London's Consumption-Based Emissions account 2001 - 2020

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LONDON COUNCILS

London’s Consumption-Based Emissions Account (2001 – 2020)

Contents

1. Executive Summary

This report sets out the impacts of the goods and services that Londoners consume on the climate and how we can work together to reduce those impacts, whilst being mindful of challenges facing Londoners, including the cost of living crisis. It was jointly commissioned by London Councils, the Greater London Authority (GLA) and ReLondon, from the University of Leeds.

> What is a Consumption-Based Emissions Account?
>
> Standard territorial accounting of greenhouse gas emissions, such as the London Energy and Greenhouse Gas Inventory (LEGGI), measures the direct emissions produced in the Greater London area. By contrast, consumption-based emissions accounts take a wider view by including the emissions embodied in the goods and services that are imported into London and consumed here. Whilst territorial emissions account for the climate impact of activities occurring in London, consumption-based emissions account for the climate impact of Londoners' lifestyles. A detailed explanation of consumption-based emissions and the methodology used can be found in the technical report produced by the University of Leeds.

In this report we analyse London's consumption-based emissions from 2001 – 2020, focusing on household consumption across five themes: food, housing, transport, goods and services.[1] London is the only city in the world that has a long-term, disaggregated consumption-based emissions dataset at the city-wide and borough level. The full dataset and technical report that underpins this report can be found online.[2]

Key messages from this report:

- London continues to see annual reductions in consumption-based emissions, in line with the overall UK trend.
- Despite significant reductions in emissions, London will need to go further to achieve net zero.
- The key areas of London's household consumption-based emissions remain transport, housing (including emissions embedded in buildings' materials) and food (eaten at home and outside the home).
- Borough emissions profiles are largely similar, although the difference between the lowest and the highest is significant: the lowest emitting borough (Newham, 6.31 tonnes CO_2e (tCO_2e)) is around two-thirds that of the highest (City of London, 9.64 tCO_2e).

[1] This report updates the previous pan-London consumption-based emissions accounting commissioned by the GLA and the borough-level accounting commissioned by London Councils and ReLondon. Moving forward, London Councils, GLA and ReLondon have agreed to jointly commission CBE accounting on annual basis.

[2] https://www.londoncouncils.gov.uk/our-key-themes/climate-change/consumption-based-greenhouse-gas-household-emissions-profiles-london; https://data.london.gov.uk/dataset/london-s-consumption-based-greenhouse-gas-emissions

- London Councils, the GLA and ReLondon will continue to collaborate to commission these accounts, and support efforts to make similar accounts available to all UK local authorities.[3]

Key Findings

- London's consumption-based emissions dropped 32% between 2001 – 2020, from 104 Mtonnes CO_2e to 71 Mtonnes (Fig.3.1). On a per capita basis, taking into account London's population growth, they have dropped 43%, from 13.80 tCO_2e to 7.86 tonnes (Fig.3.2).
- Every London borough has seen a reduction in their total consumption-based emissions between 2001 – 2020, with Kensington and Chelsea reducing by the largest proportion (39.9%) and City of London reducing by the smallest (9.5%). On a per capita basis, Redbridge has seen the largest per capita reduction (49.6%) and Kensington and Chelsea the least (35.4%).
- The 2008 financial crisis was the main cause of these reductions, due to its negative impact on incomes and consumption, together with the decarbonisation of the UK electricity sector. The impact of Covid-19 can for the first time be seen in this data, with significant reductions in transport and services in London in 2020 compared to 2019.The impact of methodological changes introduced this year can also be seen, particularly in the transport footprint.
- Whilst these reductions are substantial, their current pace is largely insufficient to meet the London Councils' One World Living programme target of a two-thirds reduction in consumption-based emissions by 2030, or targets to achieve net zero in London by the same date.[4]
- Much of the required emissions reductions are structural, relating to the decarbonisation of housing and transport, the development of redistribution infrastructure (e.g. for goods and building materials) or for example the development of repair, renting and sharing services. But this structural development will need to go hand in hand with a change to the way Londoners eat, travel and shop.
- The wide variation in income and living styles within boroughs needs to be taken into account in supporting this change. Wealthy areas have larger than average impacts, driven by spending on goods such as clothing, air travel, recreation and other services. However, many Londoners have seen their incomes stagnate in recent years.[5] There will be considerable variation within each borough, at a granular level that this data is not currently able to illuminate.

[3] www.localfootprint.uk

[4] https://www.london.gov.uk/programmes-and-strategies/environment-and-climate-change/climate-change/zero-carbon-london/pathways-net-zero-carbon-2030

https://www.londoncouncils.gov.uk/our-key-themes/climate-change/borough-climate-action-plans-and-targets

[5] https://www.london.gov.uk/media-centre/mayors-press-release/POORWAGEGROWTH

- Further work such as the development of personas is needed to draw out the different emissions profiles of Londoners' ways of living and develop strategies that can deliver a just transition to low carbon lifestyles for all Londoners.

Thematic findings

- London's footprint is divided into five themes for household-related emissions – food, housing, transport, goods and services, and two themes for non-household emissions – government and capital investment consumption.
- Household emissions, which are the focus of this report, have dropped 39% between 2001 – 2020, from 75 Mtonnes CO_2e to 45 Mtonnes (Fig. 3.1). On a per capita basis they have dropped 49% from 10.04 tonnes CO_2e to 5.09 tonnes (Fig. 3.2). Figure 1 illustrates the distribution of emissions across these categories, which is largely mirrored at the borough level (Fig. 3.7).
- London's emissions for food, housing, transport and goods are lower than the average for other UK regions, but the services emissions are larger (Fig. 3.6). Compared to 2019, London's per capita emissions for food and housing are almost exactly the same, and for goods are very slightly higher. Transport and services emissions saw significant reductions in 2020 compared to 2019 (Fig. 3.3).

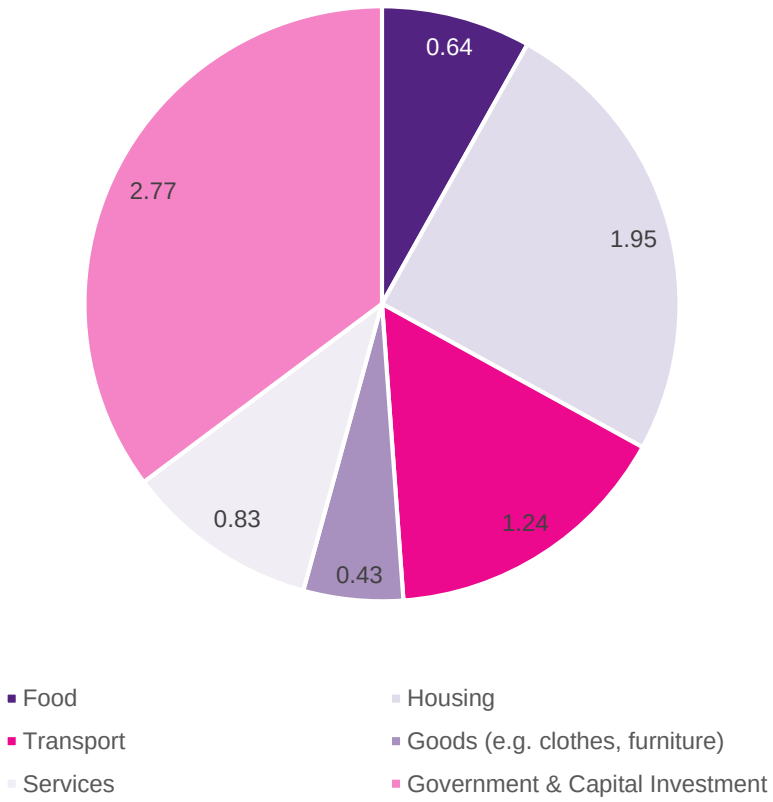

Figure 1.1: Per capita consumption-based emissions by theme, 2020 (tonnes CO_2e)

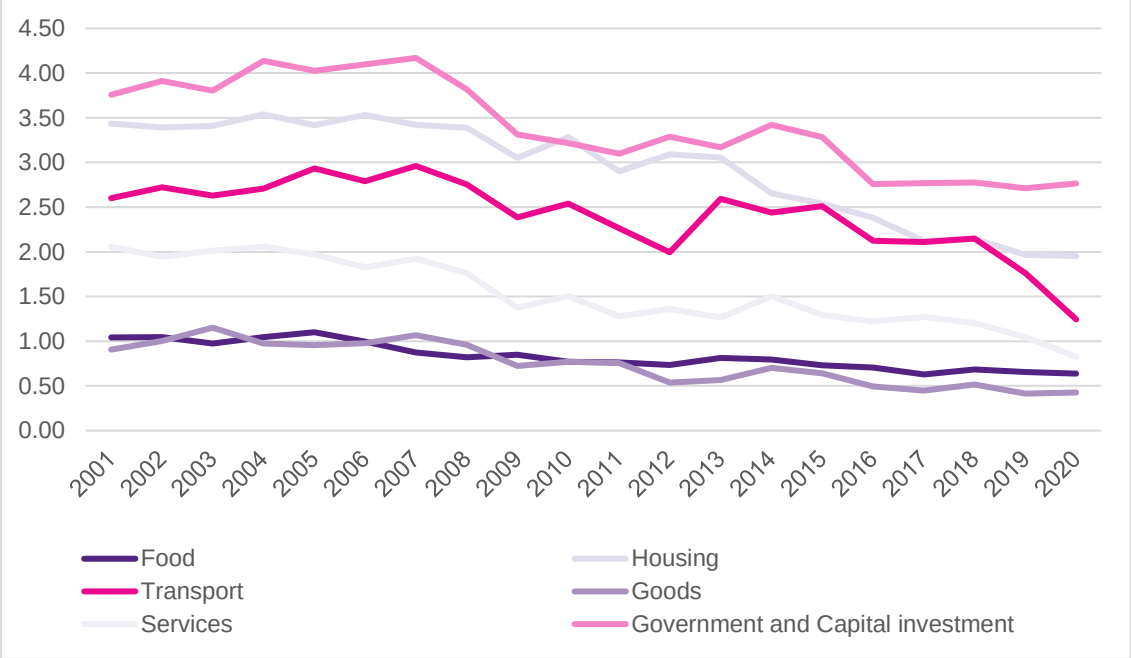

Figure 1.2: Per capita emissions from household consumption-based emissions, 2001 – 2020 (tCO_2e)

- **Food** accounted for 8% of London's per capita emissions in 2020. Between 2001 and 2020 they dropped by 39%; since 2019 they have reduced by 2%. Meat comprises 59% of Londoners' food footprint, followed by bread and cereals (16%) and dairy and eggs (11%). Food emissions are low relative to other UK regions, reflecting the fact that Londoners spend less on meat.
- **Housing** emissions are dominated by gas used for heating, hot water and cooking; gas and other fuels account for 57% emissions. In 2020, housing accounted for 25% of per capita emissions, with a 43% fall since 2001 and a 0.7% fall since 2019. Compared to other regions in the UK, Londoners spend less on heating and power. This is a function of increased household occupancy rather than lower energy bills and/ or more efficient homes.
- **Transport** accounted for 16% of London's per capita emissions in 2020. Between 2001 and 2020 they dropped by 52%; since 2019 they have reduced by 29% (mainly associated with reductions in public transport and aviation). Half of London's transport emissions are from private transport. A further 25% arise from aviation, with 16% from public transport. London's transport emissions are the lowest in the UK, but follow a very different pattern due to the density of London's public transport network.
- The **Goods** theme includes hobbies, pets and sports (36%), furniture and homeware (20%), and clothes (17%), and is the smallest category of per capita emissions, accounting for 5% in 2020. This represents a 53% reduction since 2001, and a 2.7% increase since 2019. Nonetheless, London has the lowest average goods footprint in the country, with particularly low spend on hobbies, pets and sports.
- **Services** accounted for 11% per capita emissions in 2020; they have reduced by 60% since 2001 and 21% since 2019, mainly reflecting reductions in spend on private healthcare and

restaurants and cafes. Service emissions are dominated by restaurants and cafés (47%), followed by finance and insurance (13%); they are higher than the average for UK regions. Reducing emissions in this area would involve working with businesses to decarbonise and promote the circular economy.

