a decrease of 18.0% in 2020 compared to 2019. This was largely due to the impact of the COVID-19 pandemic as people were instructed to stay at home as much as possible for large periods of 2020. Every local authority in the country saw a decrease in transport emissions. Despite this large fall, transport was the sector with the highest greenhouse gas emissions in 155 local authorities, 41% of the total.

Prior to the large fall in 2020, national transport emissions had decreased slightly since 2005, even though there had been an increase in both the number of passenger vehicles[7] and the vehicle kilometres travelled[8]. This is 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[9]. In 2020, 373 out of 374 local authorities had lower CO_2 emissions from transport than in 2005, with only the Isles of Scilly having higher emissions in 2020 than in 2005.

Figure 9 shows how greenhouse gas emissions per capita from transport vary around the UK. 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.

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

Figure 9: Transport greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020



Industrial sector

Industry accounted for 19% of greenhouse gas emissions in the UK in 2020 and in authorities with large industrial sites is a very significant source of emissions. In 2020, 82% of local authorities in the UK (308 out of 374) experienced a decrease in greenhouse gas emissions from the industrial sector. Overall there was a 5.8% fall in greenhouse gas emissions from industry between 2019 and 2020, largely due to a reduction in emissions from industrial electricity use and a reduction in emissions from large industrial installations. Looking at longer term trends, all local authorities have seen decreases in CO_2 emissions from this sector since 2005.

Emissions from fuel use in large industrial installations have been mapped using the National Atmospheric Emissions Inventory database of point sources, which combines data from the EU Emissions Trading System (ETS) 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 particular sites is disclosed. This means that in particular the industrial gas category does not include all industrial gas consumption, as some is included in the Large Industrial Installations category.

As seen in Figure 10, emissions per capita in the industrial sector are higher in Wales, Scotland and Northern Ireland than in England. 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 authorities in London which has 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 emissions predominantly arise from the use of electricity and gas by businesses. They accounted for 6% of greenhouse gas emissions in the UK in 2020 and fell by 16.6% from 2019, as business activity reduced due to the pandemic. This is reflected in the local authority figures, as 95% of local authorities (354 of 374) saw a decrease in greenhouse gas emissions. Almost all (99%, 371 of 374) local authorities saw a decrease in longer term CO_2 emissions since 2005. This long term fall is largely driven by the reduction in emissions resulting from electricity use in this sector, due to a decrease in the use of coal for electricity generation and increased use of renewables.

Public sector

Most local authorities saw a fall in public sector greenhouse gas emissions between 2019 and 2020, with 89% (331 out of 374) seeing a reduction. This is in line with the overall 8.1% fall in public sector emissions in the UK, which was predominantly due to a fall in emissions from public sector electricity use, whereas emissions from public sector gas consumption remained at about the same level as in 2019. Almost all (99%, 372 of 374) local authorities saw a decrease in CO_2 emissions from the public sector since 2005, predominantly as a result of a reduction in emissions resulting from electricity use in this sector, due to the national decrease in the use of coal for electricity generation and increased use of renewables.

Figures 10, 11 and 12 show greenhouse gas emissions per capita for the industrial, commercial and public sectors respectively.

Figure 10: Industrial greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020

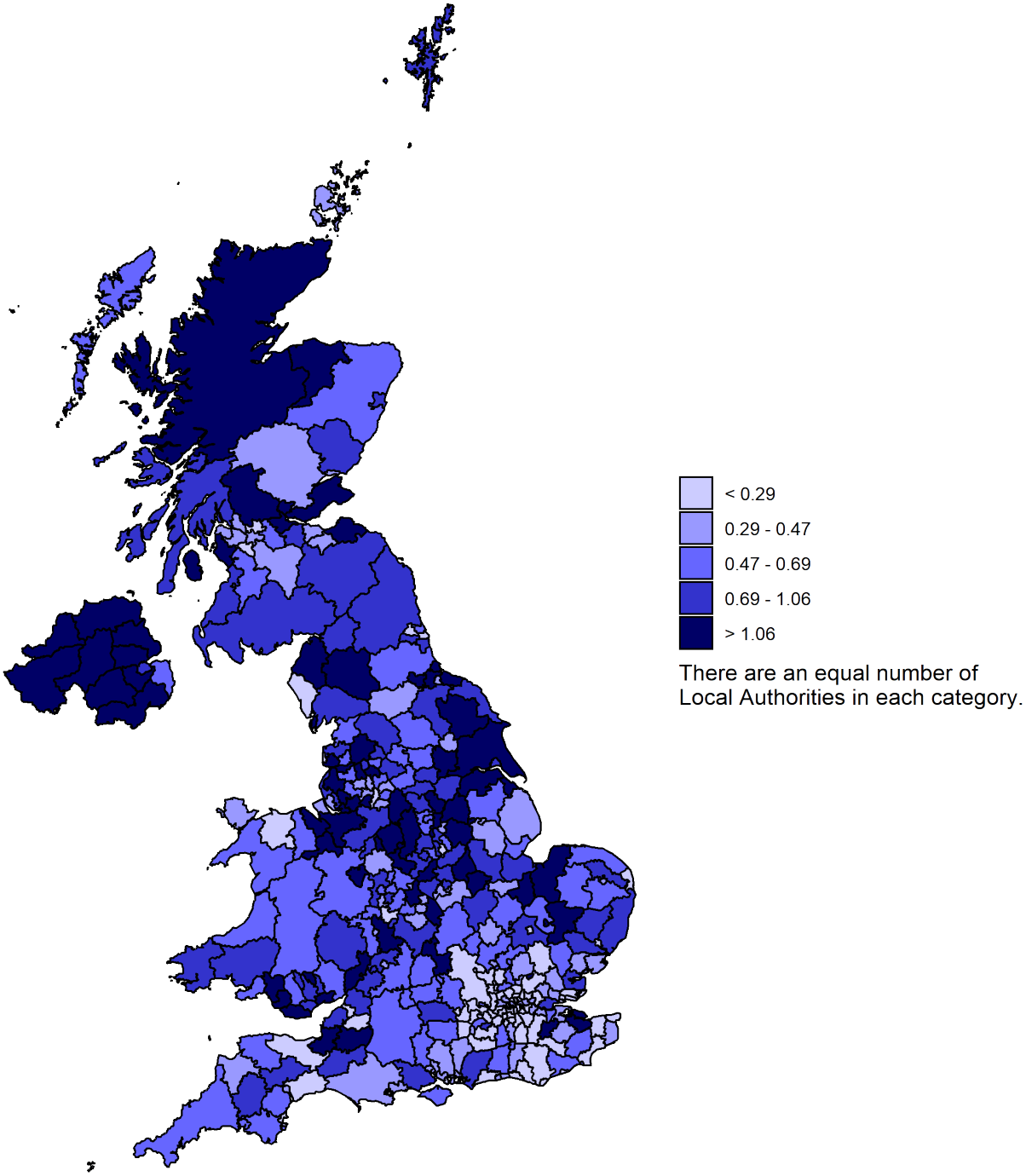


Figure 11: Commercial greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020

