Cambridgeshire County Council Annual Carbon Footprint Report

April 2023 – March 2024

This is the Council's Sixth Annual Carbon Footprint Report.

DRAFT VERSION

Updated 24 September 2024.

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1. Introduction

1.1 About this report

This is Cambridgeshire County Council's DRAFT annual carbon footprint report for the period April 2023 to March 2024. This report examines both the carbon footprint of Cambridgeshire County Council as an organisation (for the financial year 1 April 2023 to 31 March 2024), and also that of the geographical area of Cambridgeshire as a whole (for which the most recent data available is the calendar year 2022).

Cambridgeshire County Council updated its Climate Change and Environment Strategy in 2022, setting a number of targets relating to reducing greenhouse gas emissions, including reducing the Council's own 'scopes 1 and 2' (direct) emissions to net zero by 2030, reducing 'scope 3' (indirect) emissions by 50.4% by 2030 (compared to the 2018 baseline), and to support delivery of net zero for the county of Cambridgeshire by 2045. In order to monitor progress against these targets, it is necessary to measure the Council's carbon footprint each year.

Recovering from COVID-19

In 2020-21, the global COVID-19 pandemic led to nationwide lockdowns, reduced travel and changed ways of working for many people, combined with unprecedented demands on public health and social care services. Greenhouse gas emissions globally fell during that year and carbon reductions were also experienced both in Cambridgeshire and across the UK. In the following years, as we started to recover from the impacts of COVID-19, there were inevitably some increases in emissions as services began to return to pre-pandemic levels. This year, that journey of a gradual return to normality has continued.

1.2 What is a carbon footprint?

A carbon footprint is a measure of greenhouse gases (GHGs) emitted into the atmosphere. The most common GHG is carbon dioxide (CO_2), which makes up around 80% of UK GHGs. Other GHGs such as methane (CH_4) or nitrous oxide (N_2O) are measured in 'carbon dioxide equivalent' (CO_2e), which takes into account the different global warming potential (GWP) of different gases.

GHGs are produced by a variety of activities, including energy generation (burning fossil fuels such as coal, oil and gas), transport (burning fossil fuels like petrol and diesel), agriculture (such as methane from livestock and nitrous oxide from fertilisers), waste management (such as methane from landfill sites) and land use (such as carbon loss from soil erosion or deforestation).

We can measure the carbon footprint of a geographical area, or of an organisation, or of a product or an activity. In this report we have included both the carbon footprint of Cambridgeshire County Council as an organisation, and that of the geographical area of Cambridgeshire. More information about the methodology is in section 2.11.

Nationwide, emissions of CO_2 make up about 80% of GHG emissions, with the remainder from methane (14%), nitrous oxide (4%) and fluorinated gases (2%), when weighted by GWP, as shown in Figure 1.

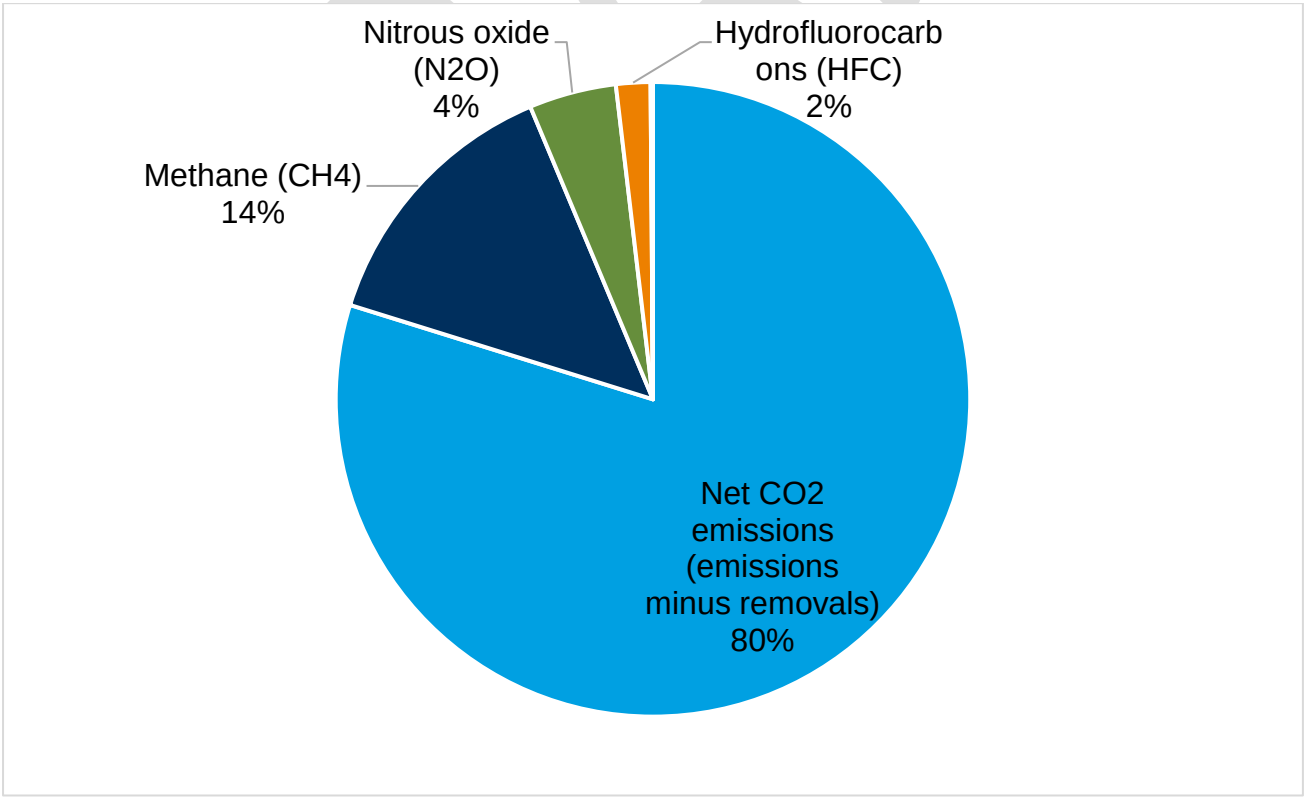

Figure 1: UK-wide Greenhouse Gas Emissions, 2022, by type of gas (CO_2e) (data from DESNZ)

1.3 What are scopes 1, 2 and 3?

Emissions-releasing activities of organisations are classified in the GHG Protocol Corporate Standard into three groups known as scopes. These are described in Table *1* and illustrated in Figure 2 below.

Table 1: Scopes

Scope	Description
Scope 1 (Direct)	Emissions that occur directly from sites or assets owned or controlled by the organisation (e.g. gas boilers at own premises, fleet vehicles).
Scope 2 (Energy indirect)	Emissions from purchased electricity, heat or steam.
Scope 3 (Other indirect)	Emissions that occur due to the organisation's activities / products / services, but at assets not owned or controlled by that organisation (e.g. travel in employee-owned vehicles or public transport, purchased goods and services).

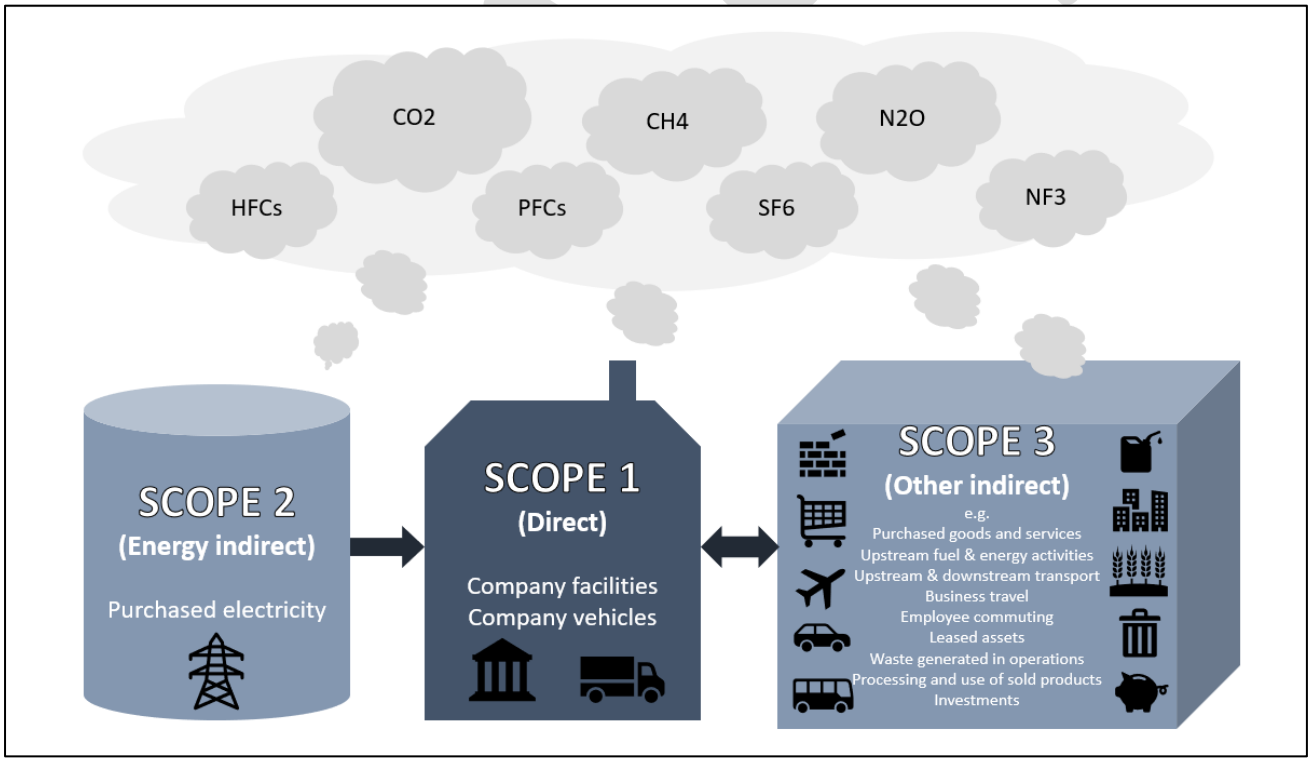

Figure 2: Diagram of scopes 1, 2 and 3 GHG emissions

Activities in all three scopes have been included in this report. However, Scope 3 emissions are more difficult to account for, because the required data often lies with other organisations. As a result, there is a higher degree of estimation in the scope 3 categories.

The vast majority (99%) of the Council's GHG emissions fall under 'scope 3', which means these are indirect emissions from assets outside of the Council's direct control.

1.4 Reducing our carbon footprint

Cambridgeshire County Council's Climate Change and Environment Strategy and Action Plan sets out the work we are already doing, and plan to do, to reduce our impact on the climate and on nature.

The Council has already taken a variety of measures to reduce our carbon footprint. For example, our programme of low carbon heating works has already reduced our scope 1 carbon emissions, and these will reduce further over the next few years, as we replace gas and oil heating with low carbon air source heat pumps at more sites. We have already decarbonised 25 of our buildings and are working on more this year. An example of one of these projects is shown in case study 1 above.

CASE STUDY 1

– LOW CARBON HEATING AT MARCH COMMUNITY CENTRE

Technologies installed	Strebel air source heat pumps
Total project cost	£369k
Grant funding obtained from the Public Sector Decarbonisation Scheme	£149k (grant covered 40% of project costs)
Project status	Completed June 2024
Estimated carbon saving	23 tonnes CO_2e per year

Scope 1 emissions have also been further reduced by swapping diesel for Hydrotreated Vegetable Oil (HVO) biofuel on some larger fleet vehicles for our highways service.

Our scope 2 emissions are zero, using the market-based method, because we purchase a 100% zero carbon electricity tariff through our supply contract. (See section 2.11 on methodology.)

The Council already has several key measures in place to reduce our carbon footprint and help mitigate against climate change. These include a range of energy efficiency projects across our property portfolio, such as on-site renewable generation assets (e.g. rooftop solar PV), Building Energy Management Systems (BEMS), and installation of LED lighting. Without these projects, the Council's carbon footprint would have been higher.