- **Government** emissions represented 20% of London's consumption-based emissions and are dominated by central government, followed by local authorities and not-for-profit institutions.
- **Capital** emissions account for 15% of London's per capita consumption-based emissions, include the emissions associated with the development and construction of buildings, infrastructure, large machineries and other capital investment from individuals, public and private organisations. Although the methodology used doesn't give any details on where those emissions come from, based on other studies, it can be assumed that most of it comes from the construction of buildings and infrastructures.[6]
- Given that government consumption and capital investment emissions are based on a population weighted share of the national level emissions, reductions over time do not tell us anything about London in particular.

[6] Emissions associated with construction and refurbishment of buildings represented 11% of consumption-based emissions in C40 member cities in 2017 (https://www.c40.org/wp-content/uploads/2021/08/2270_C40_CBE_MainReport_250719.original.pdf)

2. Background to this report

2.1. Why London Government commissions this data

London Government is taking ambitious action on climate change, with accelerated targets for reaching net zero.[7] London boroughs have made climate change one of the key shared ambitious of their collective work through London Councils, working closely with the GLA and ReLondon, amongst other partners. A suite of major programmes underpins this collaboration, including the One World Living programme, which focuses on reducing consumption emissions.[8]

A substantial proportion of our emissions, particularly those associated with goods and services, are produced outside of the UK and embodied in the goods and services imported into the city through manufacturing, transportation or disposal. These emissions are not included in standard territorial emissions accounts, and since cities consume significant amounts of goods and services, a territorial account of their emissions does not reflect the full impact of their consumption on the climate.

In 2020, the GLA commissioned University of Leeds to produce a regional consumption-based greenhouse gas (GHG) emissions account for the Greater London area. However, London boroughs recognised that there was a need for more granular, borough-level consumption emissions data, to enable them to understand and effectively address emissions in their area. Working with GLA, ReLondon and University of Leeds, London Councils commissioned the UK's first ever set of local authority-level consumption-based emissions profiles in 2021, covering London boroughs from 2001 - 2018. This report presents a non-technical summary of updated regional and borough-level data for 2001 – 2020; it should be read in conjunction with University of Leeds' Technical report, 'Consumption Based Greenhouse Gas Emissions for London and its Boroughs'.[9]

The consumption-based emissions account for London and its boroughs provides a strong evidence base for understanding and shaping London government's efforts – working with residents, businesses and central government – to reduce those emissions in a fair and equitable manner. The One World Living programme, led by the London Borough of Harrow working with West London Waste Authority, is one of London Councils' major collaborative climate programmes and will continue to be a major focus point for these efforts: for more information on its work, you can download the programme action plan online[10], or contact the programme leads.[11]

[7] https://www.london.gov.uk/programmes-and-strategies/environment-and-climate-change/climate-change/zero-carbon-london/pathways-net-zero-carbon-2030
https://www.londoncouncils.gov.uk/our-key-themes/climate-change/borough-climate-action-plans-and-targets

[8] https://www.londoncouncils.gov.uk/our-key-themes/climate-change

[9] https://www.londoncouncils.gov.uk/our-key-themes/climate-change/consumption-based-greenhouse-gas-household-emissions-profiles-london

[10] https://www.londoncouncils.gov.uk/our-key-themes/climate-change

[11] Matthew Adams (matthew.adams@harrow.gov.uk), Motoko Doolan (motokodoolan@westlondonwaste.gov.uk), or Christin Kowalke (ChristinKowalke@westlondonwaste.gov.uk).

2.2. Methodological improvements

Since the 2001 – 2018 results were published in 2021, there have been several methodological improvements in the calculation of the emissions associated with Greater London. Some improvements are a legacy of changes made at the national level; other changes are specific to how the share of emissions is distributed by sub-national regions in the UK.

At the national level, a major improvement in the way removals of taxes from imports are calculated, and the changes to the method for calculating the Global Warming Potentials for non-CO_2 greenhouse gasses in the Intergovernmental Panel on Climate Change's Fifth Assessment Report (AR5), have led to a fall in the national consumption-based emissions account. When translated to the London results, this has meant that the 2023 per capita release is on average 12% lower than the 2021 per capita release; the nature of the national methodological changes has a particularly strong impact on London, due to the make-up of its consumption-based emissions.

Two improvements have been made to the methodology which distributes the UK's emissions to the regional and local level. The first relates to the distribution of emissions associated with direct fuel burnt in heating the home, where previously no distinction was made between gas and other higher-carbon fuels. The new methodology reduces the average per capita gas footprint in London by 18% (0.26 tCO_2e), reflecting the fact that a higher share of the UK solid fuel emissions arise in Northern Ireland.

Secondly, ferries and cruise ships are no longer in the same spending category as Oyster card travel. This means that the carbon multiplier ($kgCO_2e$/£) associated with Oyster card spend is a lot smaller because it doesn't include high carbon modes of travel like ferries and cruise ships. As a result, per capita emissions for passenger travel in London are now a full 1 tCO_2e lower for the year 2018. Previously, emissions estimates for Oyster card spend were far too high.

Finally, this year's release includes a population weighted share of the national level emissions associated with government and capital investment expenditure. Emissions associated with buildings, roads, Government spend on the health services, education and defence and local government expenditure are calculated at the national level and each UK citizen is given an equal share of this amount. In 2020 this was 2.80 tCO_2e per person. The inclusion of this additional category means that care needs to be taken when comparing this year's release with the 2001 – 2019 results, published in 2021.

3. London's Consumption-Based Emissions Data

3.1. Overview

London's overall consumption-based emissions in 2020 are 71 Mtonnes CO_2e, a reduction of 32% from 104 Mtonnes CO_2e in 2001. These emissions include household and government consumption and capital investment.[12] Emissions from households dropped 39% from 75 Mtonnes CO_2e in 2001 to 45 Mtonnes CO_2e in 2020 (Fig 3.1).

The emissions for London slowly rose between 2001 and 2007 and reduced sharply during the recession years 2007-2009. During the recession, analysis of the UK results shows that emissions reductions were caused by lower spending and a preference to purchase domestically produced goods rather than imports.[13] From 2009-2014, emissions stabilise with some fluctuation, then steadily reduced from 2014 to 2018.[14] This period of emissions reduction is mainly driven by decarbonisation of the UK electricity sector.

We see a further steep decline post 2018. In contrast to emissions changes in other UK regions, London reduced its emissions sharply between both 2018 and 2019 and between 2019 and 2020. In both cases, the reduction was due to reduced spend on car fuel. London's reduction in emissions during Covid-19 appears to be lower than the UK average. This is due to the relatively small size of London's private transport footprint compared to other regions. Although the percentage reduction in spend on car fuel was similar in all regions of the UK (apart from Northern Ireland), in London this was a reduction on a smaller starting level.

On a per capita basis, London has dropped 43% from 13.80 CO_2e tonnes in 2001 to 7.86 tonnes in 2020. Looking at household per capita consumption only, the drop has been 49% from 10.04 tonnes to 5.09 tonnes (Fig.3.2).

It is not possible to accurately disaggregate government and capital investment consumption to the local level. This means we are unable to analyse the components of government or capital investment emissions and neither is it possible to allocate government and capital investment consumption to boroughs without simply adding the national average to the borough emissions. In addition, ordinary Londoners have no means to directly influence emissions from many government or capital investment activities, for example defence spending. This report accordingly focuses on household consumption emissions, and all further references to consumption-based emissions refer to household emissions unless otherwise stated.

[12] Capital investment refers to physical assets such as property, buildings, equipment or technology as well as intangible assets.

[13] https://www.carbonbrief.org/guest-post-why-uks-carbon-footprint-is-decreasing/

[14] The slight uptick in 2012-2013 appears to be from higher than average spend on aviation in 2013 from London residents

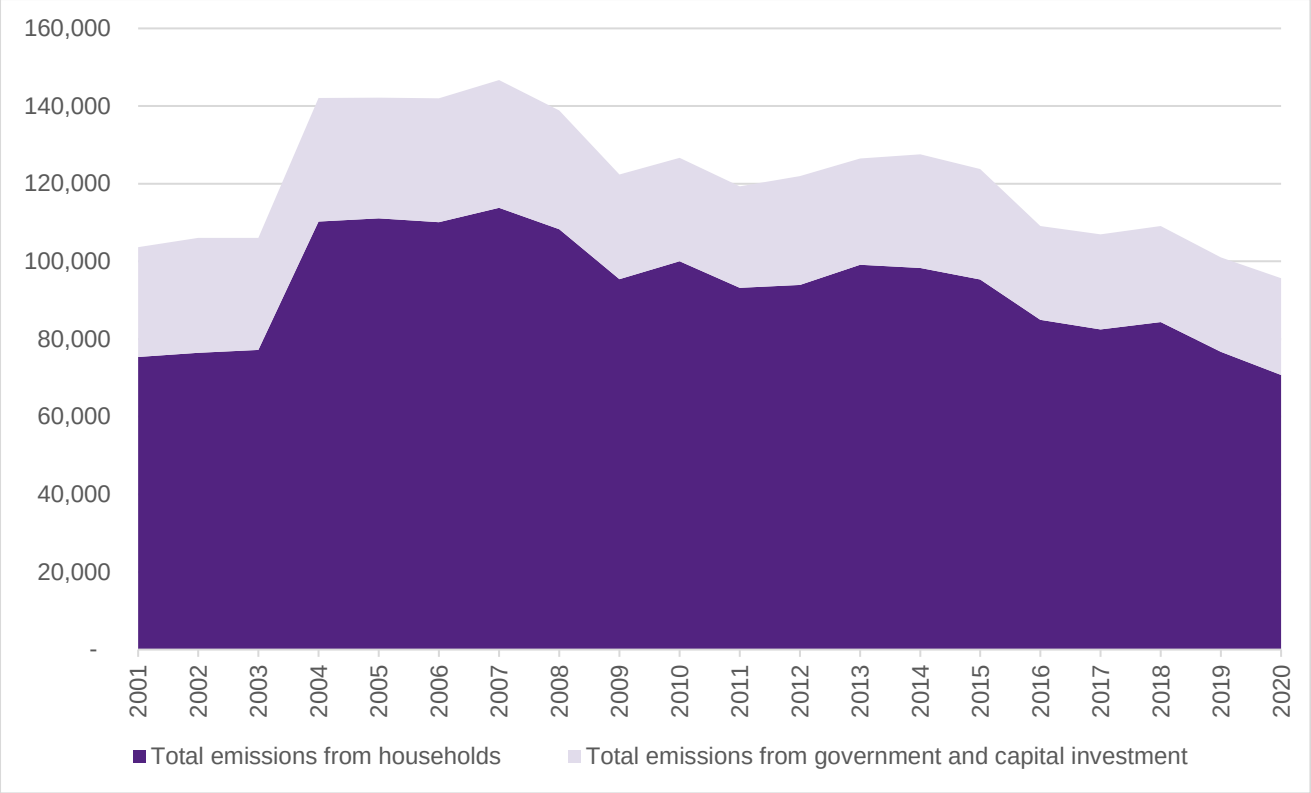

Figure 3.1 London's Total Consumption-Based Emissions, 2001 – 2020 (CO_2e)