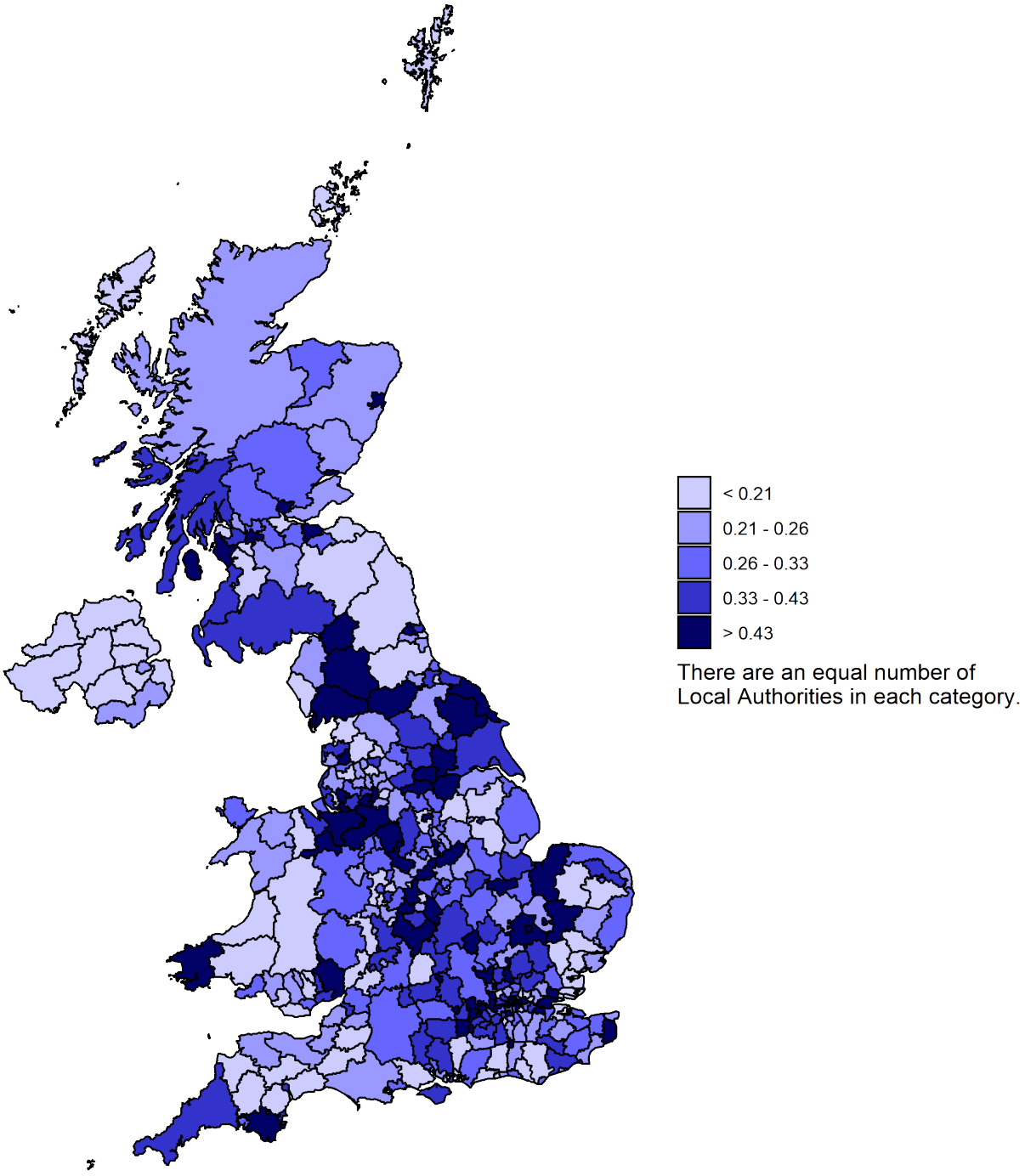
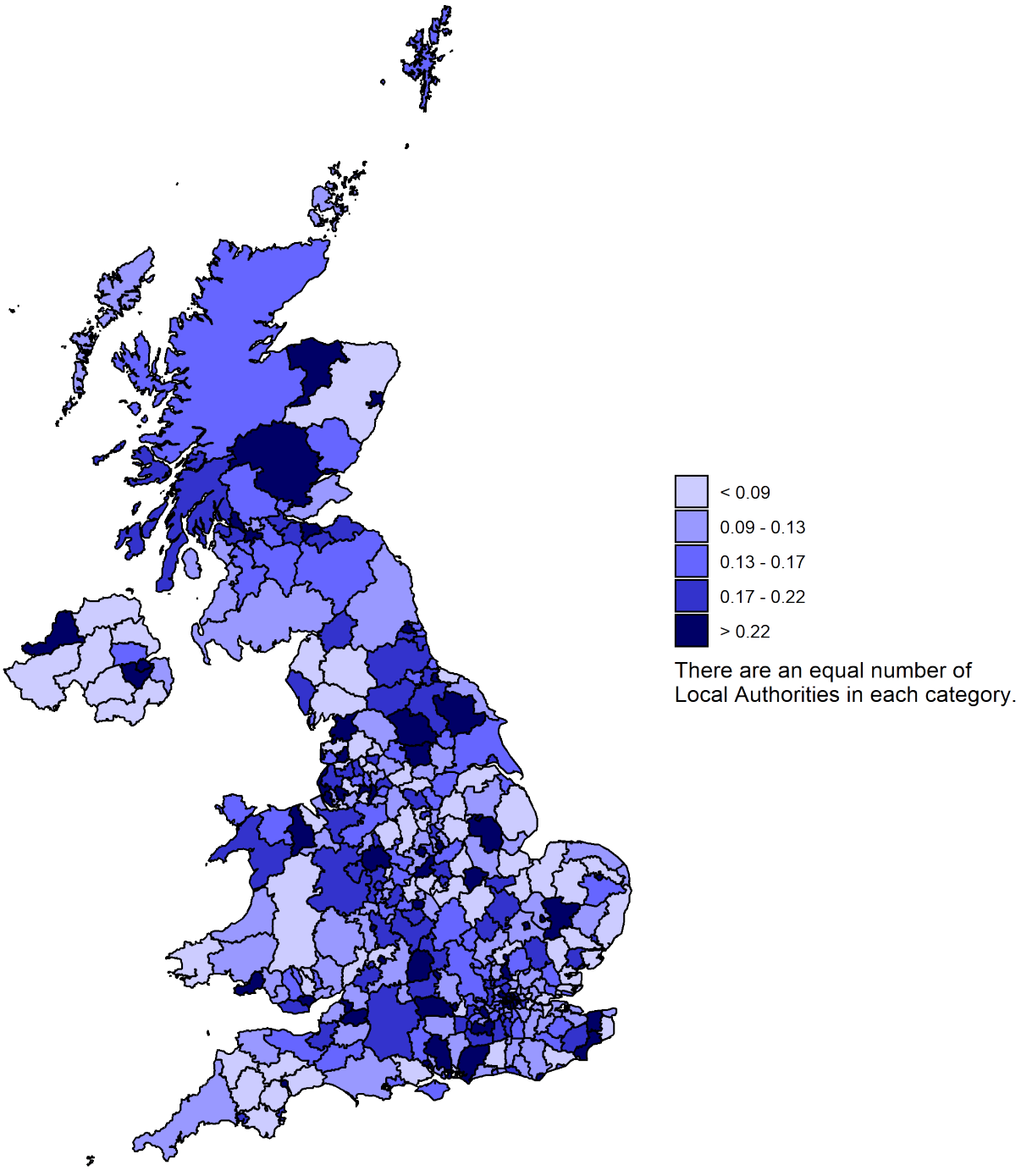


Figure 12: Public sector greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020



Agriculture

Methane and nitrous oxide emissions from livestock and agricultural soils have been included in these local authority estimates for the first time this year. In the data tables accompanying this publication these have been shown in the new agriculture sector, along with emissions from electricity and fuel use for agriculture that were in previous publications included in the industry sector. Most emissions in the agriculture sector come from these gases, with 53% of the 2020 emissions total being methane and 31% nitrous oxide. The remaining 16% of emissions were carbon dioxide.

Agriculture is a significant source of emissions in a number of authorities and was the sector with the highest emissions in 56 local authorities in 2020, 15% of the total. Nationally, greenhouse gas emissions from agriculture fell by 3.1% between 2019 and 2020, and it is likely that the majority of local authorities saw a decrease. At this time our estimates of emissions from livestock and agricultural soils are limited in that we have only been able to estimate emissions for 2020 from the data available. So while estimates are shown in the tables for each local authority going back to 2018, these have been produced by assuming that the emissions in each local authority followed the same trend as the national emissions totals from these sources. We have included these estimates to enable users to have approximate emissions estimates for these years for each authority, but this does mean that the changes between 2018 and 2020 do not necessarily reflect what happened locally in each authority area. We will investigate whether we can improve these estimates in future years.