CASE STUDY 2

– HAUXTON PRIMARY SCHOOL LOW CARBON HEATING PROJECT

Technologies installed	2 x Modutherm Air Source Heat Pumps, TREND Building Energy Management System and LED lighting upgrade
Total project cost	£224k
Grant funding obtained from the Public Sector Decarbonisation Scheme	£86k (grant covered 38% of project costs)
Project status	Completed March 2024
Estimated carbon saving	15 tonnes CO_2e per year

As well our own buildings, the Council has been running a programme to retrofit energy conservation measures in both maintained and academy schools in Cambridgeshire since 2014. To date the Council has worked with 69 schools, to invest more than £17m in energy efficiency, energy generation and low carbon heating measures. The schools energy programme is delivering significant savings on both energy bills and carbon emissions for schools. One example of this is at Hauxton Primary School, featured in case study 2.

In addition, the Council has a number of large scale renewable energy projects. Our solar assets, including our 12MW solar farm in Soham (pictured in Figure 3) and several rooftop solar PV installations across multiple Council buildings, between them generated enough electricity to power about 5,000 homes, and avoid 2,580 tonnes CO_2e of greenhouse gas emissions in 2023-24.

Figure 3. CCC's Triangle Farm solar park in Soham

We are also working on more large scale renewable energy projects, such as Smart Energy Grids at St Ives and Babraham Park and Rides (featured in Case Study 3 on the next page).

CASE STUDY 3

– BABRAHAM PARK AND RIDE SMART ENERGY GRID

Technologies installed	Microgrid including Solar PV on carports and EV chargepoints
Project status	Construction in progress (as at July 2024)
Estimated renewable electricity output	71 GWh over 30 years
Estimated carbon saving	5,735 tonnes CO_2 savings over 30 years
Other benefits	• Direct supply of 100% renewable electricity for the Park & Ride's on site usage such as for lighting and CCTV. • Electricity generated will also supply the new electric vehicle chargepoints for members of the public to use. • Excess electricity will be exported to a large local customer via new infrastructure. • Generating income for the Council from the sale of exported electricity and from EV charging services.

CASE STUDY 4

– USING RECYCLED MATERIALS FOR ROAD REPAIRS

What are we doing?	Here we are recycling the existing road into the new, by reusing the excavated material to form the new unbound road layers. We are also utilising stabilisation grids to manage movement caused by peat deposits under the road.
The project in numbers:	• 7500 m^2 of road reconstructed • Zero imported aggregate required • 5300 tonnes of recycled material used • Over 24 tonnes CO_2e of carbon saved
Other benefits:	Safer travel for our local communities. The stabilisation grids prolong the design life of the road. Whilst we are on site the team are also installing new safety fencing and refreshing over 4 linear km of white lining, all whilst keeping the local community informed and up to date.

2. Cambridgeshire County Council's Carbon Footprint

2.1 Key findings for 2023-24 – scope 1 and 2 emissions

Scopes 1 and 2 are those that the council has the most control over, as they comprise of emissions from our own assets, such as council buildings or vehicles. Scope 1 comprises of direct emissions from the council's assets and includes emissions from gas and oil boilers for heating our buildings, fugitive refrigerant gases and emissions from fleet vehicles.

Scope 2 is emissions from purchased electricity for our buildings and street lighting etc.

We found that our scopes 1 (direct) and 2 (purchased electricity) emissions, together amounted to **941 tonnes CO_2e.** All of the emissions for scope 2 are zero, using the market-based method, because the Council purchases a zero carbon electricity tariff through our supply contract. (See section 2.11 on methodology.) The breakdown of the scope 1 emissions is shown in Figure 4 below, with the largest share coming from gas to heat our buildings.

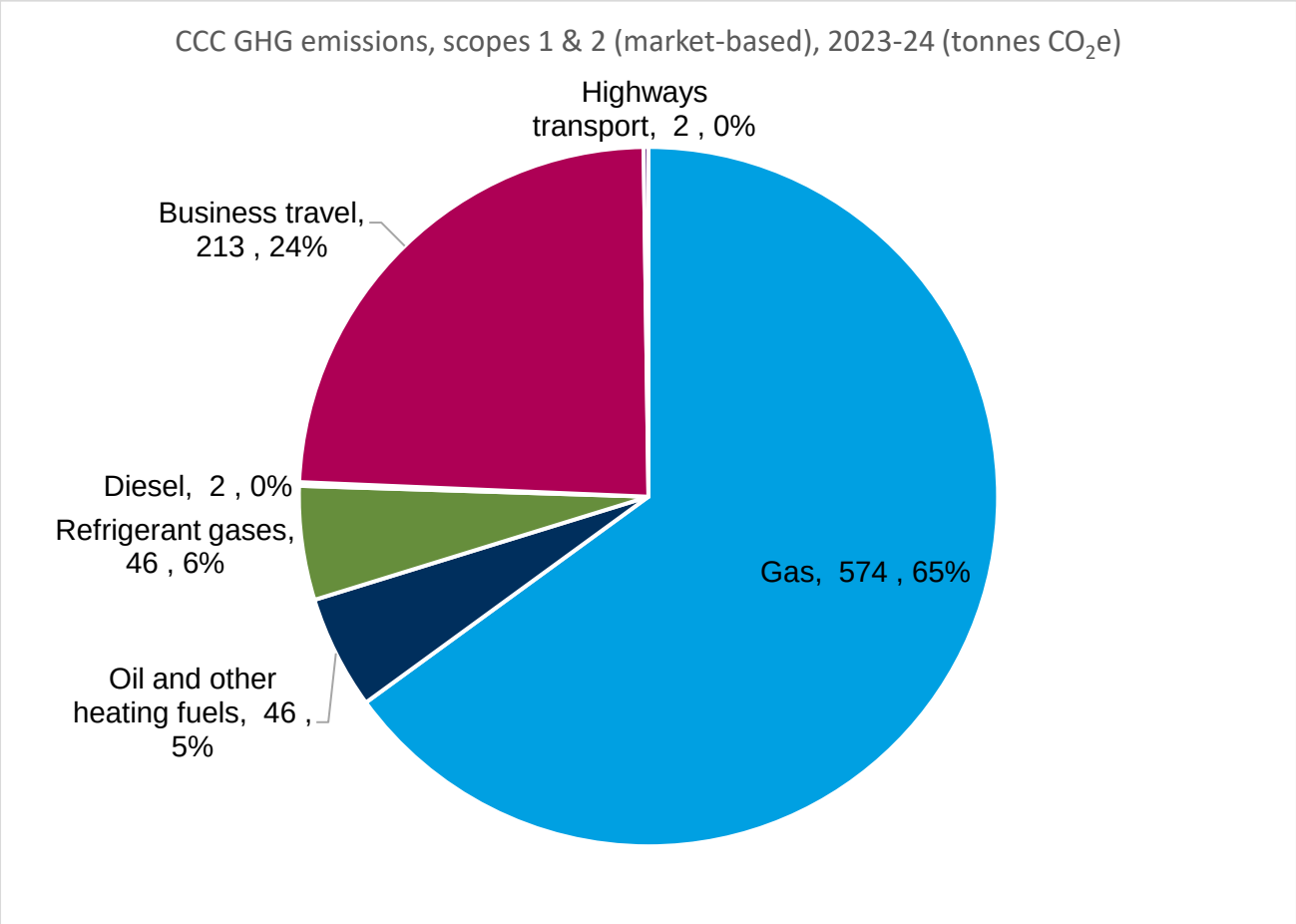

Figure 4: CCC GHG emissions, 2023-24, scopes 1 and 2, by category

2.2 Key findings for 2023-24 - scope 3 emissions

Scope 3 means indirect emissions from assets outside of the Council's control, such as those of our contractors and suppliers. This means that it is harder to measure scope 3 because we do not always have access to all of the required data. The Council's gross scope 3 emissions were **111,307 tonnes CO_2e** in 2023-24.

The vast majority (~99%) of all known emissions were scope 3 (indirect). This includes transport emissions from vehicles not under Council control (such as employee's own cars or contractors' vehicles), emissions from county waste disposal and treatment, emissions from Local Authority maintained schools' energy usage, and emissions associated with purchased goods and services delivered by third parties, such as capital construction works.

For this first time, this year, our scope 3 emissions have also been categorised into the 15 categories of the GHG Protocol *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*. The reasons for doing this are to provide a better comparator to other organisations and also to offer new insights on the sources of the Council's scope 3 emissions. The results are shown in Figure 5. (Not all categories are used, since some are not applicable to the Council.)

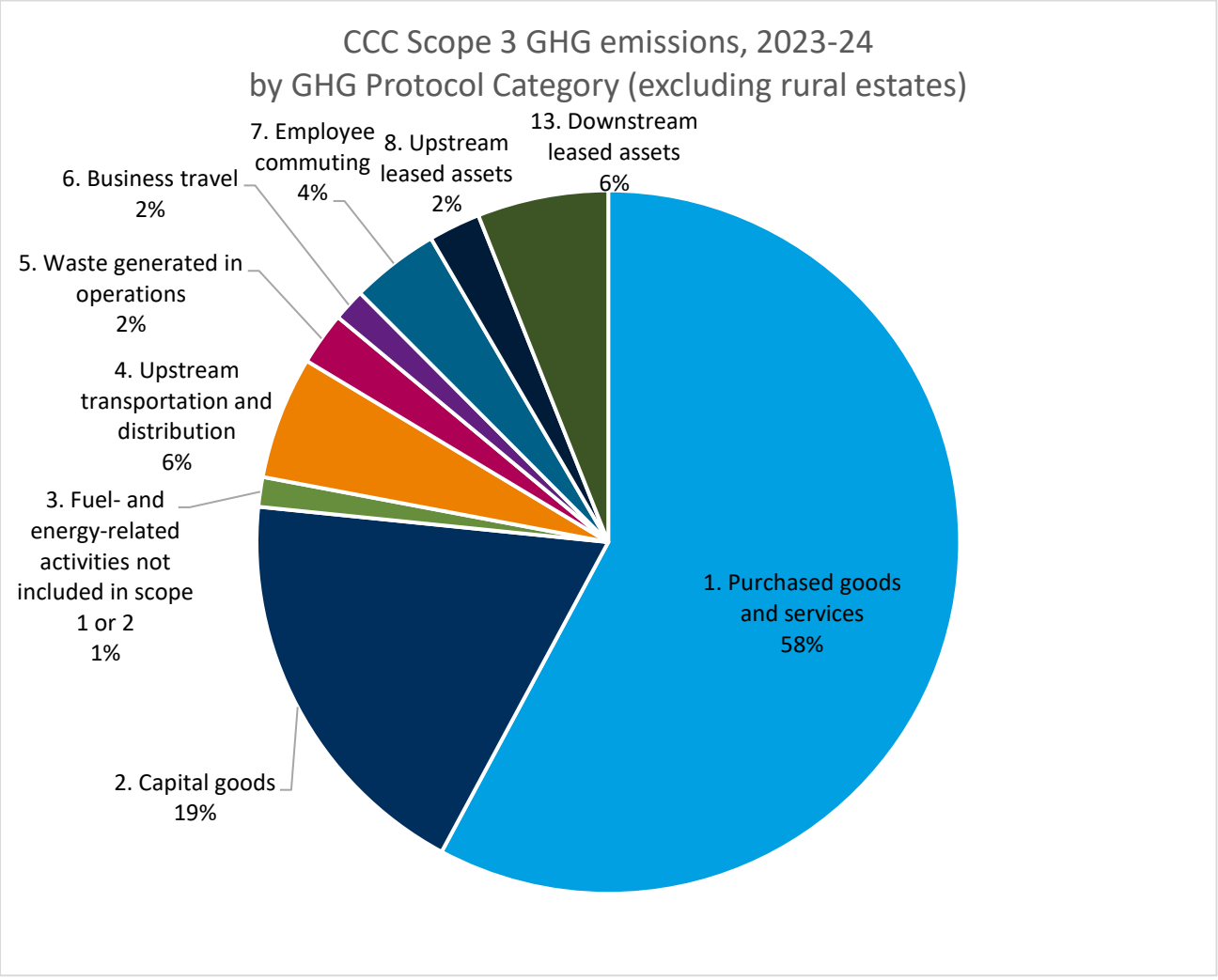

Figure 5. CCC Scope 3 emissions, 2023-24, by GHG Protocol Category

Note that the county waste disposal service is categorised under 'purchased goods and services' because the Council purchases these services from its waste disposal contractors. The 'waste generated in operations' category includes waste from the Council's own sites and from construction work. 'Purchased goods and services' also includes a variety of other sources from the Council's supply chain, unless they fall under one of the other categories such as fuel or transportation. Construction projects are categorised as 'capital goods'.

Some additional emissions associated with purchased goods and services are not yet included, because we do not have the relevant data to calculate these. However, we are working to improve this coverage. More information on this data improvement process and the results so far, along with a list of what has been included and excluded, together with reasons for exclusions, is in section 2.11.