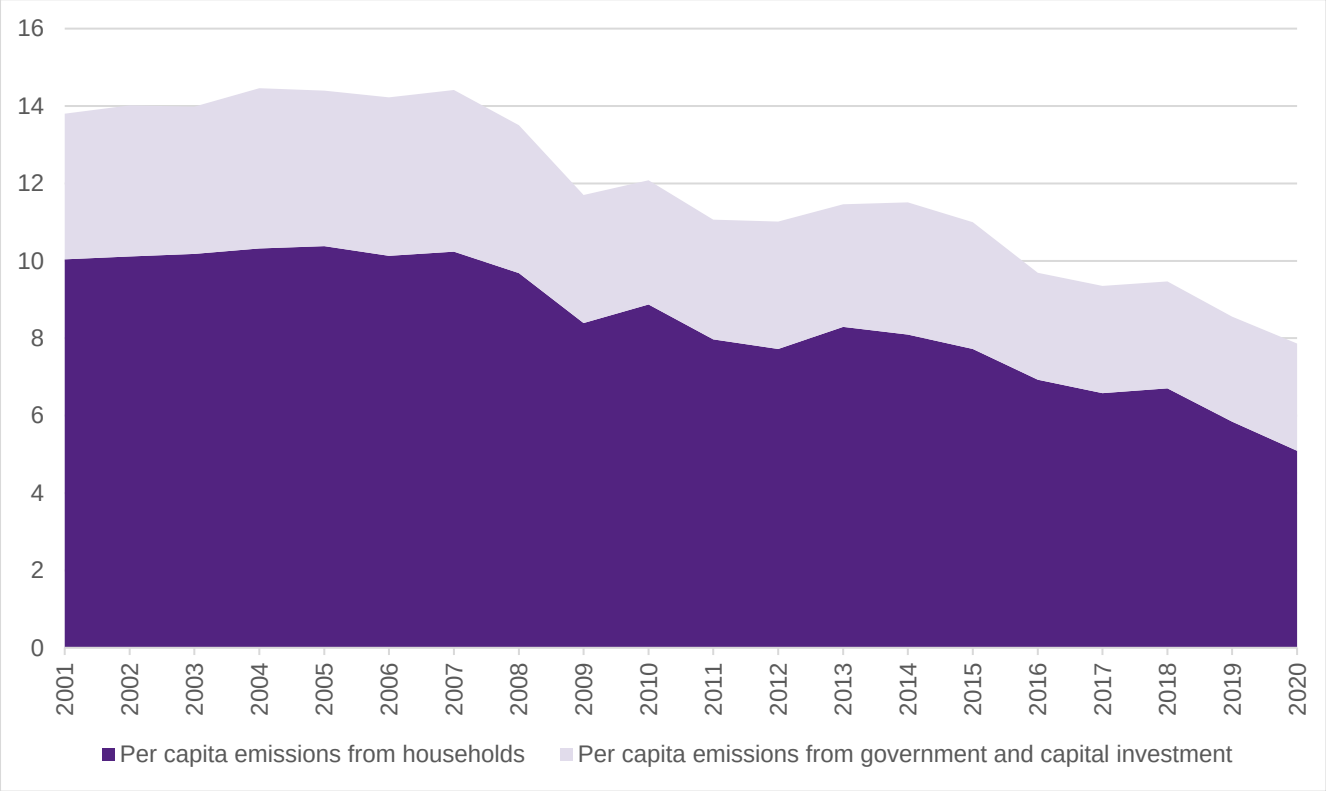

Figure 3.2 London's Per Capita Consumption-Based Emissions, 2001 – 2020 (CO_2e)

Looking at specific themes, and setting aside government consumption and capital investment, the major source of emissions continues to be heating and powering London's homes (Fig. 3.3). We also see a significant decrease in the transport footprint (including public transport, air travel, vehicle purchases and running a car), due to the impact of the first year of the Covid-19 pandemic.

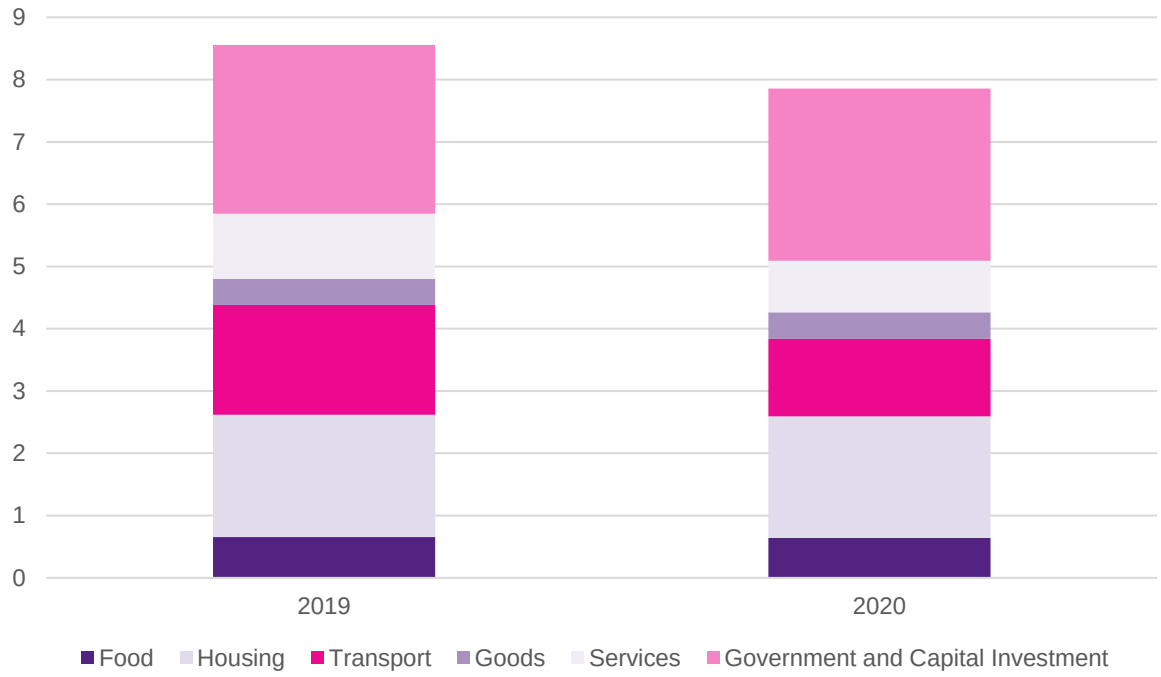

Figure 3.3: London consumption emissions by theme (2019 and 2020) (tCO_2e)

3.1.1. International Comparison

Work by the Institute for Global Environmental Strategies (IGES) in collaboration with the Hot or Cool Institute assessed the household consumption footprints across cities ('lifestyle footprints') (Figure 3.4)[15]. Compared to these cities, London fits between Yokohama and Kyoto at 7 tonnes/capita and Sao Paulo at 3.5 tonnes/ capita, although this should be seen as indicative given the differences in methodology. Similarly, the Global Carbon project puts the UK at around the middle of European and OECD countries, but does not provide disaggregation by domain.[16,17]

[15] https://www.iges.or.jp/en/pub/1-5degree-policiesforlowcarboncities2030/en

[16] The Global Carbon Project measures CO_2, not CO_2e, which covers all greenhouse gases.

[17] https://www.globalcarbonproject.org/

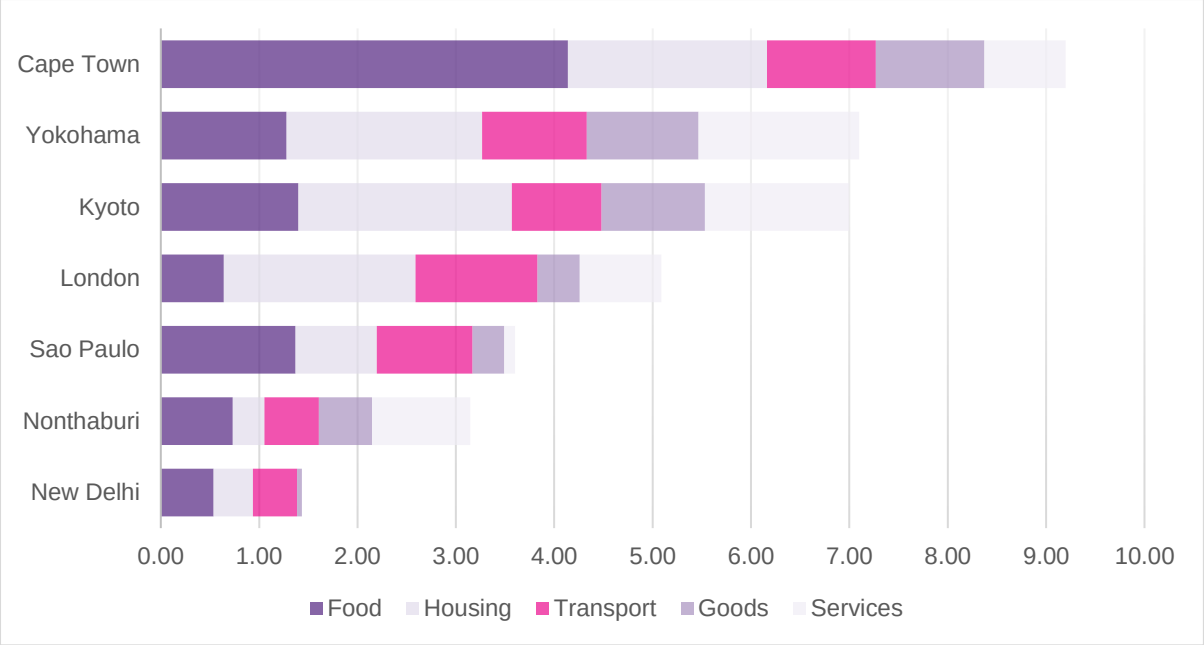

Figure 3.4 Per Capita Consumption-Based Emissions, City Data (Source: Hot or Cool Institute and the Institute for Global Environmental Strategies[18], together with 2020 London CBE data)

The Hot or Cool Institute has also produced disaggregated data on per capita consumption-based emissions for 10 countries including the UK (Fig.3.5), and proposed targets in line with the Paris Agreement target: 2.5 tonnes/capita by 2030, 1.4 tonnes/capita by 2040 and 0.7 tonnes/capita by 2050. A two-thirds reduction from the 2020 household emissions of 5.09 tonnes/capita would give a London target of 1.7 tonnes/capita, making the London target more ambitious.