Waste management

Methane and nitrous oxide emissions from landfill and other waste management sources have been included in these local authority estimates for the first time this year. These make up the majority of waste management emissions, with methane emissions from landfill sites in particular making up 73% of waste management emissions across the UK.

Rather than recording waste management emissions against the locations where the emissions occurred, in these statistics we have allocated emissions to local authorities based on the locations where the waste occurs. This is to enable local authorities to understand the emissions resulting from waste produced in their area, in a similar way to how emissions from energy supply are shown on an end-user basis in these statistics, so that emissions resulting from the production and supply of electricity and other energy are shown against the locations where the energy was used.

Nationally, greenhouse gas emissions from waste management fell by 6.6% between 2019 and 2020, and it is likely that the majority of local authorities saw a decrease. At this time our estimates of emissions from landfill are limited in that we have only been able to estimate emissions for 2018 for the whole of the UK from the data available, and from 2019 for landfill waste in England. So while estimates are shown in the tables for each local authority for each year from 2018 to 2020, these have been produced by assuming that the emissions in each local authority followed the same trend as the national emissions totals from these sources. This enables users to have approximate emissions estimates for these years for each authority, but means that the changes between 2018 and 2020 do not necessarily reflect what happened locally in each authority area.

Figure 13: Agriculture net greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020

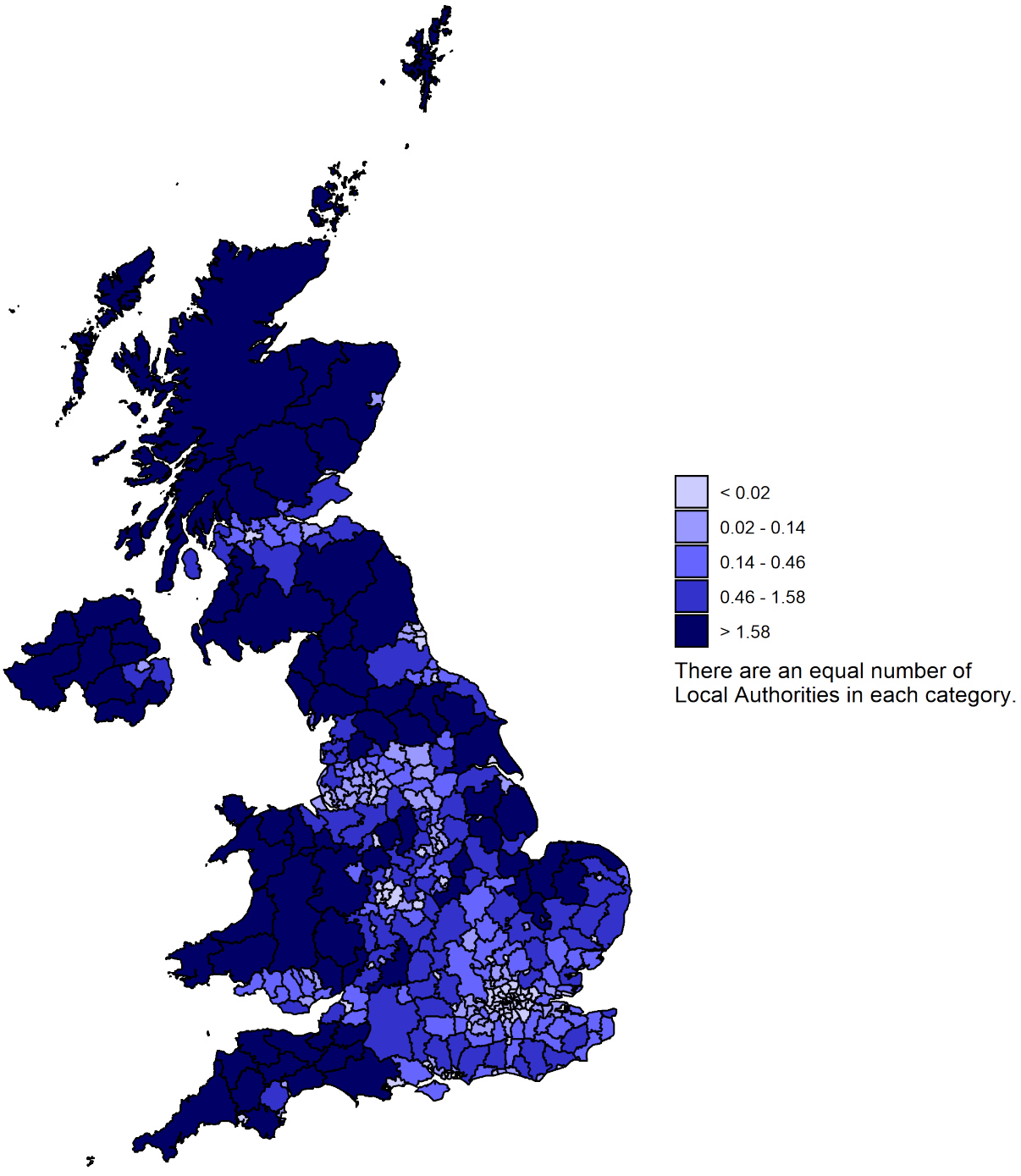
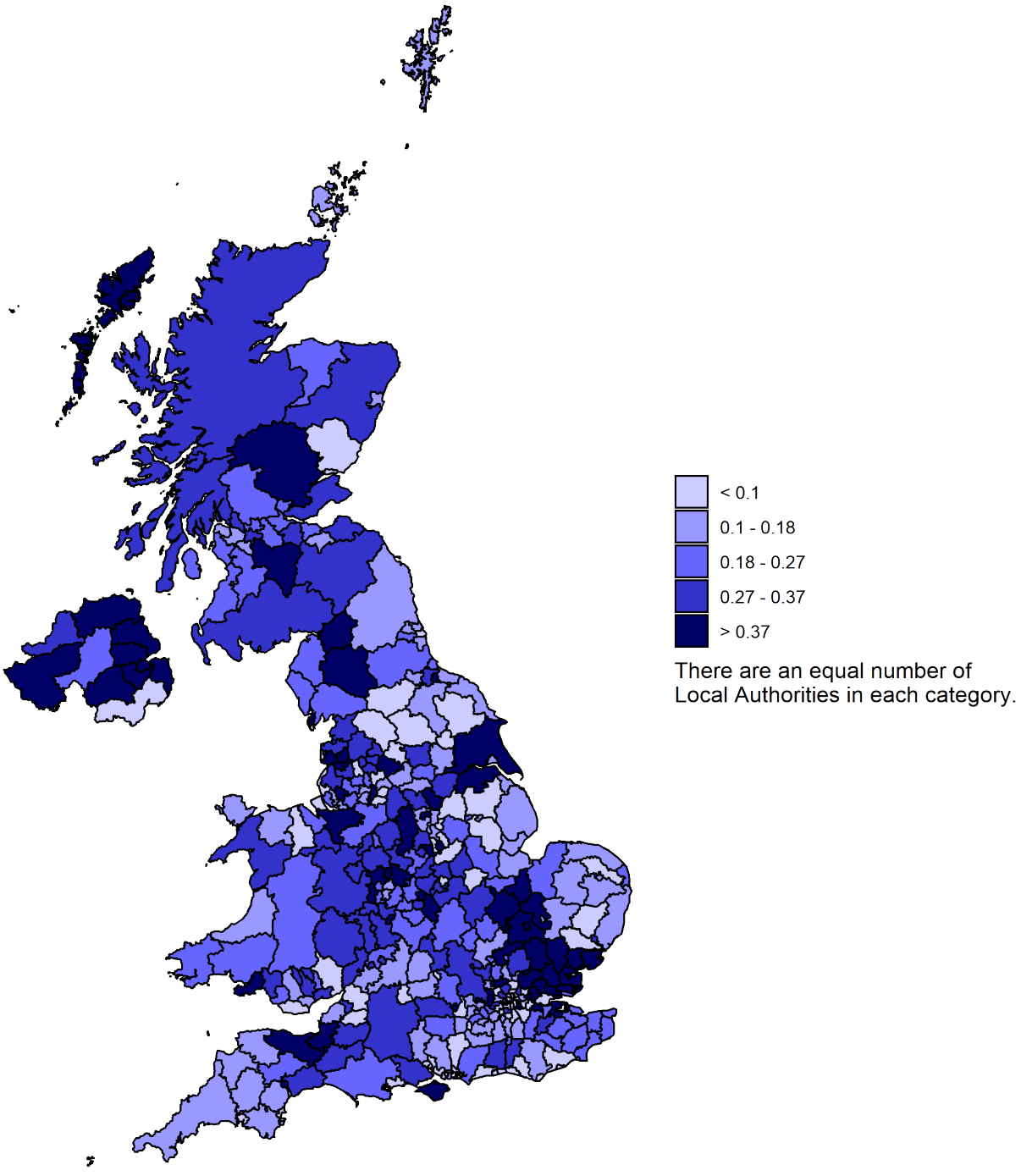