One of the categories not yet included is emissions from agriculture and land use. During 2023-24, the Council commissioned detailed work on the rural estate to identify its carbon emissions, agree a baseline and identify the range of actions needed to reduce these carbon emissions. This work found that the scale of carbon emissions on the rural estate is significant, at approximately 200,000 tonnes CO_2e per annum, which is almost double all other scope 1,2 and 3 emissions. Due to the need for further assessment of these findings, our reporting on the rural estate emissions is not yet included in the scope 3 emissions data here, but is reported in more detail and separately in section 2.10.

2.3 Key findings for 2023-24 - all scopes

The Council's total known gross GHG emissions in 2023-24 for all 3 scopes (but excluding the rural estate) amounted to **112,248 tonnes CO_2e** (using the market-based method for scope 2). (This would have been 116,506 tonnes CO_2e using the location-based method for scope 2.)

Excluding the rural estate emissions, means the largest share of emissions was from waste, mainly due to the Council's statutory duty as the Waste Disposal Authority. This is shown in Figure 6 and Table 2.

Table 2: CCC GHG emissions, 2023-24, by source category

Category	Scope 1	Scope 2 (market-based)	Scope 3	Total (tonnes CO_2e)
CCC Buildings & Utilities	668	-	1,537	2,205
Non-CCC Buildings	-	-	3,645	3,645
Schools (maintained)	-	-	6,616	6,616
Transport	273	-	11,280	11,552
Waste	-	-	67,638	67,638
Construction and other materials	-	-	20,592	20,592
Total gross GHG emissions	**941**	-	**111,307**	**112,248**

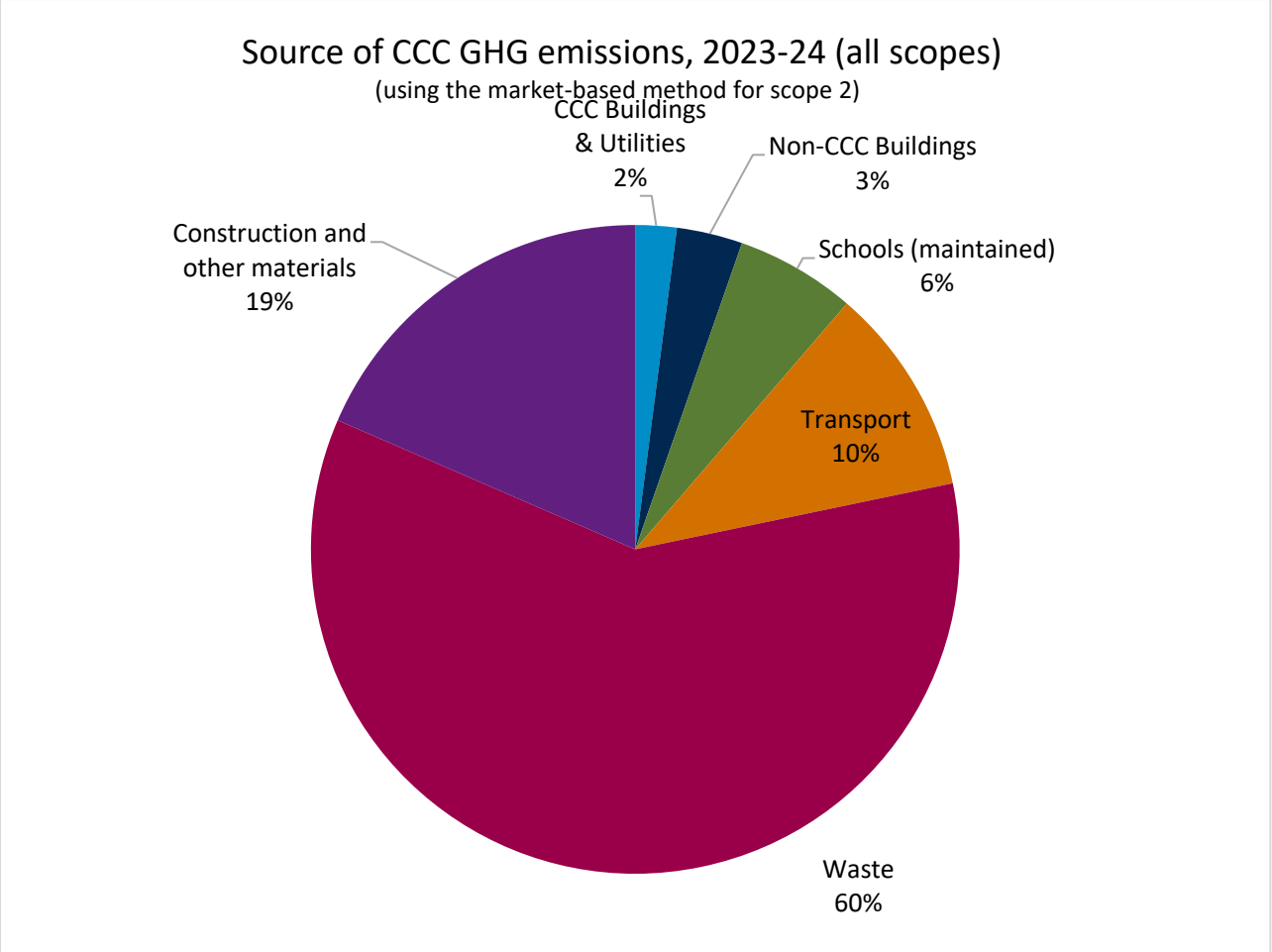

Figure 6: CCC GHG emissions, 2023-24, by source category

There is also a more detailed breakdown of all the sources of emissions in Table 5 on page 19.

In addition, this year, emissions sources have been aligned to the five Directorates of the Council's organisational structure, where possible, in order to help directorates understand the scale and scope of emissions that sit within their remit. This is shown in Figure 7.

Although rural estates is not included here, it would be the largest source of carbon emissions and sits within the 'Finance and Resources' Directorate. This is discussed separately in section 2.10. The next highest directorate, which is shown in the graph below, is 'Place and Sustainability', as it hosts the waste service as well as highways. 'Children, Education and Families' includes schools' energy use and education capital construction works.

Emissions from council buildings, employee commuting and business travel are classed as 'Multiple' since these sources include more than one service. Some directorates show as 0% because all of their emissions are either within the 'multiple' section, or are not yet included (such as the rural estate). 2.10

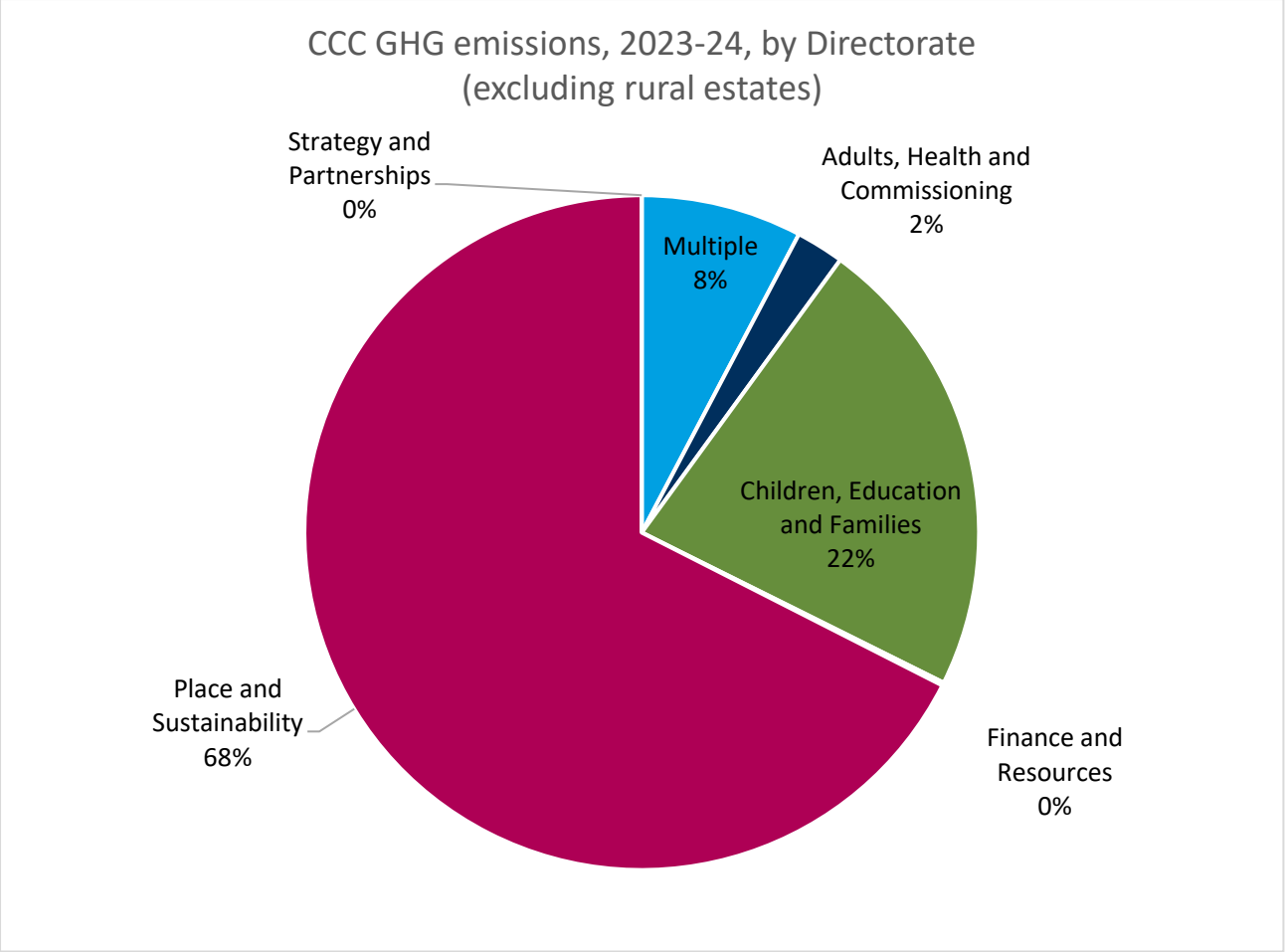

Figure 7: CCC GHG emissions, 2023-24, by Directorate

2.4 Comparison to previous years

Emissions from all previous years back to our baseline year of 2018-19 have been recalculated where possible, in order to be more accurate where updated data becomes available, and to ensure consistency with emissions reported now, in terms of what is included and the calculation methodology. These changes, along with some other minor updates, mean that the baseline year net emissions for 2018-19, in total for all three scopes, are now calculated at **179,943** tonnes CO_2e (using the market-based method for scope 2), as shown in Table 3. (This is excluding the rural estate.)

The Council's total known net GHG emissions in 2023-24, for all 3 scopes, amounted to **103,255 tonnes CO_2e** (net, after reductions for avoided emissions and excluding the rural estate). This is 43% lower than our baseline year of 2018-19.

The tables below show the Council's total carbon emissions across all 3 scopes, for each year since 2018-19, using both the market-based method (Table 3) and the location-based method (Table 4) for scope 2.

Table 3 CCC Annual GHG emissions – using market-based method for scope 2

(tonnes CO_2e)	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Scope 1	1,611	1,611	1,314	1,528	1,055	941
Scope 2 (market-based)	0	0	0	0	0	0
Scope 3	182,090	176,081	89,279	82,089	101,152	111,307
Gross total scopes 1-3	**183,701**	**177,692**	**90,593**	**83,617**	**102,206**	**112,248**
Reductions	-3,758	-3,371	-3,085	-2,861	-3,653	--8,993
Net total in scope after reductions	**179,943**	**174,320**	**87,508**	**80,756**	**95,866**	**103,255**
Outside of scopes	0	37	181	15,131	17,874	26,469

Table 4: CCC Annual GHG emissions – using location-based method for scope 2

(tonnes CO_2e)	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Scope 1	1,611	1,611	1,314	1,528	1,055	941
Scope 2 (location-based)	5,537	5,021	4,349	4,138	3,727	4,258
Scope 3	182,090	176,081	89,279	82,089	101,152	111,307
Gross total scopes 1-3	**189,238**	**182,713**	**94,942**	**87,755**	**105,933**	**116,506**
Reductions	-3,758	-3,371	-3,085	-2,861	-3,653	-8,993
Net total in scope after reductions	**185,480**	**179,342**	**91,858**	**84,894**	**102,280**	**107,514**
Outside of scopes	0	37	181	15,131	17,874	26,469

For an explanation of the methodology (including emissions outside of scopes) see section 2.11.