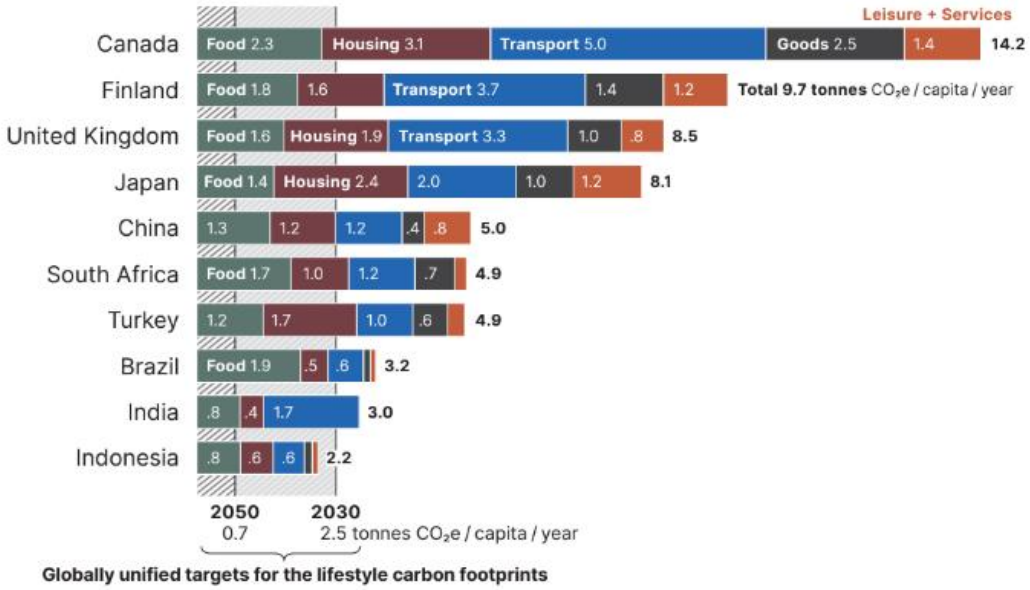

Figure 3.5 Per Capita Consumption-Based Emissions, National Data (average lifestyle carbon footprint of country established as of 2019) (Source: Hot or Cool Institute[19])

[18] https://www.iges.or.jp/en/pub/1-5degree-policiesforlowcarboncities2030/en

[19] https://hotorcool.org/1-5-degree-lifestyles-report/

C40 Cities, a global network of nearly 100 mayors, announced a collaboration in May 2022 between New York City and London to further investigate available data in both cities linked to consumption-based emissions. The project aims to develop an actionable data indicators framework to help both cities identify data that they can use to plan and measure actions to reduce consumption-based emissions and/or shift consumption patterns to reduce climate impacts and improve wellbeing[20].

3.1.2. UK Regional Comparison

London had the lowest per capita emissions of any UK region in 2020, having achieved the greatest decrease in emissions from 2001, when it had emissions around the average for UK regions. Figure 3.4 shows that London had the lowest consumption-based emissions in every theme, except for Services.

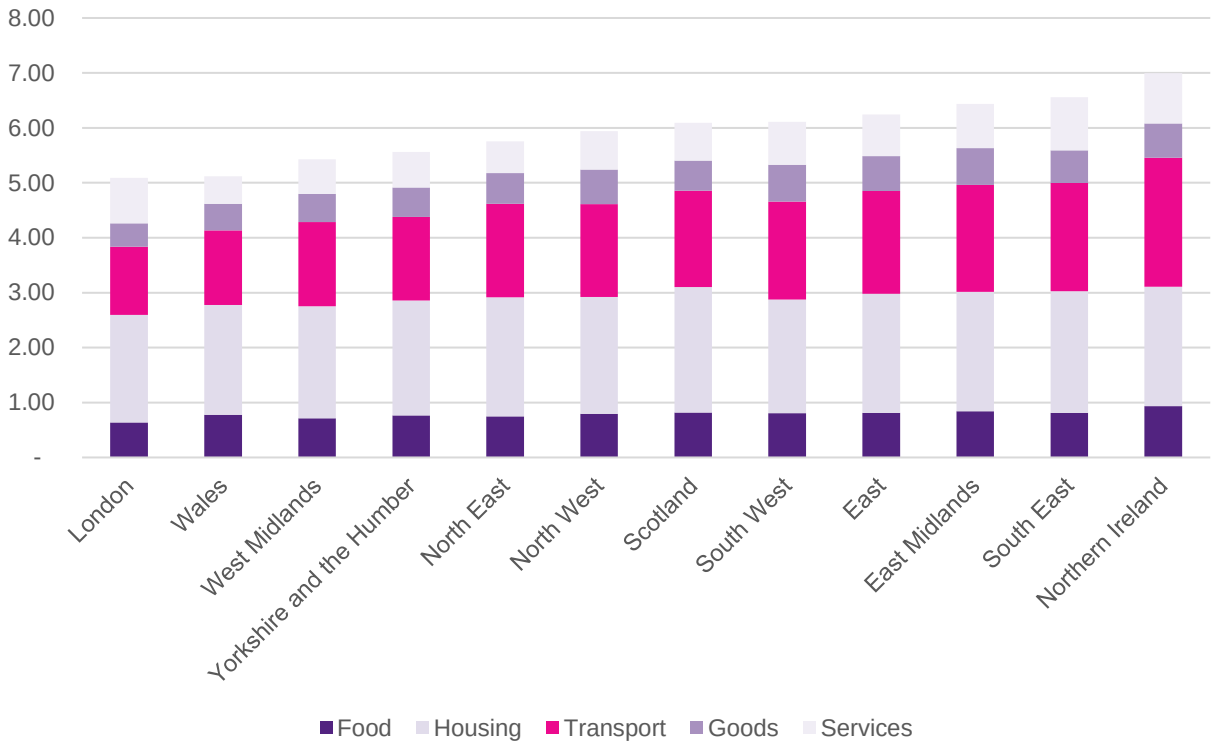

Figure 3.6 UK Per Capita Consumption-Based Emissions by Region, 2001 – 2020 (tCO_2e)

3.1.3. London Analysis

Within London, as for the 2021 release, the lowest emitting borough is Newham with 3.54 tonnes/per capita household consumption-based emissions and the highest emitting is the City of London with 6.87 tonnes/per capita. All boroughs have seen a reduction in their total consumption-based emissions since 2001; on a per capita basis, Redbridge has seen the largest reduction (49.6%) and Kensington and Chelsea the least (35.4%).

[20] https://www.c40.org/news/amex-map-consumption-emissions-london-new-york-city

Most boroughs are close to the overall average of 5.12 tonnes/capita. Wealthier boroughs tend to emit more, which is in line with previous research showing a correlation between income and emissions.[21,22] Boroughs are broadly aligned to the London-wide split across themes, outlined in Figure 3.3. above, with housing remaining the major area of emissions.

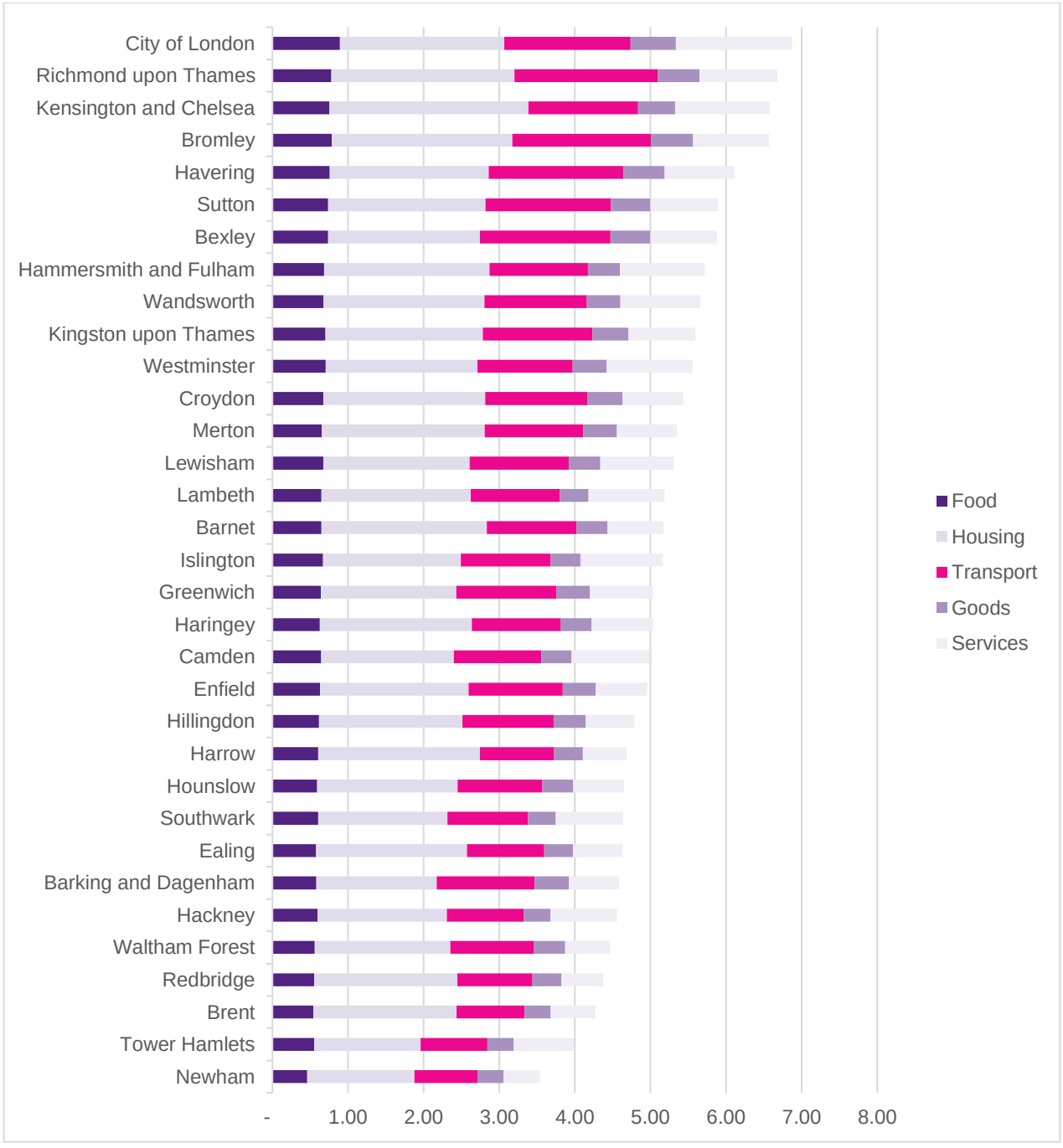

Figure 3.7 Household Per Capita Consumption-Based Emissions Data, London Boroughs and the City of London, 2001 – 2020 (tCO_2e)

[21] https://www.oxfam.org/en/research/confronting-carbon-inequality

[22] https://www.unep.org/emissions-gap-report-2020

3.1.4. Public Perception

The data presented here demonstrate considerable variation in emissions between different themes. However, London Councils' polling shows that Londoners do not always understand where their actions can make most difference. Other polling has consistently shown that public understanding regarding effective action is not aligned with the science.[23,24,25] For example, the public usually believes recycling has a considerable climate impact, which is not the case. Recycling's main environmental impact is through preventing land and water pollution and harming animals and nature from resource extraction or waste disposal.

There are limited examples of people living in high income nations reducing their emissions to a sustainable level[26]. Where examples exist, participants have had a clear understanding of their current footprint, the reduction potential of changes and how to move along a pathway to sustainability as a member of a supporting group. To make the reductions needed, Londoners will also need the right knowledge, tools and enabling environment.