Figure 14: Waste management net greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020



Land use, land use change and forestry (LULUCF)

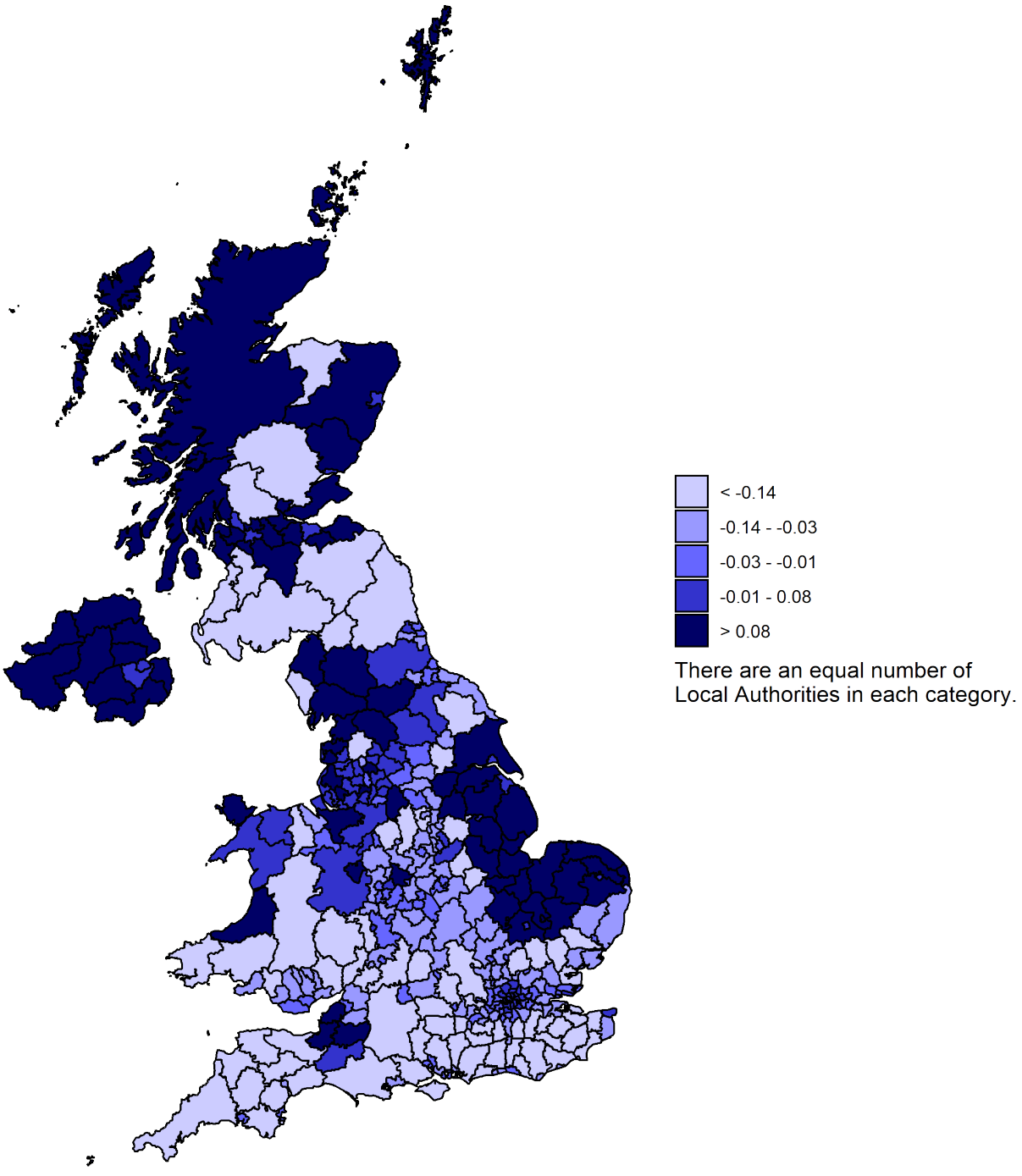
The LULUCF sector consists of emissions and removals from forest land, cropland, grassland, settlements and harvested wood products. It is the only sector that includes emission removals, although we estimate the sector as a whole to be a net source of greenhouse gas emissions in each year from the start of the data series in 1990. In general, cropland is the largest sources of carbon dioxide emissions, while forest land is the dominant sink. Settlements, wetlands and grasslands are estimated to have been net sources of emissions throughout the data series. While the LULUCF sector was a net source of emissions across the UK as a whole in 2020, we estimate that it was a net sink in 69% of local authorities (259 of 374). This is because some there are some local authorities where it is a large source of emissions, in Northern Ireland and the East of England in particular.

The LULUCF sector is estimated to have had net emissions of 3.7 $MtCO_2e$ in 2020. This is a slight decrease of 0.4 $MtCO_2e$ from 2019 and down from a total of 13.1 $MtCO_2e$ in 1990. This long-term fall has been driven by a reduction in emissions from grassland, cropland and settlements, and an increase in the sink provided by forest land, with an increasing uptake of carbon dioxide by trees as they reach maturity, in line with the historical planting pattern. There has also been some reduction in emissions since 1990 due to changes in agricultural practices.

While there was an overall decrease in net emissions from the LULUCF sector in 2020 compared to 2019, only 14% of local authorities (53 of 374) showed a decrease in net emissions from the LULUCF sector, with the other 86% (320 of 374) seeing an increase. This was because the overall decrease was driven by very large reductions in net emissions in the Highland and West Dunbartonshire local authorities compared to changes of much smaller magnitudes elsewhere, as discussed in the next section about local authorities that saw large changes in their emissions in 2019. The large majority of local authorities (91%, 340 of 374) saw a decrease in net CO_2 emissions from the LULUCF sector between 2005 and 2020.