Our scopes 1 and 2 emissions (market-based) were 11% lower in 2023-24 than the previous year, and 42% lower than in our baseline reporting year of 2018-19. (Scopes 1+2 was the same as scope 1 alone, since scope 2 emissions were zero using that method.)

Scopes 1 and 2 emissions
down 42%
since 2018-19 baseline
(using market-based method for scope 2)

The main reason for the reduction in scope 1 emissions this year is our programme of low carbon heating projects, where we have been removing fossil fuel based heating systems (such as gas or oil boilers) at some sites, and installing low carbon air source heat pumps instead. We are continuing our programme of low carbon heating projects in order to further reduce gas and oil usage in future, as more sites switch to using heat pumps. The beneficial impact of the low carbon heating programme in reducing our scope 1 carbon emissions is illustrated in Figure 8, in the light blue sections, which have been reducing year on year.

For the past two years, our highways service has been using Hydrotreated Vegetable Oil (HVO) biofuel for some of our largest vehicles, instead of diesel. This led to a large reduction in GHG emissions last year, which has stayed low in 2023-24. This is shown in dark blue in Figure 8.

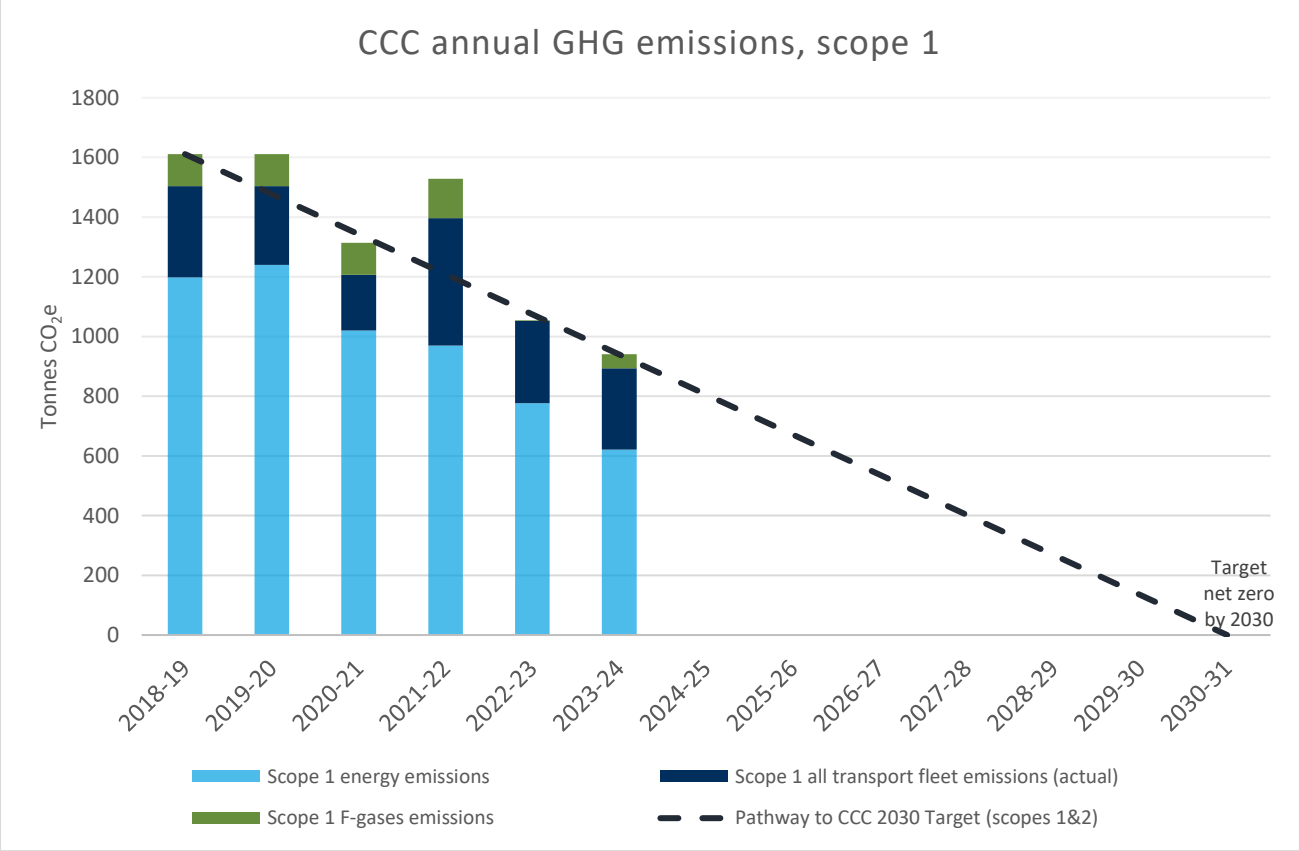

Figure 8: Cambridgeshire County Council annual GHG emissions, scope 1

Scope 3 emissions were 10% higher in 2023-24 than in the previous year, but 39% lower than in our baseline year of 2018-19.

The change in scope 3 emissions is shown in Figure 9 below.

Scope 3 emissions
down 39%
since 2018-19 baseline

The largest reduction in scope 3 emissions (and overall emissions) since our baseline year is due to reduced construction work. This is shown by the purple bars in Figure 10. Construction activity has been low for the past few years, partially due to the impacts of the COVID-19 restrictions and their impact on the construction sector, followed by a partial recovery in the following years. However, it is anticipated that construction work will increase again in future years. We are working to develop better forecasting of carbon emissions from our capital programme in future.

Further detail on each sector is in the relevant sections (2.6 to 2.10) below.

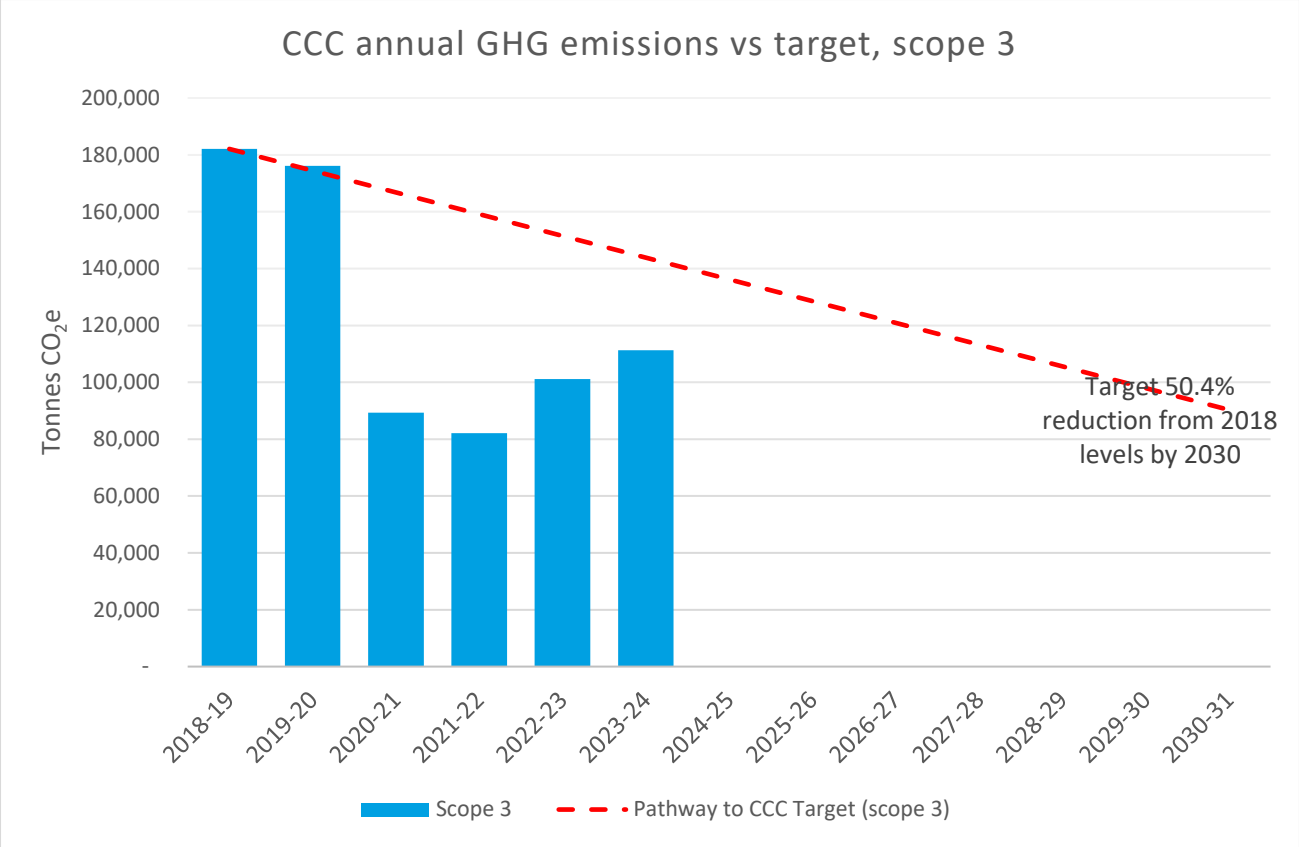

Figure 9: Cambridgeshire County Council annual GHG emissions, scope 3

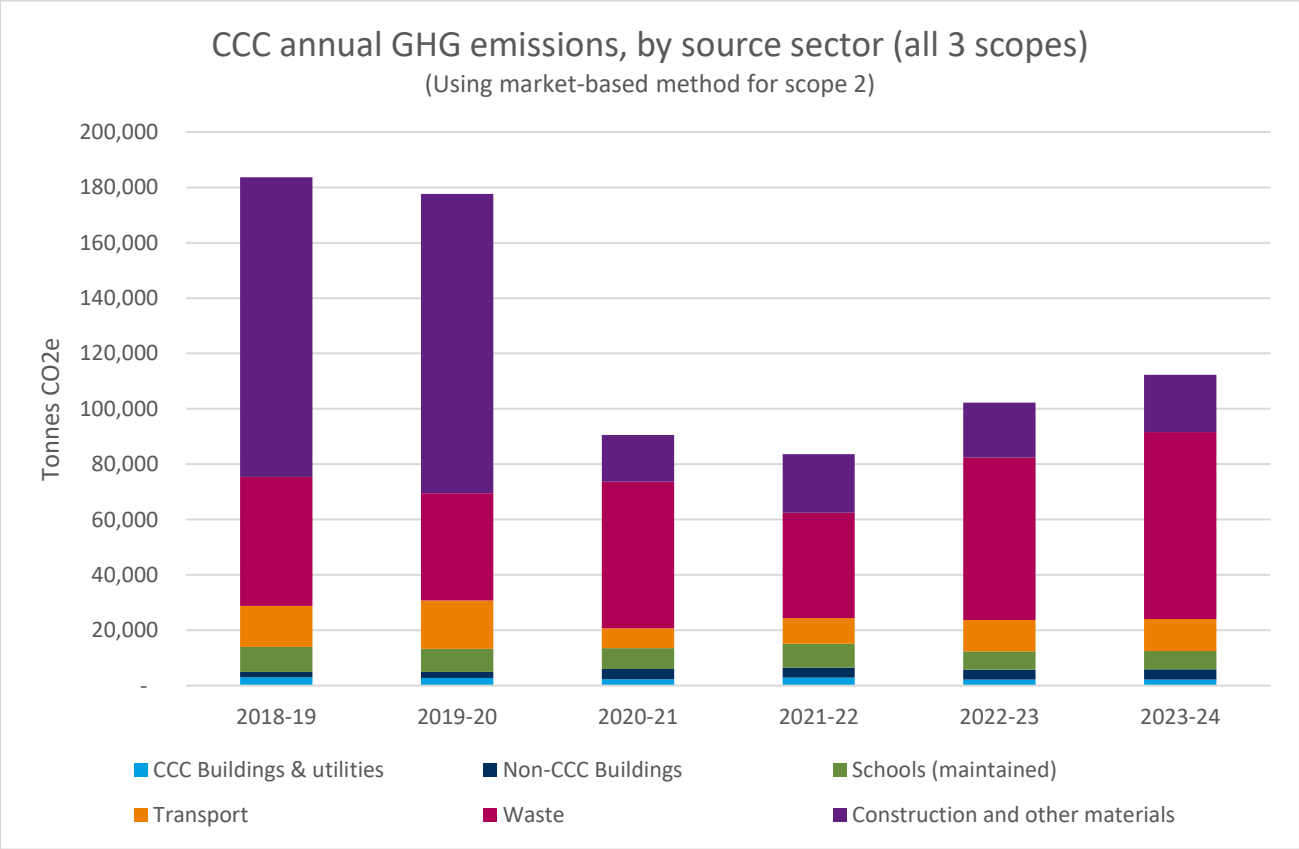

Figure 10: Cambridgeshire County Council annual GHG emissions, all scopes

2.5 Full breakdown

Table 5: Cambridgeshire County Council Greenhouse Gas emissions 2023-24, breakdown