The following sections examine the themes in turn, highlighting London and the boroughs' relative position, and hotspots.

[23] https://cast.ac.uk/publications/briefings/

[24] https://wrap.org.uk/resources/report/attitudes-climate-change-uk-september-2020

[25] https://www.londoncouncils.gov.uk/climate-change-poll

[26] https://www.iges.or.jp/en/pub/sustainablelifestylespolicyandpractice/en

3.2. Food

In 2020, the average Londoner had a food carbon footprint of 0.64 tCo_2e, the lowest of the UK regions (Fig. 3.8). London's food footprint dropped 39% during the period 2001 – 2020, from 1.04 tonnes/capita. It has dropped 2% since 2019.

The food footprint comprises all of the emissions relating to the production, transportation and selling of food, including food produced overseas and imported into London. Meat is the most carbon intensive part of any diet, with the highest emissions associated with red/ruminant meats and the lowest from birds such as chicken.[27] The reductions in the London food footprint are primarily due to the significant drop in emissions related to meat, which have fallen from 0.57 tonnes/capita to 0.37 tonnes/capita, a fall of 34%.

Within London, the average food footprint ranges from 0.46 tonnes/capita in Newham with the City of London being the highest at 0.89 tonnes/capita. The proportion of different sub-themes is similar across each borough though, suggesting that levels of, rather than type of consumption, is driving differences between boroughs.

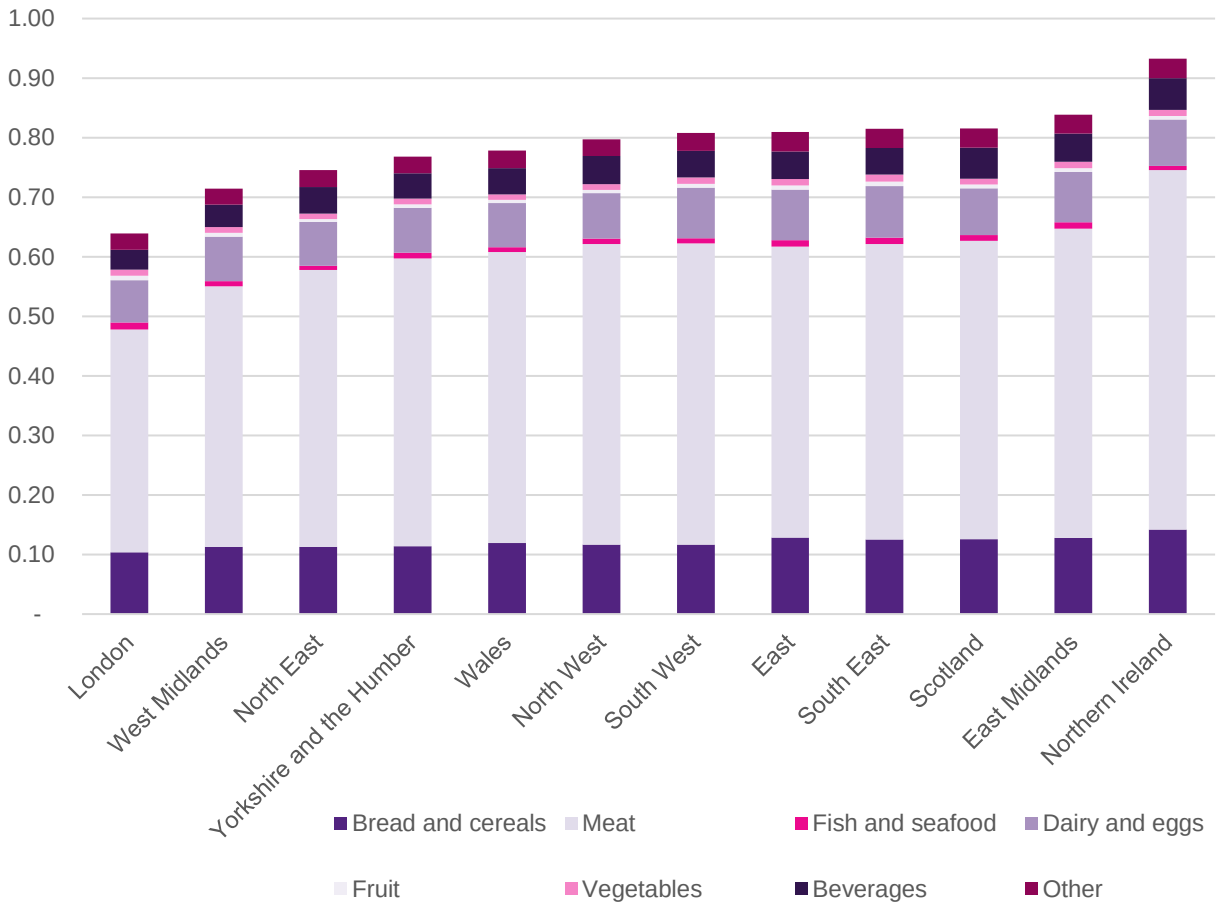

Figure 3.8 Per Capita Emissions for Food, UK Regions, 2020 (tCO_2e)

[27] https://ourworldindata.org/environmental-impacts-of-food

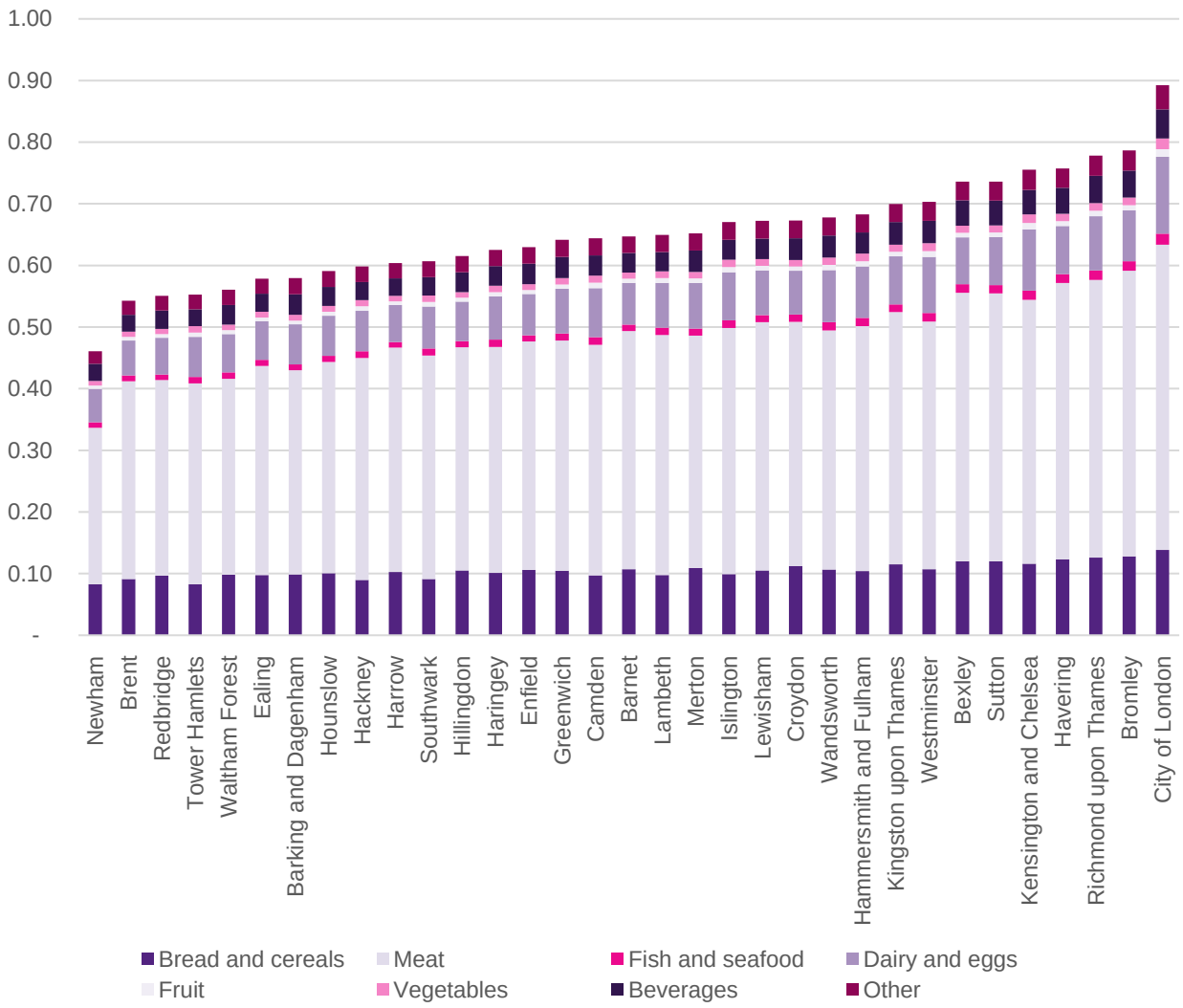

Figure 3.9 Per Capita Emissions for Food, London Boroughs and the City of London, 2020 (tCO_2e)

We note that a detailed Materials Flow Analysis for food in London, published by ReLondon in 2021, found that although meat was the largest category of food emissions, it represented only 27% of households' consumption-based emissions, compared to 59% in this footprint. The ReLondon study also found that meat represented only 5% of the food consumed by Londoners (in tonnes). Dairy also represented a high shared of total emissions (19%), while cereals accounted for 9%. Finally, miscellaneous/ other comprised 29% of emissions and includes a variety of often processed food products.[28]

[28] 2021, ReLondon, *London's Food Footprint* (https://relondon.gov.uk/wp-content/uploads/2021/11/ReLondon_Londons_food_footprint_online.pdf)

3.3. Housing

Londoners' per capita housing footprint was 1.95 tonnes in 2020, as compared to the UK average of 2.12 tonnes. This is again the lowest of the UK regions, but with relatively less variability compared to food emissions.