In the LULUCF sector, there are clear regional trends in per capita emissions (Figure 15). In particular, in large parts of Scotland, Wales and the North East there are large sinks of carbon dioxide. In other parts of the UK, such as in Northern Ireland and parts of the East of England, LULUCF is a large 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 15: Land Use, Land Use Change and Forestry net greenhouse gas emissions per capita by local authority (tonnes CO_2e per capita) in 2020



Local authorities with large changes in emissions since 2019

Overall, greenhouse gas emissions decreased in 371 out of 374 local authorities between 2019 and 2020, reflecting the 9% decrease in the national emissions total between 2019 and 2020. For most local authorities this was largely due to a large fall in road traffic as a result of

the impact of the COVID-19 pandemic, as people were instructed to stay at home as much as possible for large periods of 2020. Many authorities also saw a significant fall in commercial emissions as business activity reduced during the pandemic. The exceptions to this are generally those local authorities that have shown changes in industrial emissions following closures or expansions of large industrial sites in those areas. The three authorities that saw an increase in emissions in 2020 all did so due to an increase in industrial emissions. There are also 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 authorities 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 2019 and 2020 were seen in West Dunbartonshire (28%), Highland (24%) and City of London (21%). The largest factors in the falls in West Dunbartonshire and in Highland were reductions in net emissions from forest land and wetlands, with forest land in West Dunbartonshire switching to being an emissions sink in 2020. The reduction in City of London was largely related to commercial electricity, as business activity reduced due to the pandemic.

Armagh City, Banbridge & Craigavon, Fife, and Antrim & Newtownabbey were the only three authorities that saw in increase in greenhouse gas emissions between 2019 and 2020, although only of 1-2%. In all three cases this was due to increased industrial activity following a reduction in 2019 and came despite them all seeing reductions in transport and commercial emissions in line with most other authorities.

Table 2: Local authorities that had the largest changes in greenhouse gas emissions between 2019 and 2020

Percentages

Local authority	Percentage change	Sub-sector most responsible for changes in that area
West Dunbartonshire	-28%	Net Emissions: Forest land
Highland	-24%	Net Emissions: Wetlands
City of London	-21%	Commercial Electricity
Antrim and Newtownabbey	1%	Industry 'Other'
Fife	1%	Large Industrial Installations
Armagh City, Banbridge and Craigavon	2%	Industry 'Other'

Carbon dioxide emissions trends since 2005

Because estimates of methane and nitrous oxide emissions are not available for all sources prior to 2018, this section presents trends in carbon dioxide (CO_2) emissions since 2005.

When the local authority emissions are aggregated, estimated total CO_2 emissions decreased by around 43% since 2005 (the earliest year for which data are available at local authority level) – falling from 539 million tonnes to 306 million tonnes. 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) and between 2011 and 2012 (largely due to 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 16 and 17 show how total CO_2 emissions and annual CO_2 emissions per capita compare between 2005 and 2020 in each region and country in the UK. Emissions have decreased in all regions since 2005. The largest percentage decrease in emissions (62.3%) and the largest decrease in per capita terms of 8.5 tonnes per person were seen in the North East. The smallest decrease in percentage terms (28.7%) was seen in Northern Ireland and in per capita terms (3.6 tonnes per person) was seen in London.

Figure 16: End-user carbon dioxide emissions by region, 2005 and 2020

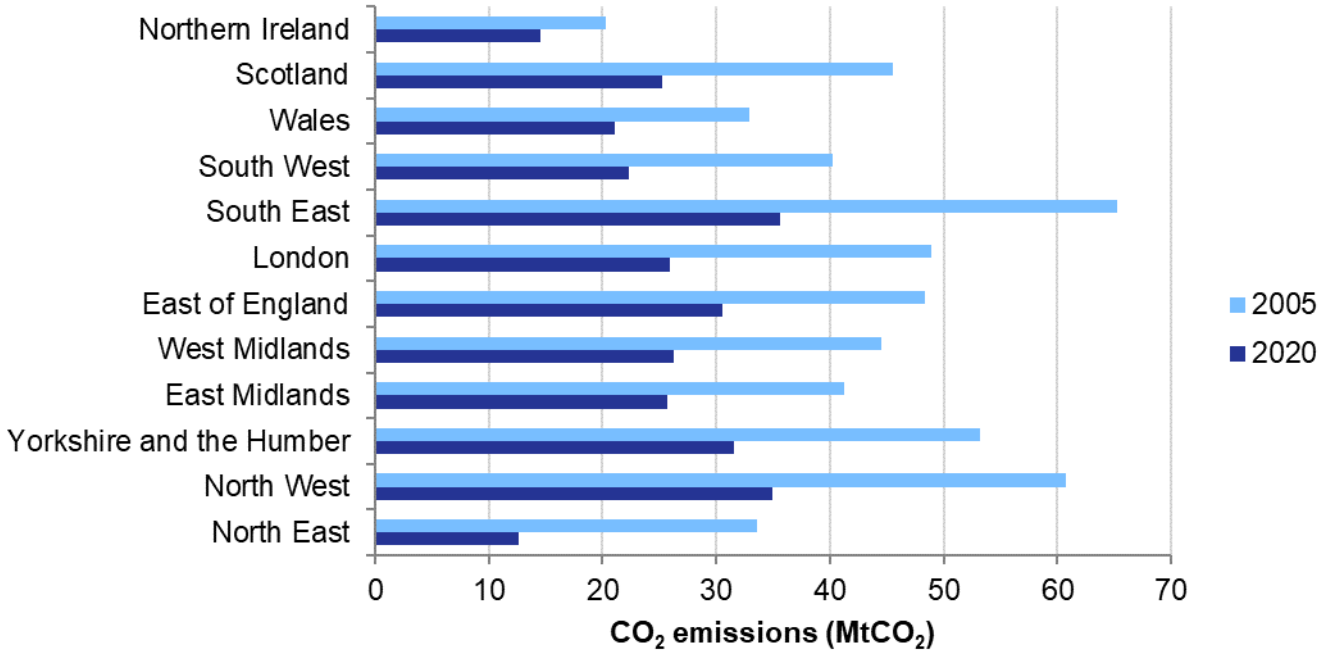


Figure 17: Annual end-user carbon dioxide emissions per capita by region, 2005 and 2020

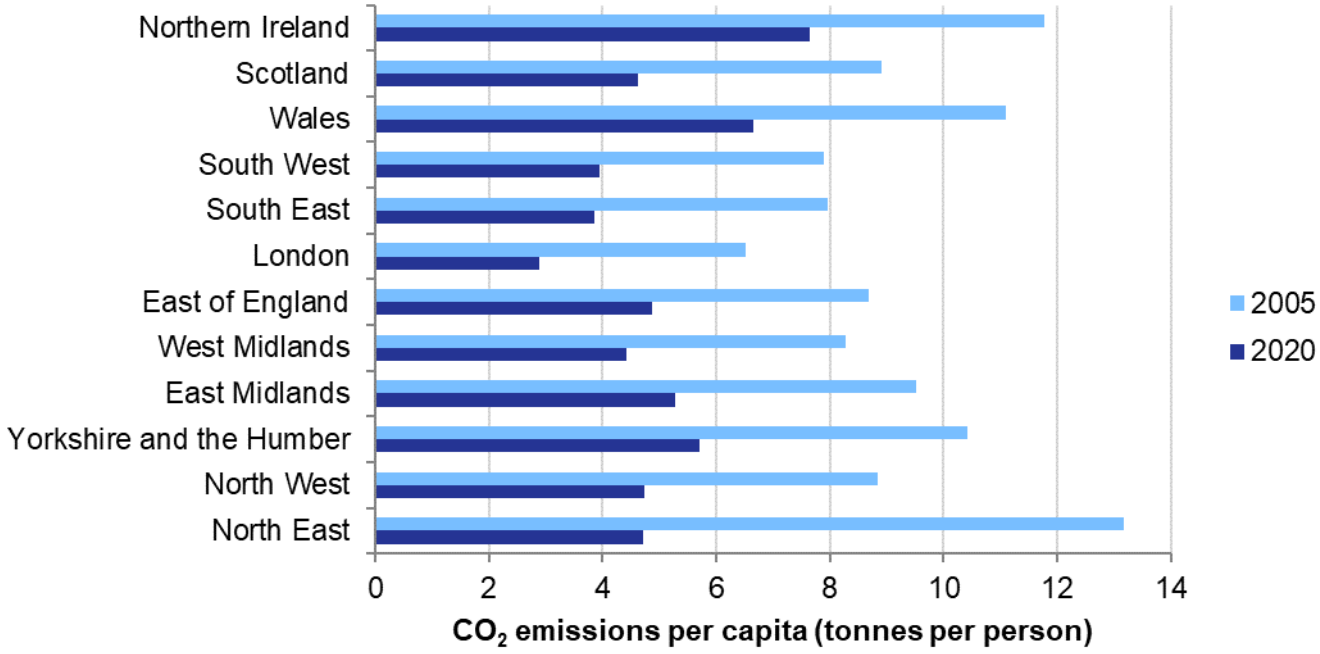


Table 3 shows how total CO_2 emissions and CO_2 emissions per km^2 compare between 2005 and 2020 in each region and country in the UK. The highest emissions per km^2 are generally in urban areas and areas with large industrial sites. At a regional level the largest emissions per km^2 are in London, at 16.3 tCO_2 per km^2 in 2020, due to London's high population density.