Category	GHG emissions (Tonnes CO_2e), 2023-24 (rounded to nearest tonne)				
	Scope 1	Scope 2 (market-based)	Scope 3	Total in scopes 1-3	Outside of scopes
CCC Buildings & utilities	668	-	1,537	2,205	-
Gas	574	-	95	668	-
Oil and other heating fuels	46	-	10	56	-
Refrigerant gases	46	-	-	46	-
Diesel for generators	2	-	0	2	-
Electricity for CCC buildings	-	-	661	661	-
Electricity for street lighting	-	-	733	733	-
Water and sewerage for CCC sites	-	-	38	38	-
Schools (maintained)	-	-	6,616	6,616	-
Electricity	-	-	2,342	2,342	-
Gas	-	-	3,619	3,619	-
Oil	-	-	507	507	-
Other heating fuels	-	-	149	149	-
Non-CCC buildings	-	-	3,645	3,645	-
Electricity for data centre	-	-	38	38	-
Cloud-hosted IT services	-	-	15	15	-
Commissioned care homes	-	-	2,582	2,582	-
Employees home working	-	-	1,010	1,010	-
Transport	273	-	11,280	11,552	654
Business travel	213	-	1,613	1,826	-
Highways vehicles	2	-	122	124	654
Social & education transport	58	-	3,711	3,769	-
Employee commuting	-	-	3,453	3,453	-
Construction transport	-	-	2,381	2,381	-
Waste	-	-	67,638	67,638	25,814
Asbestos disposal	-	-	0	0	-
CCC site waste	-	-	171	171	-
Construction waste	-	-	2,480	2,480	-
County waste disposal - landfill and MBT	-	-	54,588	54,588	17
County waste disposal – other processes	-	-	10.388	10.388	25,797
Highways waste	-	-	11	11	-
Construction and other materials	-	-	20,592	20,592	-
Education capital projects	-	-	9,816	9,816	-
Highways and major infrastructure	-	-	10,670	10,670	-
Minor works	-	-	19	19	-
IT hardware	-	-	86	86	-
Total (gross, before reductions)	**941**	**-**	**111,307**	**112,248**	**26,469**
Avoided emissions from solar assets				-2,580	
Avoided emissions from waste-to-energy				-6,413	
Net total emissions				**103,255**	

For transparency, and to align with the GHG Protocol Scope 2 Guidance, we are reporting our scope 2 emissions using both the market-based and location-based methods.

If we had used the location-based method for scope 2 emissions, then scope 2 emissions would have been 4,258 tonnes CO_2e (all within the 'buildings and utilities' category). 2,021 tonnes CO_2e of this was for electricity for street lighting, and the remaining 2,238 tonnes CO_2e was for electricity for buildings and other assets. Emissions in all other categories would be the same as in the table above. However, using the market-based method, the Council's scope 2 emissions for 2023-24 were zero, as shown in the table above.

2.6 Buildings and utilities

Council buildings

The Council's buildings and utilities were responsible for 2,205 tonnes CO_2e (2%) of the Council's GHG emissions in 2023-24 (across all 3 scopes, using the market-based method for scope 2). This is 2% lower than the previous year, but 26% lower than our baseline year of 2018-19. Most of this is in scope 3, with some emissions in this category also in scope 1.

Figure 11. St Neots Library, which is now heated by air source heat pumps

The main source of greenhouse gas emissions within the Council's own buildings is gas use, which accounts for 668 tonnes CO_2e. Gas is currently used to heat many of our buildings. The Council purchased 19% less mains gas in 2023-24 compared to the previous year, with the reduction mainly due to the replacement of fossil fuel heating with low carbon air source heat pumps in some buildings, such as those at St Neots Library (pictured below) and those at March Community Centre, featured in the case study in section 1.4. More low carbon heating projects completed during 2023-24 and beyond will lead to further reductions in future years. To date, 25 buildings have had heat pumps installed and more are being planned.

Burning oil (kerosene) and other heating fuels, although more carbon intensive than gas, accounted for only 56 tonnes CO_2e in 2023-24, because there were very few CCC sites that used these fuels.

Scope 2 emissions from electricity use were zero using the market-based method, because the council purchases a zero carbon electricity tariff. The Council purchased around 21 million kWh of electricity in 2023-24, over half of which was for street lighting. Scope 3 emissions associated with this electricity still apply though (with either method), which account for transmission and distribution losses in the electricity grid, and 'well-to-tank' emissions associated with extraction and production of fuels used for electricity generation. These scope 3 emissions connected to the council's electricity usage accounted for 1,394 tonnes CO_2e for street lighting and electricity used in council buildings and other assets in 2023-24.

Mains water and sewerage services for all our buildings and sites (where the Council is the bill payer) accounted for 38 tonnes CO_2e in 2023-24.

Finally, fugitive emissions of refrigerant gases from equipment such as air conditioning units accounted for 46 tonnes CO_2e, and diesel for generators led to 2 tonnes CO_2e emissions.

Maintained schools buildings

Schools' emissions (which are all counted as scope 3) for all the Local Authority maintained schools in Cambridgeshire accounted for 6,616 tonnes CO_2e in 2023-24. This is similar to the previous year, but 27% lower than our baseline year 2018-19. The largest share of this is from mains gas, followed by electricity, and oil and other heating fuels.

This includes data for all Cambridgeshire maintained schools that either purchase their utilities through the ESPO contract or have provided their utilities data to us directly.

We do not currently have any data for schools' water and sewerage services or air conditioning gases in schools.

Academy schools are not included in these figures since these are not under the Council's control.

Other (non-CCC) buildings

Also in scope 3 were 3,645 tonnes CO_2e for Council activities related to non-CCC sites, such as the county council's share of electricity used for our data centre (space shared with

Peterborough City Council), commissioned care home places and Council employees home working.

The electricity used for Cambridgeshire County Council's equipment at the Peterborough data centre accounted for 38 tonnes CO_2e in 2023-24, and our cloud-hosted IT services such as those from Microsoft, accounted for 15 tonnes CO_2e.

Commissioned care homes is a category of emissions that we have been able to include for the first time this year. This service provides residential care to elderly and vulnerable people. The emissions from the share of energy use in these care homes allocated to residents funded by the Council is estimated at 2,582 tonnes CO_2e in 2023-24.

We have also calculated the estimated emissions associated with home energy use for employees working from home. This is estimated at 1,010 tonnes CO_2e this year. Prior to 2020, home working was only around 10% of employee time, but this increased significantly at the start of the Covid-19 pandemic in 2020 to over 80%. In the following years it has gradually decreased again to its current level of around 50%. However, when people work from home more and travel less, the increased emissions associated with home working are much smaller than the associated reduction in emissions from employee commuting, as shown in Figure 12 below. This is because, for most people, travel causes more GHG emissions than home energy use.

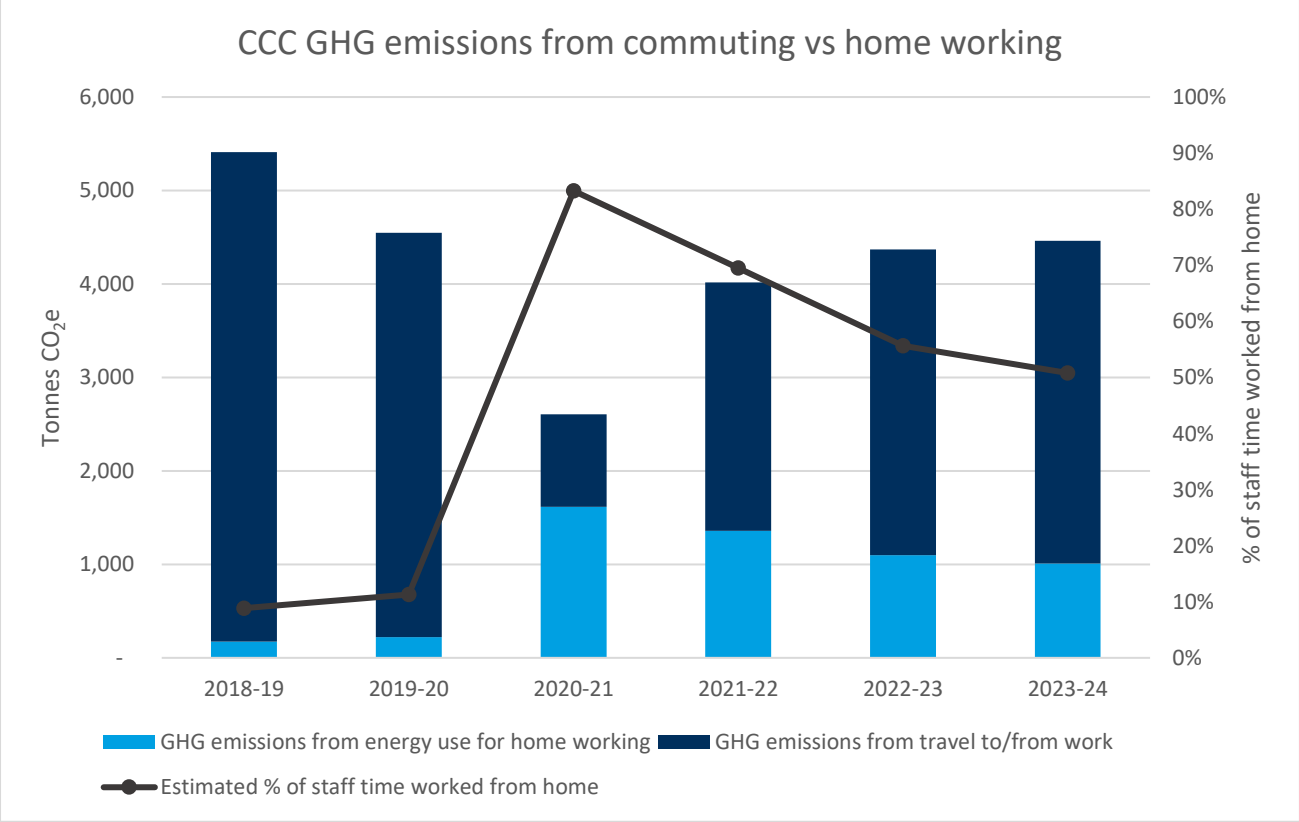

Figure 12: GHG emissions from commuting and home working

2.7 Transport

Transport accounts for 11,552 tonnes CO_2e (10%) of council GHG emissions in 2023-24. This includes some scope 1 emissions (from CCC fleet vehicles) and some scope 3 emissions (from vehicles not under the control of the Council, such as vehicles belonging to CCC employees or contractors).

Transport emissions in 2023-24 were similar to the previous year (2% increase) but were 22% lower than in our baseline year of 2018-19.