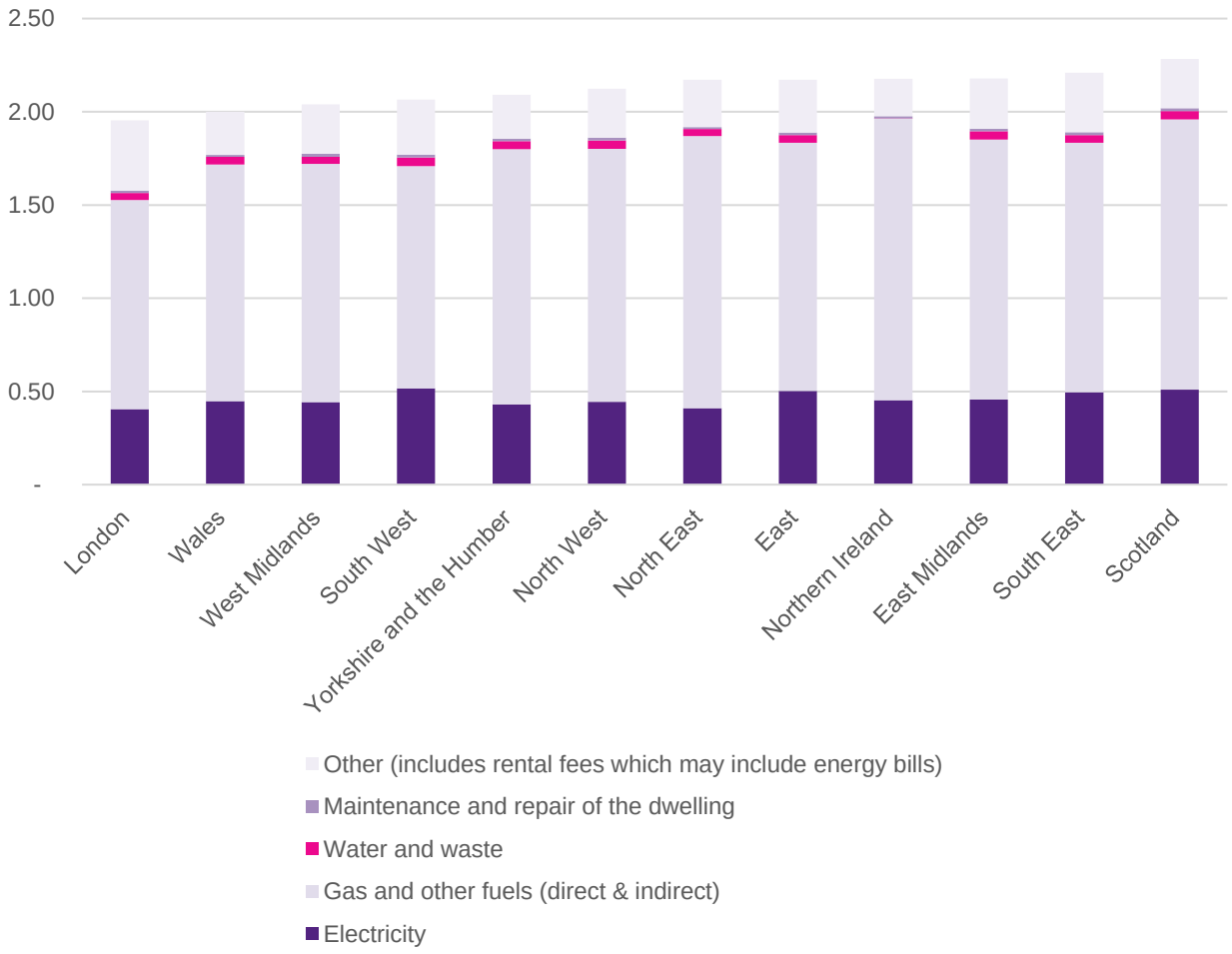

Figure 3.10 Per Capita Emissions for Housing, UK Regions, 2020 (tCO_2e)

The housing footprint in London has seen a 43% reduction since 2001, from 3.44 tonnes/capita; from 2019 it has reduced only 0.7%. Reductions since 2001 mainly reflect decarbonisation of the electricity grid, with the emissions from electricity dropping from 0.94 tonnes/capita to 0.4 tonnes/capita, a reduction of over half. Within the footprint, gas and other fuels are the largest sub-theme, at 1.12 tonnes/capita and 57% of the whole footprint. Londoners' reduced spending on heating and power is a function of increased household occupancy rather than lower energy bills and more efficient homes.[29]

[29] The housing footprint does not include the emissions associated with construction; this is found in the capital investment emissions, but it has not been possible to disaggregate the data. Ongoing work by C40 on London's consumption emissions may shed further light in this area.

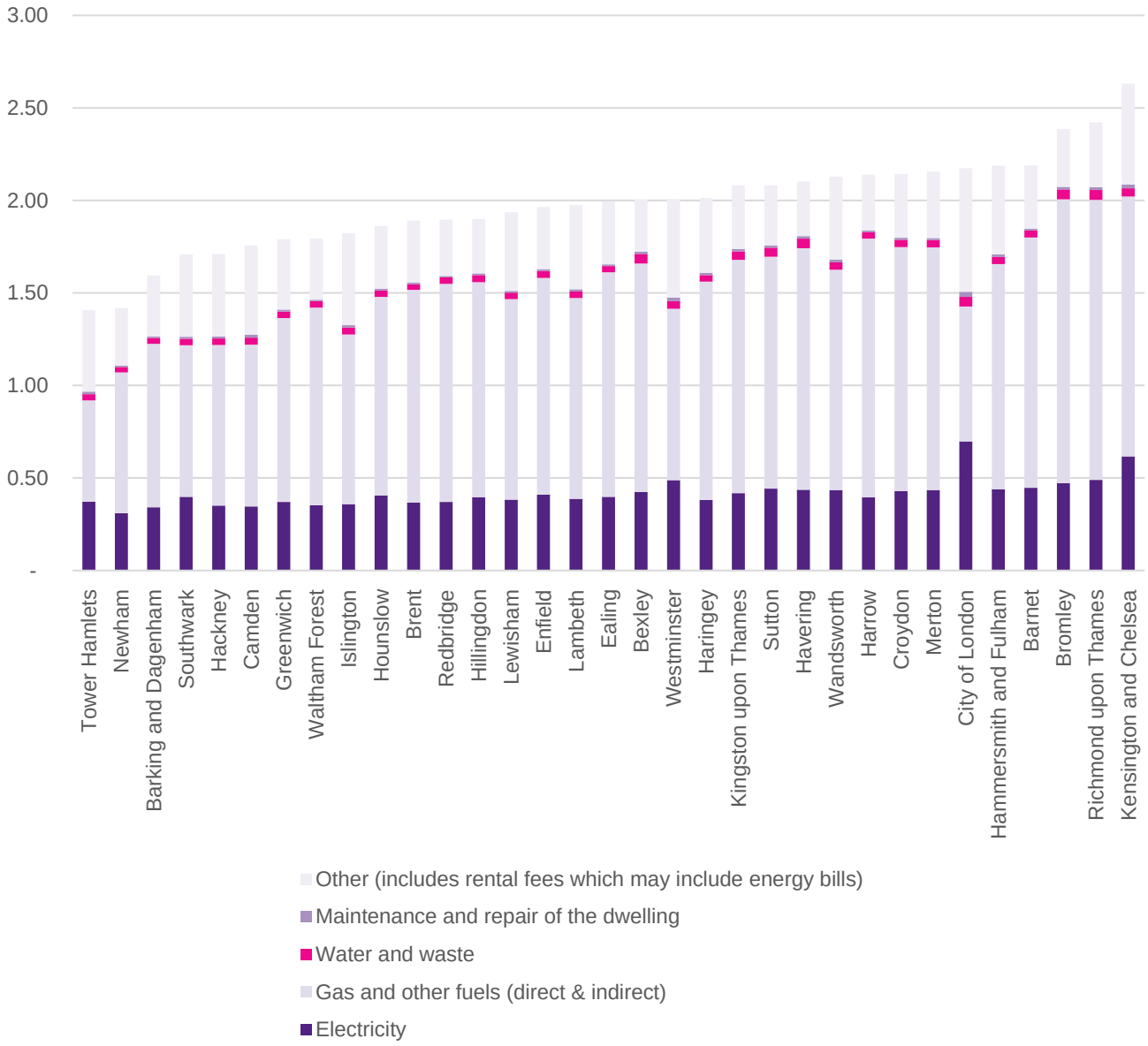

Figure 3.11 Per Capita Emissions for Housing, London Boroughs and the City of London, 2020 (tCO_2e)

Within London, there is a significant range in housing footprints, with the smallest (Tower Hamlets, 1.41 tonnes) just half of the largest (Kensington and Chelsea, 2.63 tonnes).

3.4. Transport

In 2020, the average transport footprint in London was 1.24 tonnes, which has fallen 52% from 2.60 tonnes in 2001 and 29% from 1.76 tonnes in 2020. London's transport emissions are the lowest in the UK, but follow a very different pattern due to the density of London's public transport network (Fig. 3.12). Half of London's transport emissions are from private transport. A further 25% arise from aviation, with 16% from public transport – the largest proportion of any regional footprint.

Emissions from private and public transport both reduced by more than half since 2001, whilst aviation has reduced by only 8%. The reduction since 2020 is mainly associated with reductions in public transport and aviation.

Figure 3.12 Per Capita Emissions for Transport, UK Regions, 2020 (tCO_2e)

Comparing overall transport emissions across the boroughs, the differences are more pronounced than food or housing, with the smallest footprint (Newham, 0.83 tonnes/ capita) less than half that of the largest (Richmond Upon Thames, 1.90) (Fig. 3.13).

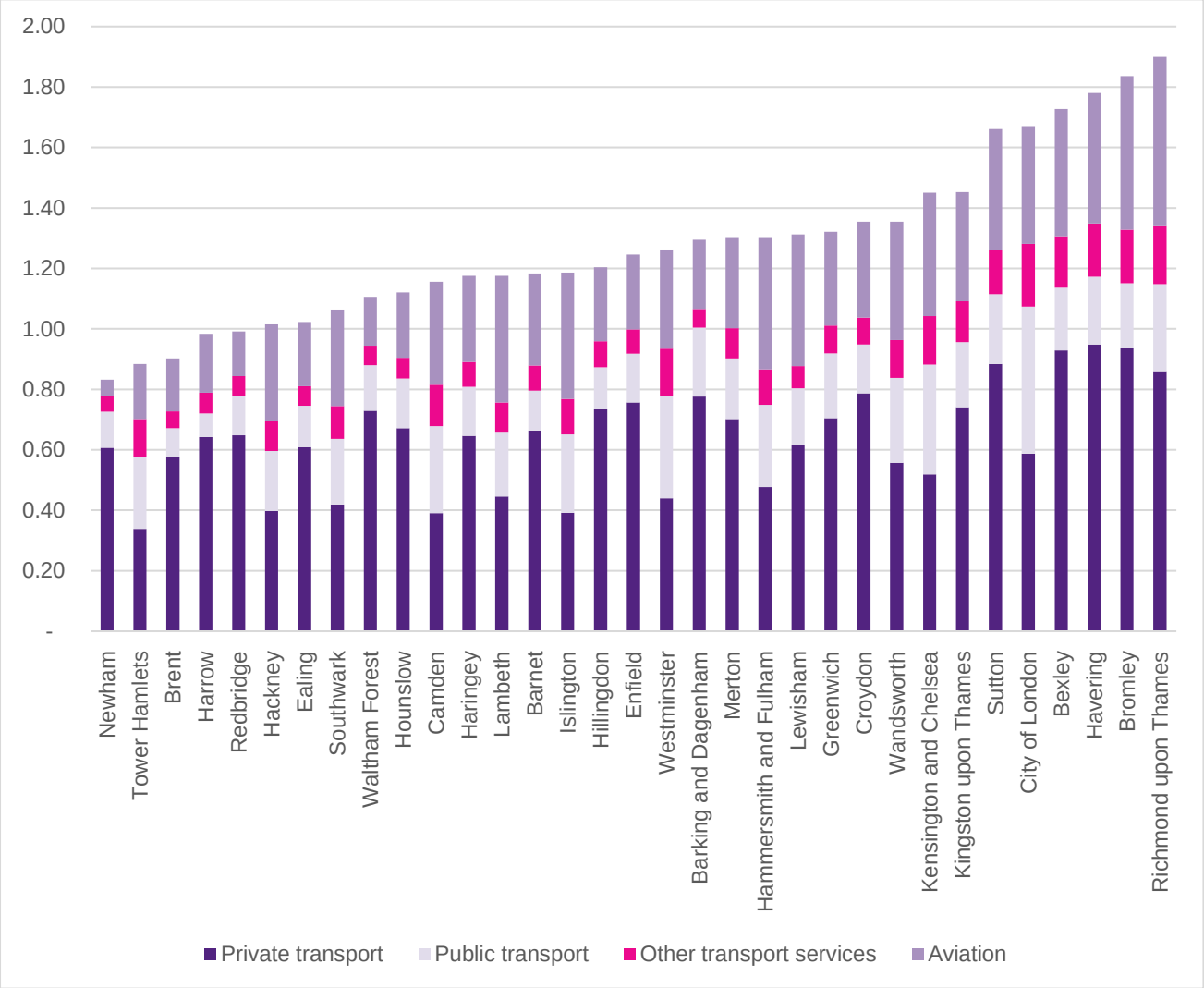

Figure 3.13 Per Capita Emissions for Transport, London Boroughs and the City of London, 2020 (tCO_2e)

The composition of transportation footprints also varies considerably across London:

Private transport		**Public transport**		**Aviation**	
Greatest	Least	Greatest	Least	Greatest	Least
0.95 (Havering)	0.34 (Tower Hamlets)	0.49 (City of London)	0.08 (Harrow)	0.56 (Richmond Upon Thames)	0.05 (Newham)

Broadly speaking, outer London boroughs tend to have greater proportion of their transport emissions under private transportation than inner London.