Table 3: End-user carbon dioxide emissions and carbon dioxide emissions per km^2 by region, 2005 and 2020

$MtCO_2$, tCO_2

Region / country	2005		2020		Difference between 2005 and 2020 per km^2 (tCO_2)
	Total emissions ($MtCO_2$)	Per km^2 (tCO_2)	Total emissions ($MtCO_2$)	Per km^2 (tCO_2)	
UK	539	2.2	306	1.2	-0.9
Wales	33	1.6	21	1.0	-0.6
Scotland	46	0.6	25	0.3	-0.3
Northern Ireland	20	1.4	15	1.0	-0.4
England	436	3.3	246	1.8	-1.4
North East	34	3.9	13	1.5	-2.4
North West	61	4.1	35	2.3	-1.7
Yorkshire and the Humber	53	3.4	32	2.0	-1.4
East Midlands	41	2.6	26	1.6	-1.0
West Midlands	45	3.4	26	2.0	-1.4
East of England	48	2.5	31	1.6	-0.9
London	49	30.7	26	16.3	-14.4
South East	65	3.4	36	1.8	-1.5
South West	40	1.6	22	0.9	-0.7

Local authority trends since 2005

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

All 374 local authorities have shown a decrease in total emissions between 2005 and 2020. This reflects the decrease in overall emissions for the UK during this period driven mainly by reductions in emissions from power stations and industrial combustion, as well as the impact of the pandemic in 2020. 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 large portion of which occurred during 2009, likely due to economic factors.

From 2005 to 2020, the largest percentage decrease:

- in total emissions was in Northumberland (down 86% since 2005), driven by the closure of some large industrial installations over this period.
- in emissions from the industrial sector was in Gravesham (down 94%) due to the closure of a cement works during 2008.
- in emissions from the commercial sector was Newark and Sherwood (down 83%) due to reductions in emissions from electricity use and from gas consumption.
- in emissions from the public sector was Bassetlaw (88%) due to reductions in emissions from gas consumption.
- in emissions from the domestic sector was in Isles of Scilly (down 59%) due to reductions in emissions from electricity consumption, although in absolute terms this reflects only a small decrease in emissions (3.2 kt of CO_2).
- in emissions from transport was in Westminster (down 49%), due to a decrease in traffic on major roads.

From 2005 to 2020, the largest percentage increase:

- in commercial emissions was in Slough (up 40%), due to increases in commercial electricity emissions.
- In emissions from the public sector was Lisburn and Castlereagh (up 26%), driven by an increase in public sector gas consumption over this period.
- in the transport sector was Isles of Scilly (up 10%) due to an increase in emissions from non-road transport.
- no local authorities showed an increase in total emissions, the industrial sector or the domestic sector.

Table 4: Breakdown of size of decrease in CO_2 emissions between 2005 and 2020

Change in emissions since 2005	Number of local authorities
Decrease of more than 50%	33
Decrease of 45%-50%	90
Decrease of 40%-45%	123
Decrease of 35%-40%	71
Decrease of 30% to 35%	25
Decrease of 0-30%	32

Tables 5 below provides some information on the local authorities that have experienced the largest percentage decreases in emissions since 2005, and the sub-sector that made the largest contribution in each case.

The majority of local authorities with the largest decreases in CO_2 emissions since 2005 were driven by closures in large industrial installations, except for City of London, where emissions reductions were mainly due to a decrease in emissions from commercial electricity use.

For Northumberland, a LULUCF sink is one factor in the trend in its emissions. A large sink can lead to the net emissions total in a local authority being much lower than its non-LULUCF emissions total, meaning that any changes in emissions from other sectors can lead to a large percentage change in total emissions. This is the case for Northumberland, the authority with one of the largest falls in CO_2 emissions since 2005, where non-LULUCF emissions have only fallen by 69% compared to a fall in total emissions of 86% when LULUCF is included.

Table 5: Local authorities that had the largest decreases in CO_2 emissions since 2005

Percentage

Local authority	Percentage decrease	Sub-sector most responsible for decrease
Northumberland	86%	Large Industrial Installations
Redcar and Cleveland	84%	Large Industrial Installations
Highland	83%	Domestic Electricity
Gravesham	76%	Large Industrial Installations
Argyll and Bute	74%	Domestic Electricity

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 the tables accompanying this publication, available on the department’s statistics website. Unlike the full dataset, the dataset of emissions within the scope of local authorities 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)" sector have been removed.
- EU Emissions Trading System (EU ETS) sites – these emissions have been removed from the "Large industrial installations" 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 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.

Removing these emissions has a significant impact on some local authorities compared to others, as some local authorities have a much bigger proportion of emissions from the above sources than others. Table 6 shows the local authorities with the largest decreases in emissions within the scope of influence of the local authority between 2005 and 2020. None of these is amongst the top five local authorities for decreases in overall emissions (which are shown in Table 5 in the previous section). This is because the largest decreases in overall emissions were 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 authorities that had the largest decreases in CO_2 emissions within the scope of influence of the local authority since 2005

Percentage

Local authority	Percentage decrease	Sub-sector most responsible for decrease
City of London	70%	Commercial Electricity
Westminster	60%	Commercial Electricity
Exeter	59%	Public Sector Gas
Reading	55%	Commercial Electricity
Thurrock	55%	Industry Gas

No local authorities had an increase in emissions within the scope of the local authority between 2005 and 2020.

Looking at changes in emissions within the scope of influence of local authorities between 2019 and 2020, five local authorities had increases in their emissions over this period. Table 7 shows the local authorities with the biggest percentage changes to the emissions within their scope of influence between 2019 and 2020. Several of these local authorities 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 authorities that had the largest increases or decreases in CO_2 emissions within the scope of influence of the local authority, 2019-2020

Percentage

Local authority	Percentage change	Sub-sector most responsible for changes in that area
City of London	-22%	Commercial Electricity
West Lothian	-19%	Industry Gas
Westminster	-18%	Commercial Electricity
Selby	3%	Industry Gas
Antrim and Newtownabbey	3%	Industry 'Other'
Armagh City, Banbridge and Craigavon	5%	Industry 'Other'