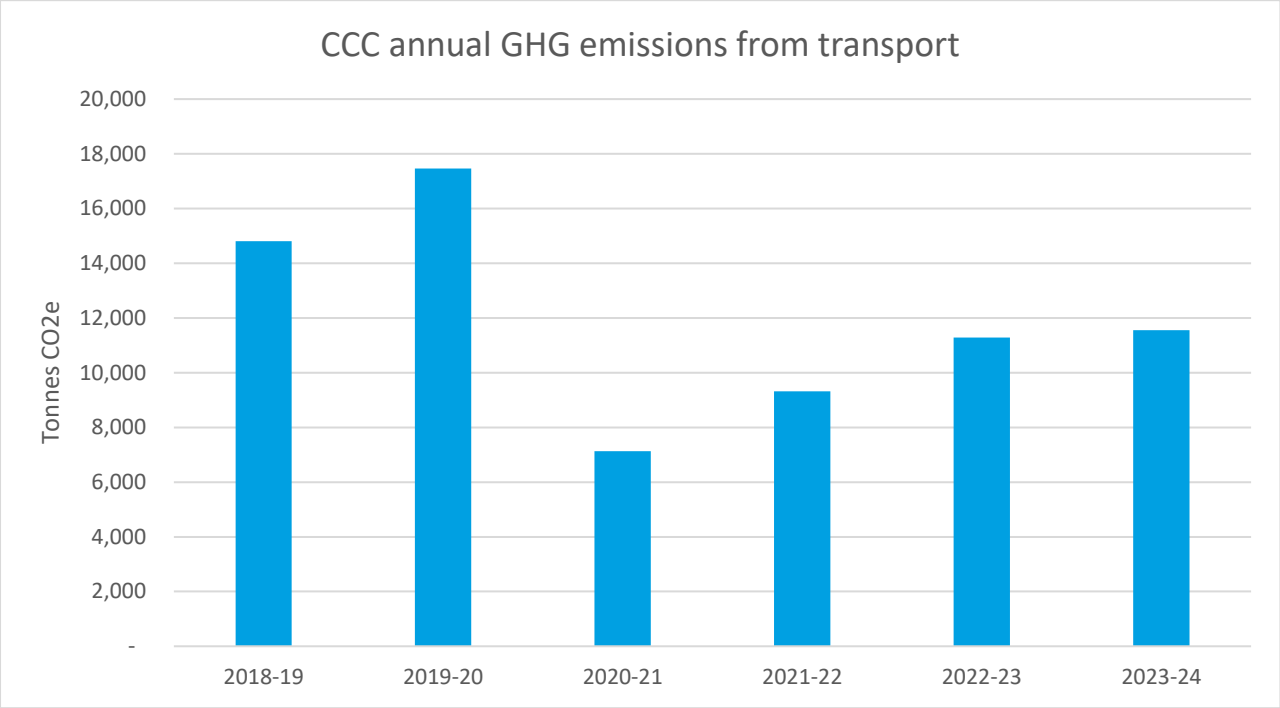

Figure 13: CCC Annual transport emissions

Of all the Council's transport emissions in 2023-24, the largest share was from our social and education transport service, at 3,769 tonnes CO_2e, which includes home to school transport as well as social care transport. Education transport emissions have fallen slightly over the years despite the rise in demand for this service.

The second largest share of transport emissions (estimated at 3,453 tonnes CO_2e) was from employee commuting. This is a small increase since the previous year, which is likely to be due to more staff travelling to work sites compared to the previous years, when travelling significantly reduced during the Covid-19 lockdowns and afterwards. However, it should also be noted that data on employee commuting is based on a staff travel survey carried out during October 2023 and relies on assumptions that the survey week was representative of the whole year, and that those who responded to the survey are representative of all staff. There is therefore some uncertainty in the figure for this source of emissions, but it does give us an estimate.

Business travel accounted for 1,826 tonnes CO_2e in 2023-24. This includes emissions associated with our pool cars, vans and other fleet vehicles, as well as business travel in employees' own vehicles and travel by public transport (trains, buses and taxis).

Highways services transport (such as the road gritters pictured) accounted for just 124 tonnes CO_2e in 2023-24. This was a 73% reduction in emissions compared to the previous year, due to the highways service switching to use HVO biofuel for more of their larger vehicles.

Finally, transport related to construction projects accounted for 2,381 tonnes CO_2e.

Travel by contractors other than those mentioned above was not included due to not having access to this data.

Figure 14: Some of the Council's highways gritting fleet

2.8 Waste

Excluding the rural estate, waste accounts for the largest share (60%) of our known emissions in 2023-24, at 67,638 tonnes CO_2e. The vast majority of this (estimated at 64,976 tonnes CO_2e) is due to the Council's statutory responsibility as the Waste Disposal Authority for treatment and disposal of waste from Cambridgeshire residents.

Note that waste collection is the responsibility of the City and District Councils, therefore transport of waste is not included in these figures, whereas treatment and disposal is the responsibility of the County Council and is included.

In 2023-24 there were 313,260 tonnes of waste collected from both the household kerbside collections and the Council's nine Household Waste Recycling Centres. Of that, 38% went directly to landfill, and 4% was processed through a Mechanical-Biological Treatment (MBT) plant, whilst 26% was composted, 26% was recycled and 6% was used for energy generation.

We have found that emissions from waste were 15% higher than the previous year, and 45% higher than our baseline year 2018-19. Waste emissions have increased this year due to more waste being sent to landfill, as well as an increase in the total amount of waste collected.

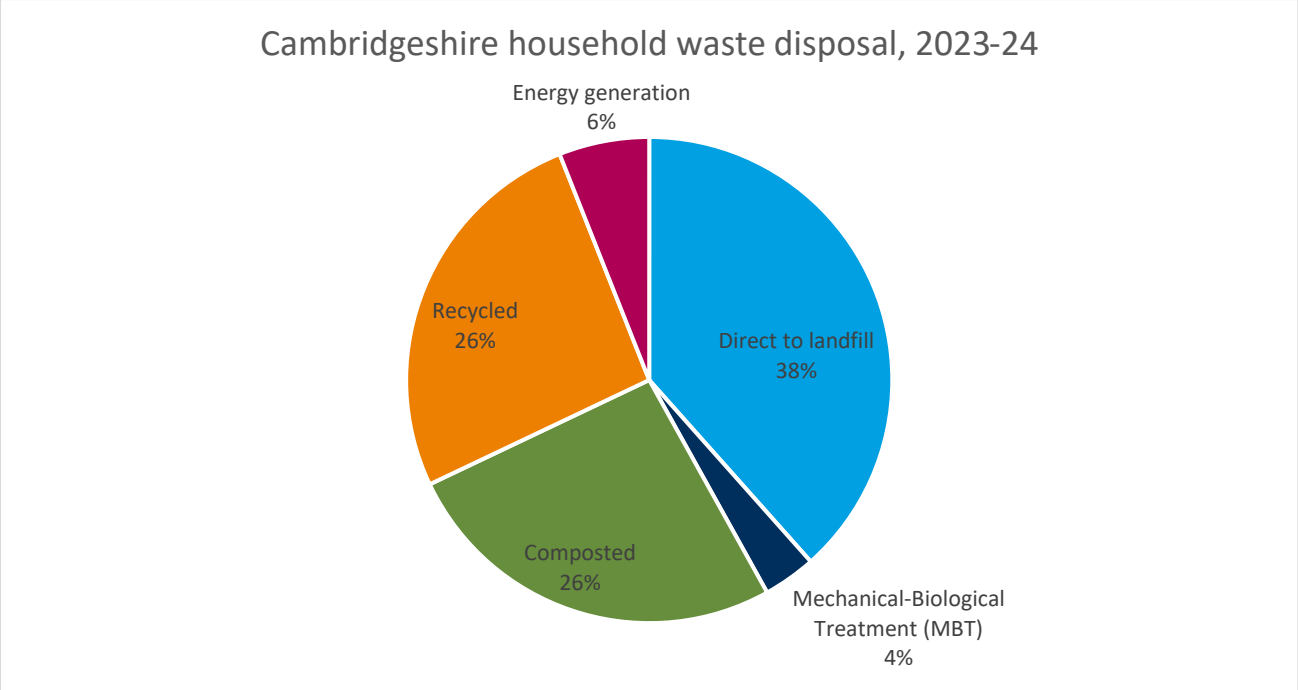

Figure 15: Cambridgeshire household waste disposal

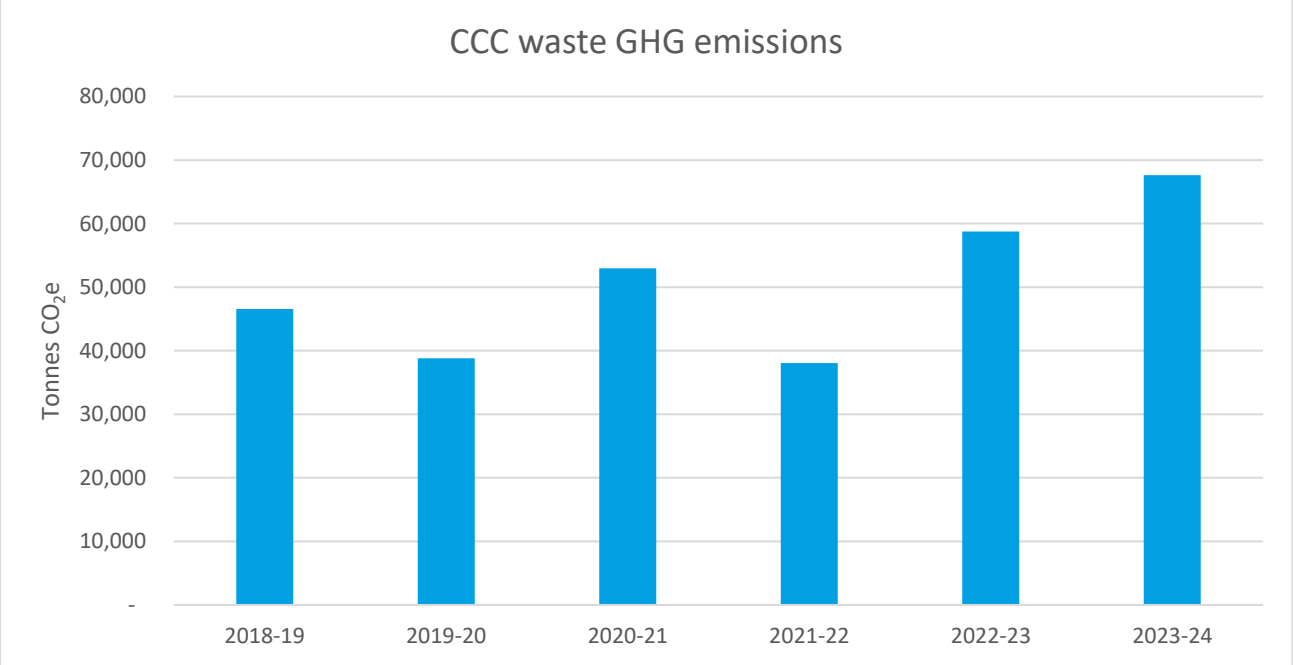

Figure 16: CCC Annual waste emissions

The small remainder of the waste category is from the waste generated at the Council's own sites, accounting for 171 tonnes CO_2e emissions, construction waste (109 tonnes CO_2e), highways waste (11 tonnes CO_2e) and asbestos disposal (less than 1 tonne CO_2e).

2.9 Construction projects and other materials use

A 19% share of the Council's 2023-24 carbon footprint (20,592 tonnes CO_2e) is from construction materials used for building projects, highways and major infrastructure, and other physical materials in items purchased. This comprises of emissions associated with extraction/mining, production/manufacture and transportation of materials to the point of purchase. These emissions are also known as 'embodied carbon'. Use of fuels for equipment on site is also included in the construction category.

Construction emissions were 4% higher this year than in the previous year, but still 81% lower than in our baseline year 2018-19. This is reflective of the very low emissions from construction activity since 2020-21, partially due to the impacts of the COVID-19 restrictions on the construction sector, followed by a partial recovery in 2021-22 and 2022-23.

10,670 tonnes CO_2e in 2023-24 was from highways and transport work, including roads maintenance and resurfacing works and highways projects completed through the Council's highways framework contracts. However, there were also some projects, including infrastructure projects carried out by the Greater Cambridge Partnership, for which we have not yet obtained full data, but we have included those projects where data was available.

9,816 tonnes CO_2e was from education capital projects such as building new schools and extensions. This is more than double the previous year, since there was more education construction work on site this year.

19 tonnes CO_2e was from minor capital works such as renovations and maintenance of existing buildings. At the moment we are only able to calculate the emissions from some of these minor works, because we do not have access to the relevant data on materials to be able to calculate the remaining emissions. Although this is a very small share of overall emissions, we are working with our contractors to try to obtain more of this data in future.

Some other types of construction work, such as some of our large energy projects, are not yet included in these figures as we await the detailed data from our contractors to calculate the construction carbon. We are currently working on this and hope to be able to include this data in future years' reports. The energy projects are helping to reduce carbon emissions in the county by generating energy from renewable sources and thus reducing the use of fossil fuels. The carbon emitted from the construction phase will therefore be 'paid back' by the carbon savings within a short time.

There were also an estimated 86 tonnes CO_2e emissions in embodied carbon from the purchase of new IT hardware in 2022-23.

2.10 Agriculture and land use, land use change and forestry (LULUCF)

The council owns a large rural estate of around 33,000 acres, which is let out to more than 160 tenant farmers, and therefore these emissions will form part of the council's scope 3 emissions. The vast majority of the County Farms estate is cropland (arable farms), with a small amount of livestock. The council also owns a variety of other land including some parkland, built-up land (buildings and highways) and forest / woodland.