3.5. Goods

In 2020, the average Londoner's goods footprint was 0.43 tCO_2e. London's footprint is the lowest in the country (Fig 3.14) and is less than half of the 2001 footprint of 0.91 tonnes/capita. The drop is mainly driven by sharp reductions in paper and stationary, furniture and clothes, all now reduced by more than 65% compared to 2001. However, London's 2020 goods footprint has seen a slight increase on 2019. The goods footprint includes emissions that result from the production, consumption and disposal of physical goods, including goods made overseas and imported into the city.

Again, detailed work linking material flows to consumption-based emissions by ReLondon, in this case on textiles, shows a more nuanced picture for London, suggesting a higher per capita footprint for clothing in particular.[30]

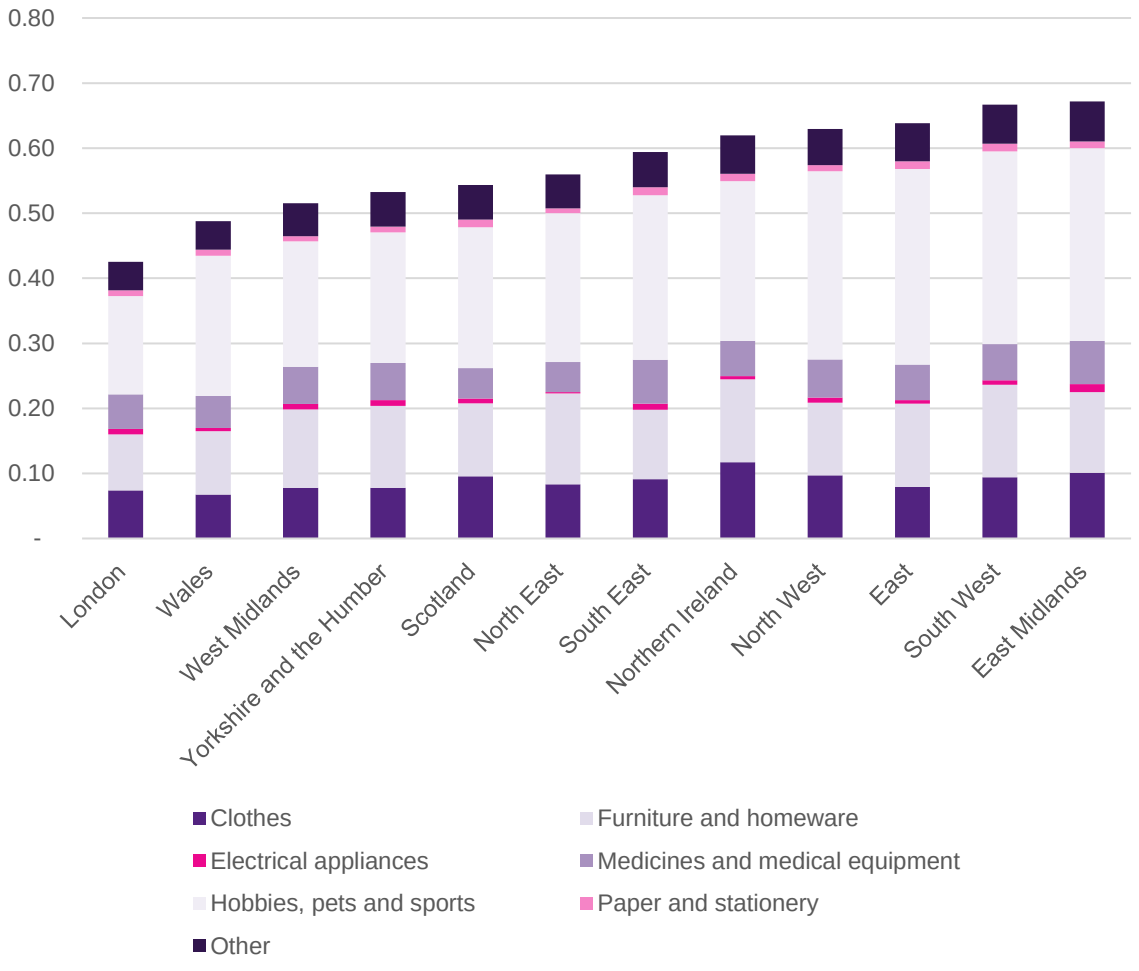

Figure 3.14 Per Capita Emissions for Goods, UK Regions, 2020 (tCO_2e)

[30] 2023, ReLondon, *London's Fashion Footprint*.

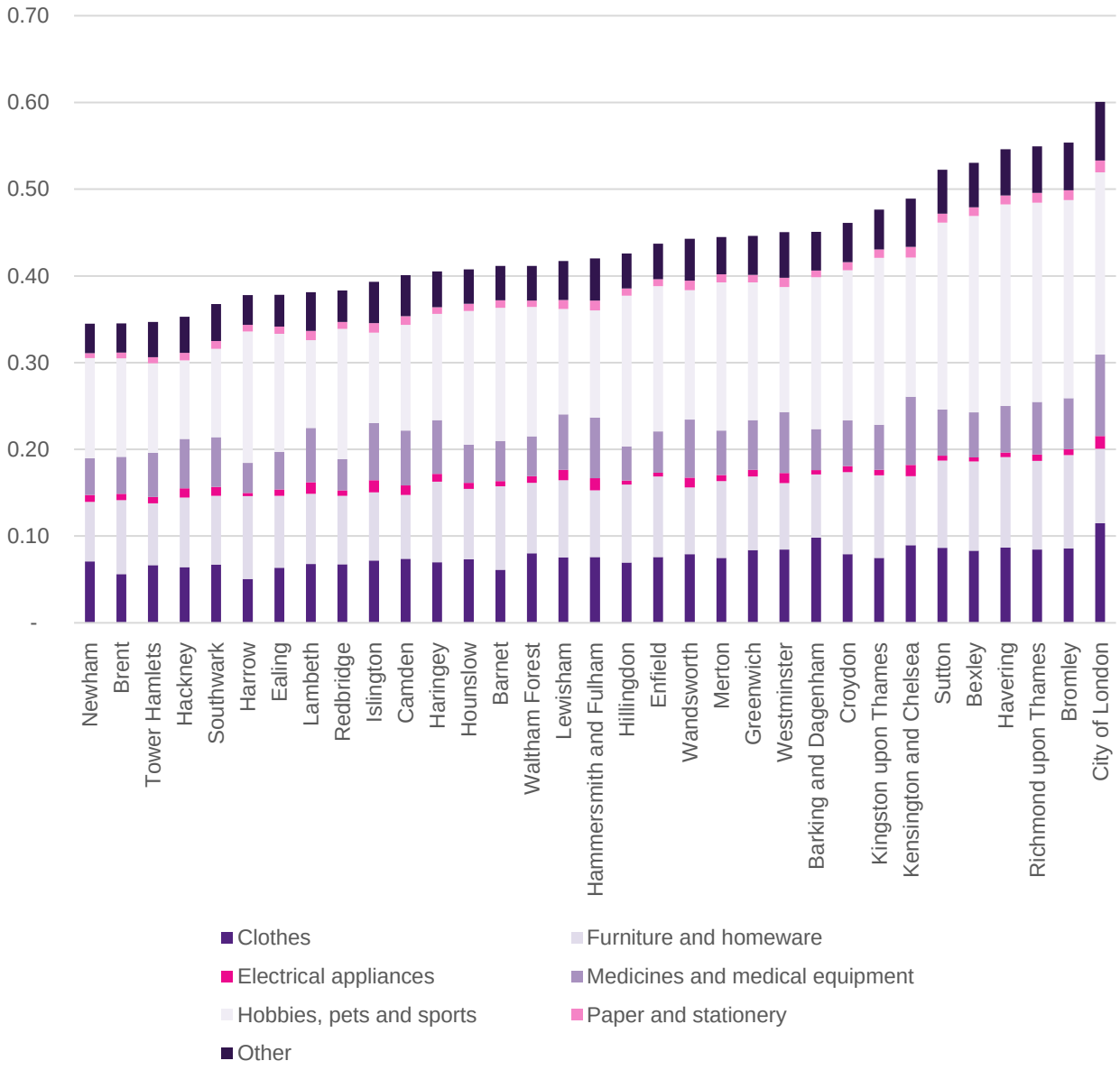

Figure 3.15 Per Capita Emissions for Goods, London Boroughs and the City of London, 2020 (tCO_2e)

Newham has the lowest footprint (0.43) compared to 0.60 tonnes/ capita in City of London (Fig. 3.15).

Whilst the impact of goods in terms of emissions is relatively small in comparison to more daily purchases such as transport and food, it is important to understand that this does not mean that goods have a minor environmental impact, particularly if their purchase becomes more frequent. The production of goods involves large impacts through material and water use, both of which are not being used sustainably. The circular economy provides a way to reduce emissions linked to goods by slowing, and where possible, closing the loop through processes of repair, remanufacturing, sharing, extending the life of a product, recycling, and recovery of materials. Whilst emissions are a strong indicator of environmental sustainability, they are not a holistic measure and it should not be assumed that activities that are low emission are environmentally friendly.

3.6. Services

Londoners' services footprint in 2020 was 0.83 tCO_2e, which is above average compared to other UK regions (Fig. 3.16). Since 2001, Londoners' service footprint has reduced by 60%, from 2.06 tonnes; since 2019 is has fallen 21%, mainly reflecting reductions in spend on private healthcare and restaurants and cafes.