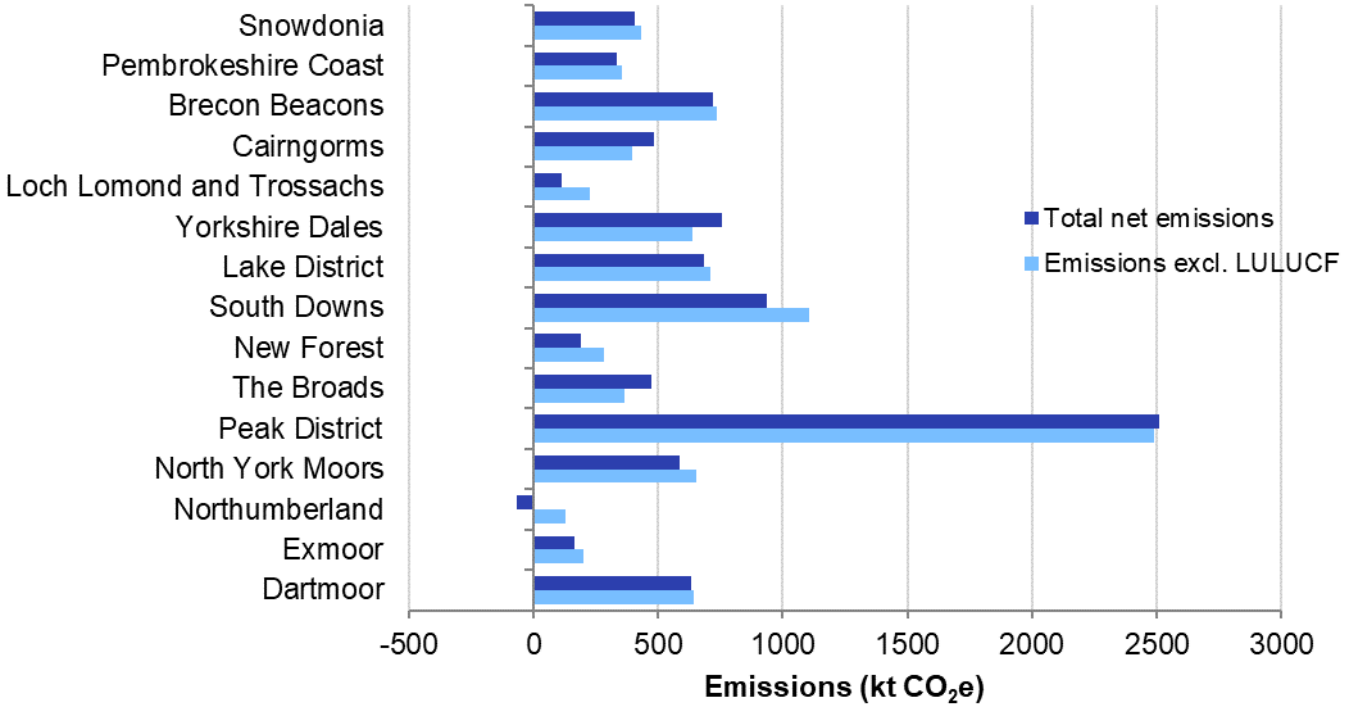
Emissions within National Park areas

Alongside the local authority estimates, as part of this publication we have published estimates of greenhouse gas emissions within the National Park areas for the first time. There are 15 National Parks in the UK, of which 10 are in England, 3 in Wales and 2 in Scotland. There are none in Northern Ireland. These estimates have been produced following the same methodologies as the local authority estimates as far as possible, and where there are differences these are given in the Technical Report that accompanies this publication.

National Parks are more rural than many other areas of the country so have quite different characteristics. Compared to their size they have lower levels of greenhouse gas emissions than more built up areas, averaging emissions of 0.4 $ktCO_2e$ per km^2 of area in 2020 compared to the UK average of 1.5 $ktCO_2e$ per km^2. However, they have higher emissions than average compared to the size of their populations, averaging 20.0 $ktCO_2e$ per capita in 2020 compared to the UK average of 5.6 $ktCO_2e$ per capita. The LULUCF sector is also more prominent in the emissions of National Park areas, both as a source and as an emissions sink in different areas.

Figure 18 shows how the net greenhouse gas emission totals in 2020 in the 15 National Parks compared including and excluding LULUCF. The Peak District has the largest total, 79% of which was industrial emissions. LULUCF acts as a net emissions sink in 11 of the 15 parks, and in Northumberland results in the total net emissions being negative.

Figure 18: Net end-user greenhouse gas emissions in National Park areas including and excluding LULUCF, 2020



Reconciliation with the UK inventory

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

A number of emission sources included in the UK inventory are not included in the local authority 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 business 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 inventory. The different elements of this reconciliation should be interpreted as follows:

- **"Excluded"** are the sectors that have been deliberately excluded from the local level allocation, as it would not have been appropriate to include them.
- **"Unallocated methodological differences"** are differences which have become apparent due to the different methodological approaches used in deriving the UK Inventory and local level 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, and harvested wood products.

- **"Methodological differences"** are the differences that have caused the discrepancies between the national inventories and the local authority carbon dioxide dataset. These are explained after the UK reconciliation table.

Table 8: Reconciliation of 2020 local emission estimates with UK inventory

$MtCO_2e$

	Details	Totals
End-user emissions allocated to local areas		**377.5**
Unallocated methodological differences:		
Large electricity users with unknown location	0.7	
Unallocated consumption	-0.5	
Total unallocated		0.2
Total UK end-user emissions (local method)		**377.7**
Excluded from local allocation:		
Domestic shipping	4.8	
Domestic aviation	0.6	
Military transport	1.5	
Exports	5.4	
International aviation and shipping	1.8	
Fluorinated gases	12.2	
Total excluded		26.3
Methodological differences:		
Industrial sector	7.0	
Commercial sector	-0.7	
Public sector	-1.5	
Agriculture sector	-0.9	
Domestic sector	-2.5	
Transport sector	0.0	
Waste management sector	0.0	
LULUCF sector	0.0	
Total methodological differences		1.5
UK total greenhouse gas emissions		**405.5**

Main differences between the local authority and Devolved Administrations (DA) datasets

This section of the report describes where there are unavoidable differences between the methodologies used in the estimation of emissions for this local authority greenhouse gas emissions dataset, and for the Devolved Administration emissions datasets.

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 BEIS sub-national energy consumption dataset which are not fully consistent with the national

energy data presented in Digest of UK Energy Statistics (DUKES)[10]. The Devolved Administration greenhouse gas inventory, however, is based on DA-wide electricity consumption statistics which are available in the electricity generation and supply section of BEIS's Energy Trends[11] 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 DA 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 authorities, 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 DA inventory 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 DA inventory, on the other hand, reports emissions against a wider geographical coverage, effectively negating the data disclosure concerns, and hence there is no need to exclude specific emissions from the DA inventories.

Unallocated LULUCF data

Harvested wood products can be allocated to particular DAs 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 DA reconciliation tables. All other LULUCF estimates are fully consistent across UK, DA and local authority data.

Use of additional gas data for Northern Ireland

Both datasets now include consideration of new gas consumption data supplied by Northern Ireland energy suppliers, which shows a large growth in gas use within Northern Ireland from 2006 onwards. The DA 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 the greater level of detail required by the data, and the UK emissions distribution grids have been used solely.

Distribution of 'Other Fuels' across DAs

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,

[10] For the definitions used in DUKES see DUKES 2021:
https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2021
[11] https://www.gov.uk/government/collections/energy-trends

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 DA inventory, fuel use data supplied by the Iron and Steel Statistics Bureau (ISSB) is used, since it is available on a DA basis.

There is also a difference in the estimation of emissions from peat in the domestic sector. In the local authority greenhouse gas emissions methodology, peat use is mapped using the domestic fuel use mapping grids which are produced by Ricardo Energy and Environment as part of the mapping process for the National Atmospheric Emissions Inventory programme. For the DA inventory, this is mapped using a DA specific distribution calculated by Centre for Ecology and Hydrology (CEH).

For domestic oil combustion, the allocation of emissions to local authorities uses separate emissions distribution grids for LPG and other oils. The mapping grids are unchanged from last year's publication. For the DA inventory, LPG grids were not available therefore all domestic oil emissions are mapped using the same distribution grid.

For domestic solid fuel combustion, the DA inventory estimates use the energy modelling work based on the 2011 census and the 2019 Defra Solid Fuel Survey, which also underpins the local authority estimates. This results in more consistent reporting between local authority greenhouse gas emissions and the DA 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 2019

In the production of the 2020 estimates, new data were introduced, together with some improvements to the underlying methodology. To ensure that the data for 2005 to 2019 are consistent with the data now available for 2020, the estimates for these years have been revised to incorporate both the new data and the improvements in the underlying methodology. For some local authorities, 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.