Figure 17: A field of wheat at Flegcroft farm, Whittlesey - one of the Council's leased out farms

Agricultural emissions occur from various sources including livestock and from application of fertiliser to land. These emissions are difficult to calculate as they depend on many different factors including soil types, fertiliser type and application rate, livestock types and more.

Land use, land use change and forestry (LULUCF) can either be a source of GHG emissions (for example from soil erosion) or a sink where GHGs are removed (for example through tree growth). In Cambridgeshire, LULUCF is often a source of emissions due to the types of land in our region.

This year, the Council's Just Transition Fund paid for a piece of work by Eunomia Research & Consulting Ltd to help the Council better understand the agricultural and land use related GHG emissions from its rural estate. This has provided an estimated baseline of these emissions, a tool to recalculate these emissions in future when we have more data, and information about potential pathways and actions to reduce emissions.

A sample of the rural estate tenant farmers completed surveys and provided data, which enabled extrapolation of the findings to the whole estate, taking into account the land area of each farm, farm type, soil type, livestock numbers, and details of buildings on the farm.

Eunomia's report found that the estimated gross GHG emissions of the rural estate in 2022-23 were 200,030 tCO_2e, while -2,649 tCO_2e was sequestered during the same period[1]. Of the gross emissions, more than 97% come from agricultural activities with the remainder caused by on-farm and residential buildings.

This would make the rural estate the largest source of greenhouse gas emissions across all Council activities. Due to the large uncertainties involved, these emissions have not been included in the total organisational emissions in this report, but are for the time being reported separately, here. This will allow further work to be carried out to verify the figures and further surveys with more of our tenant farmers this winter. It is hoped that a more accurate total can be reported next year.

A driving factor contributing to this high figure is the soil composition of the rural estate, with more than half of the rural estate (52%) sitting on peat soils. Arable land makes up 90% of farmland in the estate, 51% of which is on peat soils. Mixed arable-pasture land contributes 8% of all farmlands and is comprised of 53% peat soils. The remaining 2% of land is purely pasture, 20% of which is on peat soils. Drained peatland is a significant source of carbon dioxide and methane emissions, and the Fens are home to approximately 70% of the drained peat in England. More information on this issue is in section 3.3.

The main source of emissions across the Council's rural estate come from change in soil carbon stocks (68%). Other large sources of emissions come from nitrous oxide from managed soils. See Figure 18.

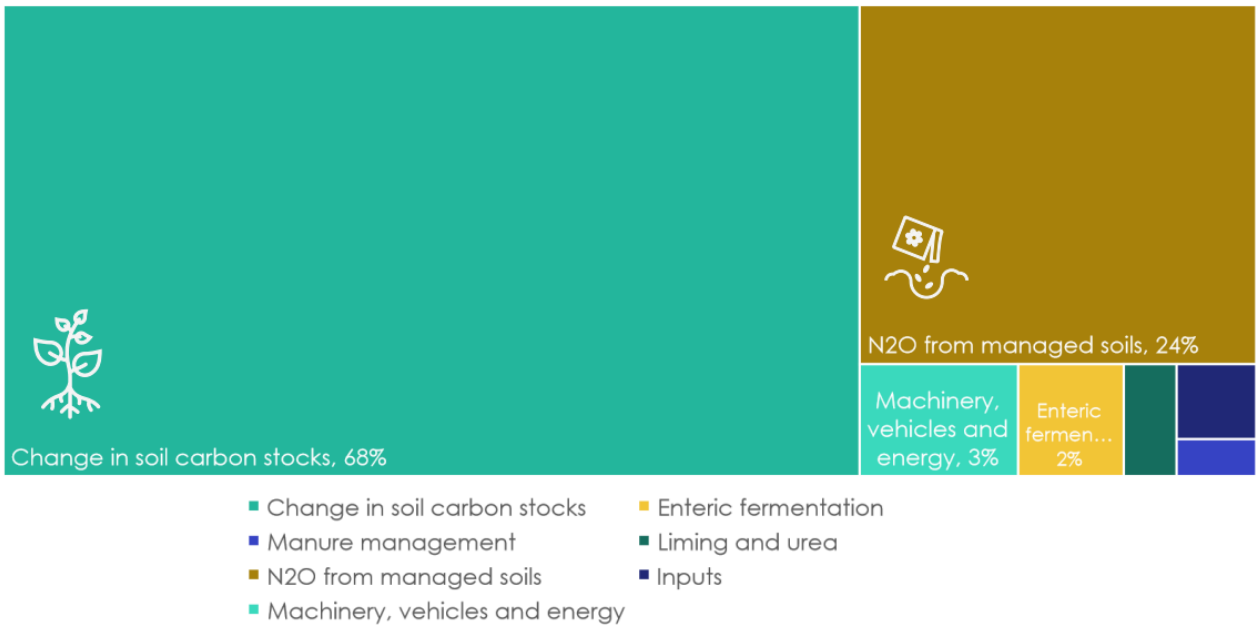

Figure 18: Rural estate GHG emissions by source (chart from Eunomia)

[1] A separate report commissioned to inform the Council's Trees and Woodland Strategy looked at (amongst other topics) carbon sequestration from across all of the Council's land holdings, including rural estates, urban estates, highways, footpaths and bridleways, byways, hedgerows and wildlife sites. This suggested that the total carbon sequestration from all of these could be as much as -15,000 tonnes CO2e per year. Further work is needed to understand this in more detail.

The Eunomia report also found that carbon emission intensity varies significantly from farm to farm and, while there is a correlation between the size of a farm and its overall emissions, the highest emitting farms are not necessarily the largest. The farming practices used on each farm have a large influence on the overall emissions. For example, a farm with one of the greatest emissions reported a very high usage of inputs, which are associated with significant nitrous oxide emissions from soils. Furthermore, farms which had at least some pasture area were more likely to rank higher in terms of absolute emissions than their size would suggest due to the higher soil emissions intensity associated with livestock farming.

It is important to note that farmland is typically more difficult to decarbonise than other sources, because emissions come from a wider variety of activities/sources; there are fewer well-known decarbonising interventions; the co-benefits of decarbonising agriculture are not as well understood; and there is a need to continue producing food. The Fens hold over 50% of the most productive, grade 1 land in England and produce around one-fifth and one-third of its crops and vegetables, respectively.

It is not possible to have a zero-emission agriculture system using current technology. However, there will be actions we can take to reduce emissions. The Council is now considering what actions it can take to help tenants to further reduce their emissions, whilst recognising that many tenants are already doing a lot of great work in this area.

Figure 19: Biodiversity Net Gain (BNG) scheme at Lower Valley Farm, Fulbourn

As well as looking at GHG emissions, the Council is also making use of some of the rural estate to increase biodiversity, with a scheme at Lower Valley Farm, Fulbourn (pictured above) now offering Biodiversity Net Gain (BNG) credits for developers to purchase. The scheme is providing public footpaths, education opportunities, new species, rich chalk grassland and support habitat connectivity across the landscape. Several sales of BNG units have already been completed, and the chalk grassland is now about to be established.

2.11 Methodology

The Council's own organisational carbon footprint has been calculated in line with the UK Government's Environmental Reporting Guidelines for Voluntary Greenhouse Gas Reporting[2], which is based on internationally-recognised standards from the World Resources Institute and World Business Council for Sustainable Development: the GHG Protocol Corporate Accounting and Reporting Standard, and the GHG Protocol Scope 3 standard, as far as possible.

Broadly, the methodology used was as follows:

1. Collect data on all activities under Cambridgeshire County Council control that emit GHGs (e.g. energy used, miles travelled, materials purchased). Actual data has been used wherever it is available.
2. Assumptions and estimates are only used where actual data was not available. Some activities have been excluded in cases where there was no data available and no basis upon which to estimate. Where this is the case, this is clearly stated below.
3. Convert data to metric tonnes of carbon dioxide equivalent (CO_2e), to calculate gross emissions using appropriate carbon conversion factors.
4. Note actions taken to reduce emissions (e.g. solar generation), then also report net emissions.

The reporting period is the financial year 1 April 2023 to 31 March 2024.

The carbon conversion factors used for this reporting period are mostly the 2023 UK Government published carbon conversion factors, except where there is no appropriate emissions factor given, or a more accurate conversion factor is available. Where alternative methodologies have been used, these are explained in Table 3 below.

In line with the international GHG Protocol, Scope 2 emissions from electricity generation are calculated and reported in two different ways; the location-based method and the market-based method. The location-based method is based on the average carbon intensity of the country's electricity grid, meaning that emissions would be the same for everyone in the UK, if they used the same amount of electricity. In contrast, the market-based method takes into account contractual arrangements, and divides all of the emissions up according to the specific fuel mix of the electricity generated for each tariff of each supplier. This method means that customers who purchase electricity from suppliers that use more renewables

[2] 2019 Environmental Reporting Guidelines, Chapter 3

would have lower emissions than those whose electricity comes more from fossil fuel sources. The market-based method is the Council's primary reporting method and the one to which our targets apply. However, both methods are included, for transparency.

Scope and boundary of reporting

Emissions-releasing activities of organisations are classified into three groups known as scopes. These are defined in the GHG Protocol Corporate Standard and are described in section 1.3. Activities in all three scopes have been included in this report.

Carbon dioxide produced from biologically-sequestered carbon, e.g. from the combustion of biomass for electricity and / or heat generation, is not included in either scopes 1, 2, or 3. However, this is reported separately as 'outside of scopes'. This is because an equivalent amount of carbon dioxide would have been absorbed from the atmosphere during the plant growth phase. This carbon dioxide would have been emitted when the plants - from which the biomass is derived - decayed naturally at the end of their life. However, two other GHGs – nitrous oxide and methane – are commonly emitted when biomass is combusted. These would not be emitted during natural decay and any nitrous oxide or methane emissions from biomass / biofuel consumption is included in the emissions under the three scopes. This is in line with the approach generally taken in international carbon accounting standards.

All activities under the operational control of Cambridgeshire County Council are within the boundary of reporting, including those outsourced to third parties in cases where the overall control or responsibility still lies with the County Council. A complete list of emissions sources included is shown below in Table 6.

Table 6: CCC Emissions Sources Included

Area	Activity	GHG Protocol category	CCC Directorate(s)	Methodology / Data source	Accuracy / Confidence level
CCC Buildings and utilities	Gas burned for heating and hot water at CCC buildings	Scope 1 + scope 3 category 3. Fuel- and energy-related activities not included in scope 1 or 2	Multiple	Usage data from utility bills	High
CCC Buildings and utilities	Oil burned for heating and hot water at CCC buildings	Scope 1 + scope 3 category 3. Fuel- and energy-related activities not included in scope 1 or 2	Multiple	Usage data from utility bills	High

Area	Activity	GHG Protocol category	CCC Directorate(s)	Methodology / Data source	Accuracy / Confidence level
CCC Buildings and utilities	Electricity used at CCC buildings	Scope 2 + scope 3 category 3. Fuel- and energy-related activities not included in scope 1 or 2	Multiple	Usage data from utility bills	High
CCC Buildings and utilities	Electricity used for CCC street lighting, traffic signals etc.	Scope 2 + scope 3 category 3. Fuel- and energy-related activities not included in scope 1 or 2	Multiple	Usage data from utility bills	High
CCC Buildings and utilities	Refrigerant gases leakage from air conditioning units in CCC-controlled buildings	Scope 1	Multiple	Based on leakage identified from top-ups at servicing, applied to CCC list of A/C units, type of refrigerant gas and capacity. Or estimated on assumed leakage rates of 3% to 6% where service records were not available.	Medium
CCC Buildings and utilities	Diesel used for on-site generators	Scope 1 + scope 3 category 3. Fuel- and energy-related activities not included in scope 1 or 2	Multiple	Litres of fuel purchased	High
CCC Buildings and utilities	Water supply and wastewater collection and treatment	Scope 3 category 1. Purchased goods and services	Multiple	Usage data from utility bills.	High
Non-CCC Buildings	Energy used for data centre in Peterborough	Scope 3 category 8. Upstream leased assets	Finance and Resources	Energy usage data from sub-metering on site	High
Non-CCC Buildings	Commissioned care homes energy use	Scope 3 category 8. Upstream leased assets	Adults, Health and commissioning	Care homes energy expenditure data sourced from Fair Cost of Care Needs Assessment, used to estimate energy usage in each of a sample of care homes. The number of CCC clients is divided by the total bed capacity, to obtain an average energy use per client, which is then multiplied by the total number of CCC clients in all commissioned care homes.	Low