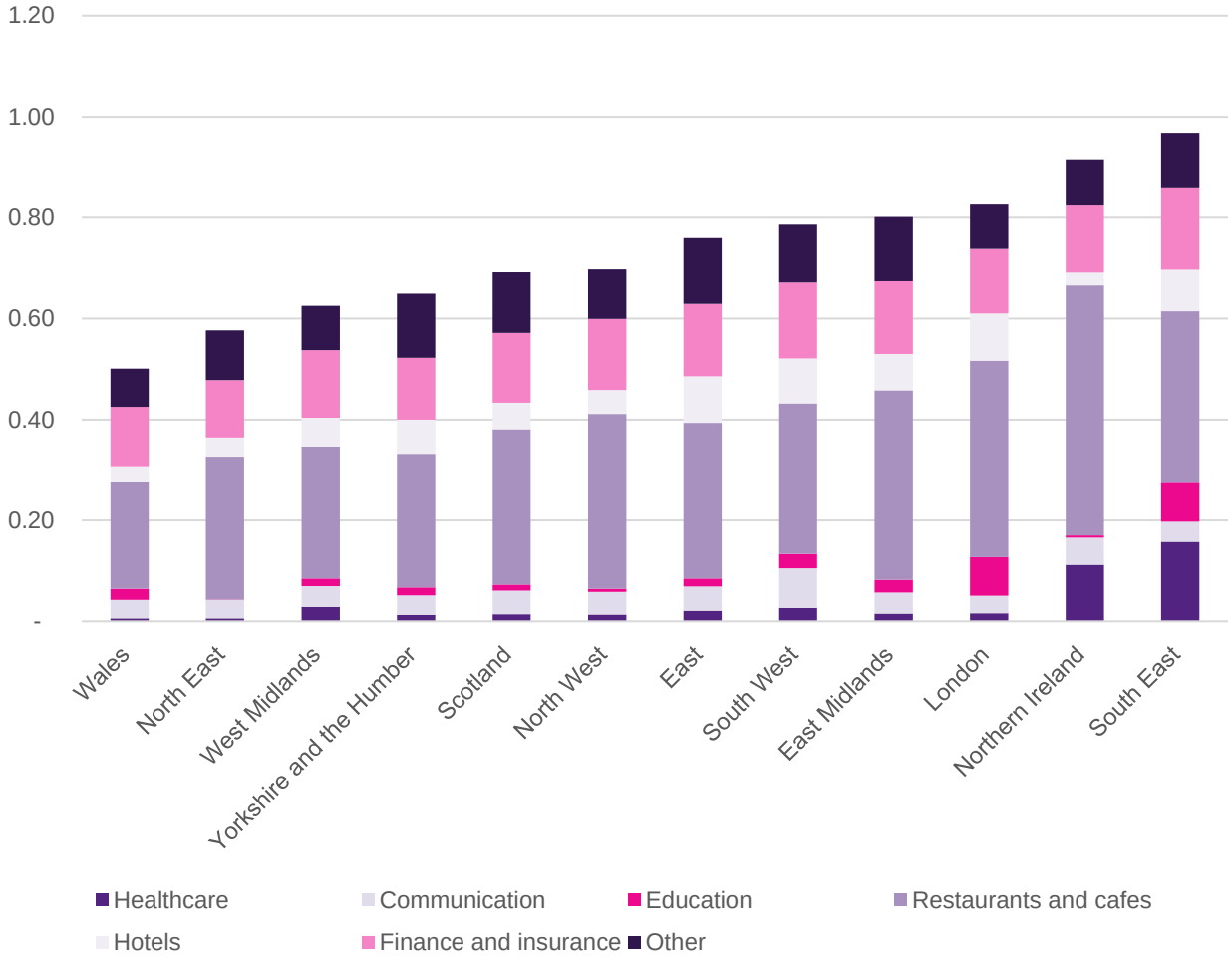

Figure 3.16 Per Capita Emissions for Services, UK Regions, 2020 (tCO_2e)

Most of the sub-themes have dropped by well over half since 2001. The largest sub-theme is restaurants, which comprises just under half of the footprint.

Within London, Newham has the lowest services footprint at 0.48 tCO_2e/ capita, compared with 1.54 tonnes in the City of London (Fig 3.17). As with the other themes, the proportion of the sub-themes within the footprint is broadly consistent across all the boroughs, with restaurants being dominant across London.

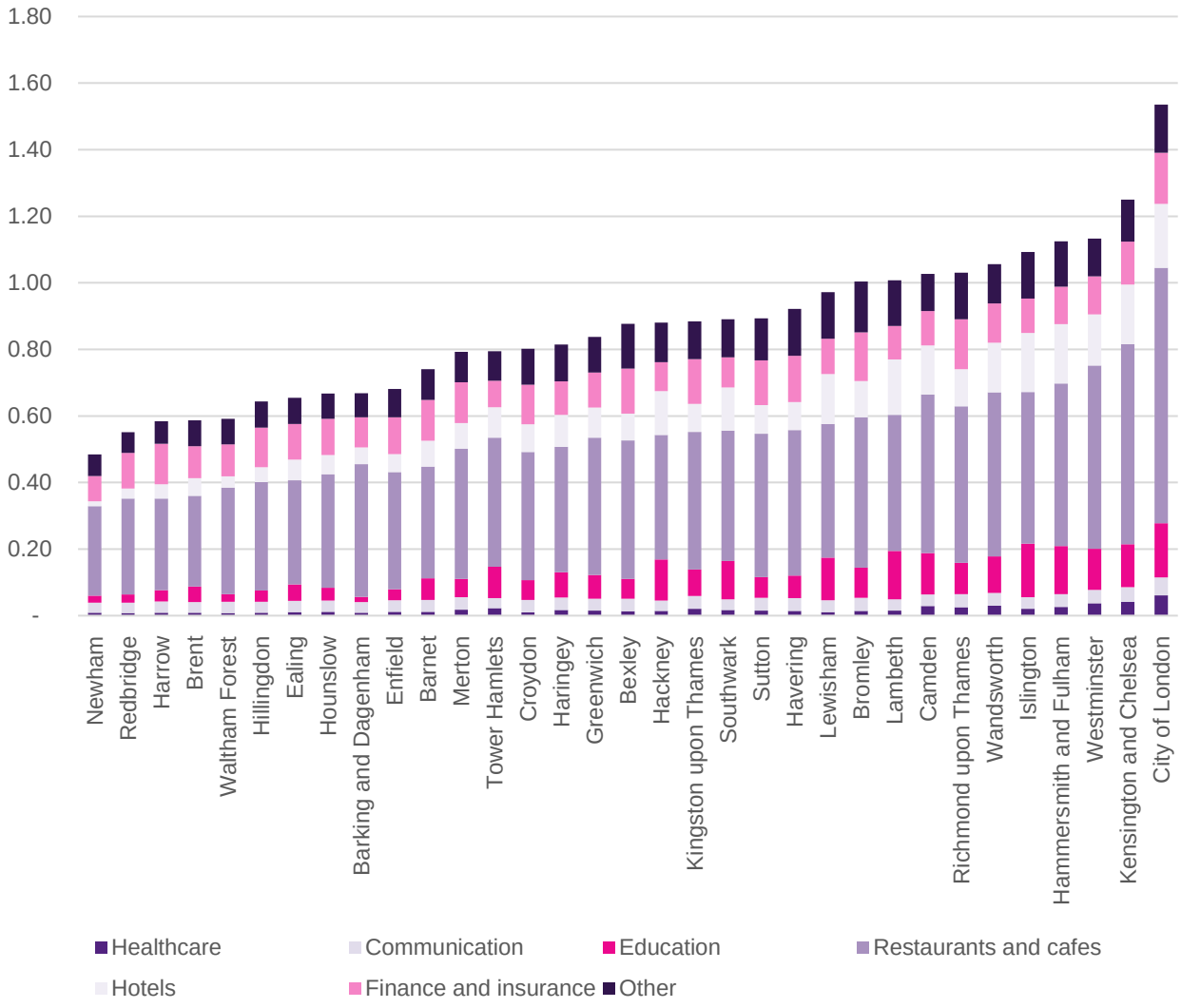

Figure 3.17 Per Capita Emissions for Services, London Boroughs and the City of London, 2020 (tCO_2e)

3.7. Government and Capital Investment

3.7.1. Methodology limitations

Emissions from government consumption and capital investment are estimated by disaggregating the total UK emissions for those categories to the local level weighted by population.
It means that, with this methodology, every London borough will have the same per capita emissions associated with these categories, and that we have limited details on what makes up these emissions, compared to the other categories.

3.7.2. Government

In 2020, the government expenditure footprint was 1.60 tCO_2e and is dominated by emissions coming from central government expenditure (69%), followed by emissions from local authority

expenditure (25%); the rest comes from expenditure by non-for-profit institutions serving households.

3.7.3. Capital Investment

The 2020 capital investment footprint was 1.17 tonnes/capita representing 15% of London's consumption-based emissions. Although the methodology used doesn't provide further detail, based on other studies, it can be assumed that most of it comes from the construction of buildings and infrastructure: emissions associated with construction and refurbishment of buildings represented 11% of consumption-based emissions in C40 member cities in 2017.[31]

4 Conclusions

The last two decades have seen considerable research and practice into how sustainable or low-carbon lifestyles might be achieved. Whilst a review of the literature and case studies are beyond this report, there is a broad consensus regarding the determinants of sustainable lifestyles which helps provide useful context for the data presented in this report.

Whilst we all choose our lifestyles, such choices are taken within the wider context of systems that enable or impede low carbon choices. There are a wide range of factors that influence lifestyle patterns and their related emissions including wealth and income, physical infrastructure or environment, cultural and social norms, and policy frameworks[32]. Whilst climate change is primarily a systemic issue – we have created infrastructure that ensures typical lives cannot avoid high levels of emissions regardless of personal preference – behavioural change is critical: an assessment by the Climate Change Committee found that one third of the greenhouse gas emissions reductions needed by 2035 require decisions by individuals to adopt a low carbon lifestyle[33].

In order to adopt a low carbon lifestyle, it is important that people undertake actions that lead to spillover (i.e. adopting one low carbon behaviour that leads to another low carbon behaviour, for example adopting recycling and then reducing energy usage) and not rebound effects (i.e. using savings from lower energy usage to take a foreign holiday, resulting in higher overall emissions). Creating consistency between behaviours requires alignment with people's values and identity, raising awareness and making people conscious of the relationship between their behaviour and its impact on climate change[34]. A number of organisations have developed personas or archetype approaches to understand how different people might be engaged on climate change[3536].

[31] https://www.c40.org/wp-content/uploads/2021/08/2270_C40_CBE_MainReport_250719.original.pdf

[32] https://www.unep.org/emissions-gap-report-2020

[33] https://committees.parliament.uk/committee/515/environment-and-climate-change-committee/news/173479/government-must-support-behaviour-change-to-meet-climate-targets/

[34] https://climateoutreach.org/reports/mainstreaming-low-carbon-lifestyles/

[35] https://climateoutreach.org/reports/britain-talks-climate/

[36] https://www.sitra.fi/en/publications/pathways-to-1-5-degree-lifestyles-by-2030

Overall, it is clear that a combination of systemic and behavioural change is needed to achieve low carbon lifestyles. The decarbonisation of transport and buildings for example, will depend on the right enabling environment and changes in people's behaviour and normalising new, lower impact ways of living. This requires considerable awareness raising around the relationship between emissions and lifestyles and clarity on what changes people need to take to live low carbon lives. London Councils' climate change polling has consistently shown that Londoners are deeply concerned about climate change and are willing to make changes to the way that they live, but there is a disconnect between public perceptions of what is needed to reduce emissions and the most effective actions.

This data deepens our understanding of hotspots and borough averages. More granular approaches such as personas – and the ongoing Material Flow Analyses being conducted by ReLondon – will now be required to enable targeted support for Londoners across different sectors in transitioning to low carbon living.

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