Methane and nitrous oxide emissions

This publication has been expanded this year to include estimates of methane and nitrous oxide emissions. Where these come from the same sources as carbon dioxide emissions they

have been estimated using similar methods, while new data sources have been introduced to produce the estimates for some emission sources, in particular for agriculture and waste management which account for the majority of methane and nitrous oxide emissions in the UK. Information about the methodologies used to produce the methane and nitrous oxide emissions estimates are given in the Technical Report.

National Park areas

This publication has also been expanded this year to include estimates of emissions in National Park areas. These have been produced following the same methodologies as the local authority estimates as far as possible, and where there are differences these are given in the Technical Report.

Non-domestic gas and electricity

Postcode level gas and electricity data has been incorporated into the employment-based energy distribution to improve precision in two ways. Firstly, the calibration of gas and electricity consumption estimates have been done at individual postcode level rather than Middle Super Output Area (MSOA) level. Secondly, whereas in previous versions an industrial/commercial site was tagged as having access to gas based on a 1x1km grid, restriction based on postcode is now possible. Details of the methodologies used to estimate non-domestic energy use emissions are outlined in the 'Employment based energy consumption in the UK' report that accompanies this publication.

Road transport

Several changes have been made to the methodology for estimating emissions from road transport. The fleet turnover model used in the estimates has been revised and is now using new, more comprehensive and up-to-date set of vehicle licensing statistics and annual mileage data from MOT records. These have been supplemented with additional DfT data from the Continuing Survey of Road Goods Transport (CSRGT) and National Travel Survey to develop revised vehicle survival rates and mileage with age profiles that vary by year and have been used to update the fleet turnover model.

There has been a change in the way fuel consumption factors are assigned to individual roads, which is done based on a combination of speed, road type and area type. Previously, each road was assigned an area type using urban / rural definitions based on population and large urban areas and average vehicle speeds were then assigned to different road types. The population-based area type is not used any more to determine the vehicle speed, but the speed limit of each road segment is now used instead.

Land Use, Land Use Change and Forestry

Several methodology changes have been made in the LULUCF sector, which are detailed in the 'Mapping greenhouse gas emissions and removals for the land use, land-use change & forestry sector' report that accompanies this publication. The most significant improvements made this year were the use of updated forest planting statistics and a new approach for adjusting reported forest areas to stocked forest (areas within the forest which actually have trees as opposed to integral open spaces), and an update to the land use change activity data which assimilates a wider range of land use and land-use change data sources to produce an annual time series, rather than the previous approach that used decadal rates of change based on the Countryside Survey.

Large Industrial Installations

There is a programme of continuous improvement and revisions have been made to the point source data for 2005-2019 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 the local and regional estimates of CO_2.

Upcoming change to Global Warming Potentials

As detailed in the introduction section, emissions of each greenhouse gas (carbon dioxide, methane, nitrous oxide) are expressed in terms of carbon dioxide equivalent (CO_2e), recognising the different global warming potentials (GWP) of the different gases.

Figures for GWPs are set out in Intergovernmental Panel on Climate Change (IPCC) Assessment Reports (AR). In this publication, emissions estimates are primarily based on 100-year AR4 GWPs, consistent with international reporting and carbon trading protocols up to 2020.

In November 2021, it was agreed by the international community at COP26 that greenhouse gas emissions shall be reported under the Paris Agreement transparency framework using 100-year AR5 GWPs (without climate-carbon feedback)[12].Therefore, emissions estimates will primarily be based on 100-year AR5 GWPs in this publication next year. While this does not affect carbon dioxide emissions, the GWP for methane will increase from 25 to 28 (a 12% rise) while the GWP for nitrous oxide will decrease from 298 to 265 (around an 11% fall).

[12] https://unfccc.int/documents/311138

Accompanying tables

The following tables are available in Excel and ODS format on the department's statistics website:

Local authority greenhouse gas emissions

Table 1.1	Local Authority territorial greenhouse gas emissions estimates 2005-2020
Table 1.2	Local Authority territorial carbon dioxide (CO_2) emissions estimates 2005-2020
Table 1.3	Local Authority territorial methane (CH_4) emissions estimates 2005-2020
Table 1.4	Local Authority territorial nitrous oxide (N_2O) emissions estimates 2005-2020

Emissions within the scope of influence of Local Authorities

Table 2.1	Local Authority territorial carbon dioxide (CO_2) emissions estimates within the scope of influence of Local Authorities 2005-2020 - Subset dataset (Excludes large industrial sites, railways, motorways and land-use)

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

Uncertainty of territorial emission estimates and past revisions

Table 4.1	Reconciliation of 2020 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 2020 Local Authority territorial greenhouse gas emissions estimates with end user inventory for England, by fuel and sector
Table 4.3	Reconciliation of 2020 Local Authority territorial greenhouse gas emissions estimates with end user inventory for Scotland, by fuel and sector
Table 4.4	Reconciliation of 2020 Local Authority territorial greenhouse gas emissions estimates with end user inventory for Wales, by fuel and sector
Table 4.5	Reconciliation of 2020 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 2005-2020
Table 6.2	National Park territorial carbon dioxide (CO_2) emissions estimates 2005-2020
Table 6.3	National Park territorial methane (CH_4) emissions estimates 2005-2020
Table 6.4	National Park territorial nitrous oxide (N_2O) emissions estimates 2005-2020

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/collections/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics

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

- **Local and regional greenhouse gas emissions estimates for 2005-2020 for the UK: technical report**
  - Report on the methodology used to produce the emissions estimates.

- **Employment based energy consumption mapping in the UK**
  - A report which outlines the methodology used to map emissions from smaller industrial and commercial sources.

- **Mapping carbon emissions & removals for the Land Use, Land Use Change & Forestry (LULUCF) sector**
  - A report looking at LULUCF emissions and removals at the local authority level.

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, including Excel tables with additional data on UK emissions, 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) for 1970-2020, produced for BEIS and the Devolved Administrations by Ricardo Energy and Environment. For further information on the UK Greenhouse Gas Inventory, see the NAEI website: https://naei.beis.gov.uk/

Given the number of local authorities, 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 local authority. 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@beis.gov.uk

Further information

Future updates to these statistics

The next UK local authority greenhouse gas emissions estimates, covering the period 2005-2021, will be published in June 2023.

Final estimates of UK greenhouse gas emissions in 2021 will be published in February 2023.

In March 2023, the 1990-2021 UK greenhouse gas emissions estimates will be updated to include uncertainty estimates and estimates by end user, and provisional 2022 UK emissions estimates will be published.

In June 2023, the 1990-2021 UK greenhouse gas emissions estimates will be updated to include estimates by Standard Industrial Classification.

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.beis.gov.uk/reports/reports?report_id=1080

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-national-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-national-statistics

Sub-national energy consumption statistics

Several publications are produced by BEIS 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 Great Britain: https://www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level

Revisions policy

The BEIS 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@beis.gov.uk

The BEIS 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.

National Statistics designation

National Statistics status means that our statistics meet the highest standards of trustworthiness, quality, and public value, and it is our responsibility to maintain compliance with these standards.

The continued designation of these statistics as National Statistics was confirmed in September 2018 following a compliance check by the Office for Statistics Regulation. The statistics last underwent a full assessment against the Code of Practice for Statistics in 2014.

Since the latest review by the Office for Statistics Regulation, we have continued to comply with the Code of Practice for Statistics, and have made the following improvements:

- Improved the accuracy of the historic emissions estimates by continuing to make methodological changes to the UK's Greenhouse Gas Inventory.
- Expanded the local authority emissions statistics to include estimates of methane and nitrous oxide emissions, and estimates of emissions in National Park areas.
- Included information about emissions per km^2 of land area in each authority and a more detailed breakdown of industrial, commercial, public sector and LULUCF emissions in the tables.

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 BEIS 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/collections/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics

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