Area	Activity	GHG Protocol category	CCC Directorate(s)	Methodology / Data source	Accuracy / Confidence level
Non-CCC Buildings	Energy used for heating and IT equipment whilst home working	Scope 3 category 7. Employee commuting	Multiple	Estimate of hours worked from home based on staff travel survey and HR data.	Medium
Non-CCC Buildings	Cloud-hosted IT services	Scope 3 category 1. Purchased goods and services	Finance and Resources	Data provided by Microsoft and extrapolated to previous years	Medium
Buildings – maintained schools	Gas burned for heating and hot water at Cambridgeshire schools, where purchased through ESPO.	Scope 3 category 13. Downstream leased assets	Children, Education and Families	Gas usage data.	High
Buildings – maintained schools	Electricity used at Cambridgeshire schools, where purchased through ESPO.	Scope 3 category 13. Downstream leased assets	Children, Education and Families	Electricity usage data.	High
Buildings – maintained schools	Oil and LPG used for heating at some Cambridgeshire schools. Other heating fuels not purchased through ESPO.	Scope 3 category 13. Downstream leased assets	Children, Education and Families	Heating fuels usage data provided by the schools.	Medium
Transport	Travel in CCC pool cars. Travel in hire cars.	Scope 1 + scope 3 category 6. Business travel	Multiple	Data from mileage reports and invoices. Based on miles travelled and type of car where known.	High
Transport	Social and education transport in own fleet.	Scope 1 + scope 3 category 6. Business travel	Children, Education and Families	Data from fuel usage.	High
Transport	Social and education transport by contractors (including home to school transport).	Scope 3 category 4. Upstream transportation and distribution	Children, Education and Families	Estimated based on known number of journeys made, estimated distances, and assumed vehicle types for each supplier.	Medium
Transport	Social and education transport by volunteer drivers.	Scope 3 category 4. Upstream transportation and distribution	Children, Education and Families	Mileage claims	Medium
Transport	Highways maintenance gritting fleet.	Scope 1 + scope 3 category 3. Fuel and energy-related activities not included in scope 1 or 2,	Place and Sustainability	Data from fuel usage.	High
Transport	Other highways maintenance vehicles	Scope 3 category 4. Upstream transportation and distribution	Place and Sustainability	Data provided by Highways maintenance contractor	High

Area	Activity	GHG Protocol category	CCC Directorate(s)	Methodology / Data source	Accuracy / Confidence level
Transport	Employee travel on CCC business in own vehicles	Scope 3 category 6. Business travel	Multiple	Data from miles claimed on employee expenses system.	High
Transport	Travel by public transport incl flights, trains, buses and taxis, where known	Scope 3 category 6. Business travel	Multiple	Currently only have partial data on this. Some train and bus travel estimated from spend.	Low
Transport	Hotel stays on CCC business	Scope 3 category 6. Business travel	Multiple	Currently only have partial data on this. Estimated from spend.	Low
Transport	Employee home to work commuting	Scope 3 category 7. Employee commuting	Multiple	Estimated based on staff travel survey carried out in October 2023.	Low
Waste	Waste produced from CCC sites – general waste, recycling and confidential paper waste	Scope 3 category 5. Waste generated in operations	Multiple	Data from waste transfer notes / invoices.	High
Waste	Waste from CCC construction projects	Scope 3 category 5. Waste generated in operations	Place and Sustainability (for highways projects and energy projects), Children, Education and Families (for education capital projects), Finance and Resources (for property minor works)	Estimates provided by project managers or contractors	Medium
Waste	Disposal / treatment of Cambridgeshire waste (as the statutory waste authority)	Scope 3 category 1. Purchased goods and services	Place and Sustainability	Based on waste volumes collected by all the City and District Councils in Cambridgeshire, and from all the Household Waste Recycling Centres, and proportions of waste recycled, composted, sent to energy generation and landfilled. Emissions calculated mainly using custom carbon calculator developed with the Local Government Association and University College London.	Medium

Area	Activity	GHG Protocol category	CCC Directorate(s)	Methodology / Data source	Accuracy / Confidence level
Construction and other materials	Construction and buildings works – major capital projects, minor works and energy projects	Scope 3 category 2. Capital goods	Place and Sustainability (for energy projects), Children, Education and Families (for education capital projects), Finance and Resources (for property minor works)	Inventory of each material used and quantity (tonnes) data from project information and/or capital works contractors (where available).	Medium
Construction and other materials	Highways works	Scope 3 category 2. Capital goods	Place and Sustainability	Data provided by our highways contractors for the works they did on our behalf.	Medium
Construction and other materials	IT hardware	Scope 3 category 2. Capital goods	Finance and Resources	Quantities of each item purchased, and emissions per item based on manufacturer data (where known) or similar products.	Low

Exclusions

Some additional emissions associated with purchased goods and services are not yet included, because we do not have the relevant data to calculate these. This includes:

- Parts of Adults and Children's social care provision, commissioned services (other than those reported above and our own buildings and staff travel, which are included);
- Legal, consultancy, insurance, pensions, investments, banking, telecommunications, post and other business services (other than our own buildings and staff travel);
- Office machinery, furniture and the like;
- Other goods and services not mentioned elsewhere.

Since the emissions data for these goods and services lies with other organisations it is more difficult to collect the relevant data. However, we are working to improve this.

These missing data will account for an unknown quantity of additional scope 3 emissions. Our action plan includes steps to identify more of this data, which we have been doing and will continue to do.

For example, our Policy and Insight team has been working with our IT team to identify, collate and analyse data to enable us to calculate the GHG emissions from cloud hosted IT services. Emissions from our use of Microsoft cloud services are included for the first time this year (and estimated back to all previous years). Work is continuing to collate and analyse data to include further cloud emissions in these estimates going forwards.

We are also investigating potential methods of estimating emissions from other purchased goods and services.

The following activities have been excluded from this carbon footprint calculation:

Table 7: Exclusions

Area	Activity	Reason for exclusion
Buildings and utilities	Energy used at other sites outside of CCC control e.g. space in a shared building, third party premises, and CCC-owned sites let to commercial or private tenants. (other than those mentioned as included above)	We do not have access to this data.
Buildings and utilities	Biomass	There are currently no biomass facilities at any CCC sites or maintained schools.
Schools	Energy used at those schools that do not purchase energy through ESPO and have not provided data directly.	We do not have access to this data.
Schools	All data for Academy schools.	These schools are outside of Council control.
Transport	Subsidised public bus routes	No longer responsibility of CCC. This is now the C&P Combined Authority.
Transport	Other travel by third parties, contractors and suppliers (other than those mentioned in scope)	We do not have access to this data.
Waste	Other waste streams from CCC sites and projects not mentioned in scope above	We do not have access to this data.
Waste	Collection and transport of Cambridgeshire household waste	This is not CCC's responsibility. (City/District Councils do this.)
Agriculture and Land use, land use change and forestry (LULUCF)	County farms / rural estates activities	Provisional data is discussed in section 2.10. Currently excluded from total emissions due to the need for further analysis work. Work is in progress to refine these figures and estimate for other years.
Purchased goods and services	All other goods and services purchased or used by CCC not accounted for elsewhere	Only spend data available. No accurate method available to convert spend to emissions.

3. Cambridgeshire's Area Carbon Footprint

The carbon footprint of the geographical area of Cambridgeshire comprises GHG emissions from commercial and industrial sources, domestic homes, transport, agriculture, waste and land use. The vast majority of this is outside of the control of the Council.

We have used the data published by the UK Government Department for Energy Security and Net Zero (DESNZ) on GHG emissions by local authority area to identify the carbon footprint of the geographical area of Cambridgeshire.

3.1 Latest GHG emissions data for Cambridgeshire

The Government publishes detailed data at a local authority (district) level, on emissions of certain greenhouse gases. This dataset includes carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) as well. This means that about 98% of all GHG emissions are now included. F-gases (the missing 2%) are still not included (these are included in UK-wide statistics but no breakdown by local authority area is available).

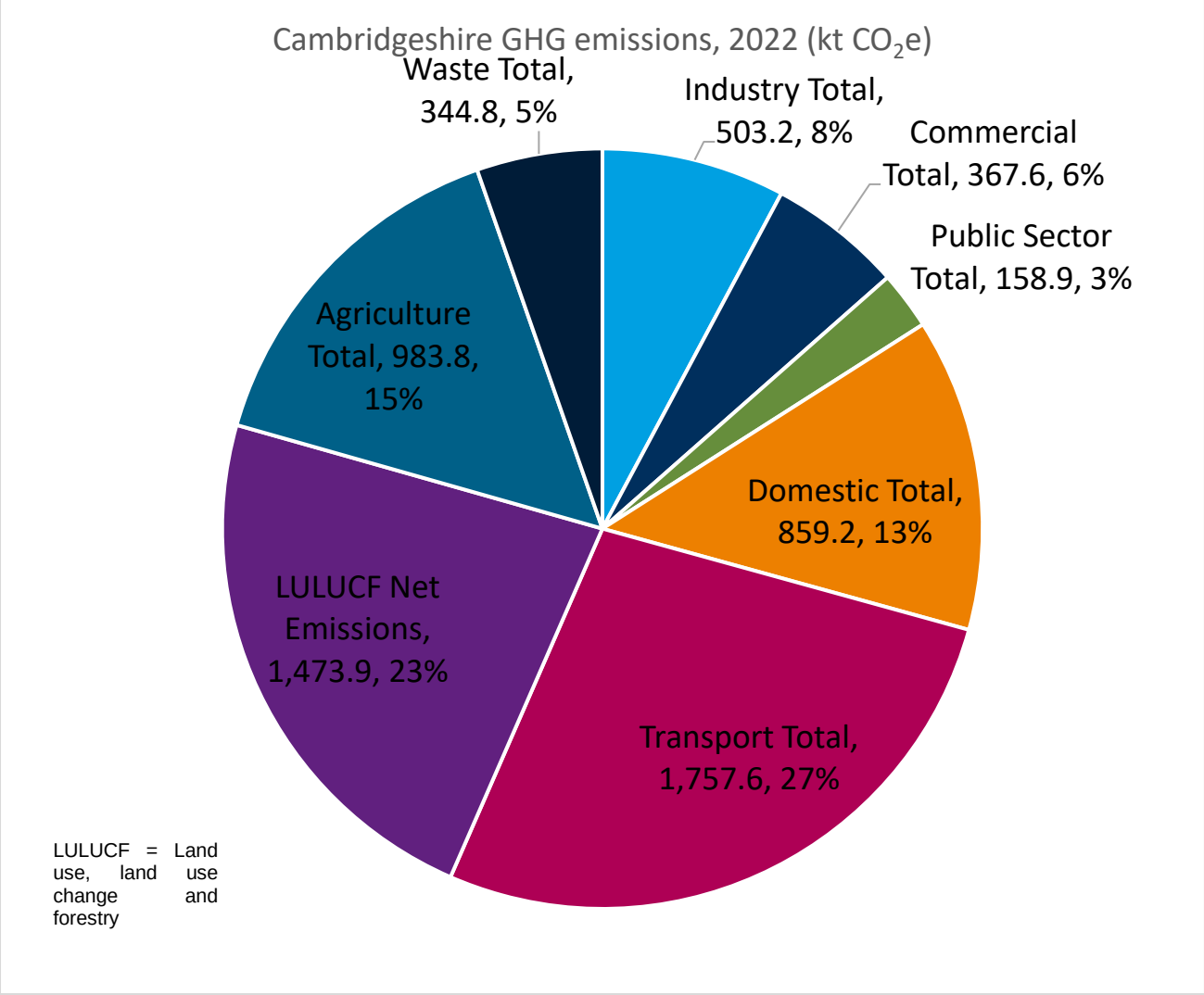

Figure 20: Cambridgeshire area GHG emissions, 2022, by source sector

2022 is the most recent year of data currently available at the time of writing, since there is a two-year time lag in this dataset being published. In 2022, the total GHG emissions (CO_2, CH_4 and N_2O) for the geographical area of Cambridgeshire were **6.45 million tonnes CO_2e**. Transport was the highest emitting sector in the county, accounting for 27% of emissions, followed by land use, land use change and forestry (LULUCF), at 23%, illustrated in Figure 20.

These emissions are broken down into sub-sectors as illustrated in Figure 21 below. This shows that most of the transport emissions are from A roads, most of the LULUCF emissions are from peatland, and most of the domestic emissions are from gas use.

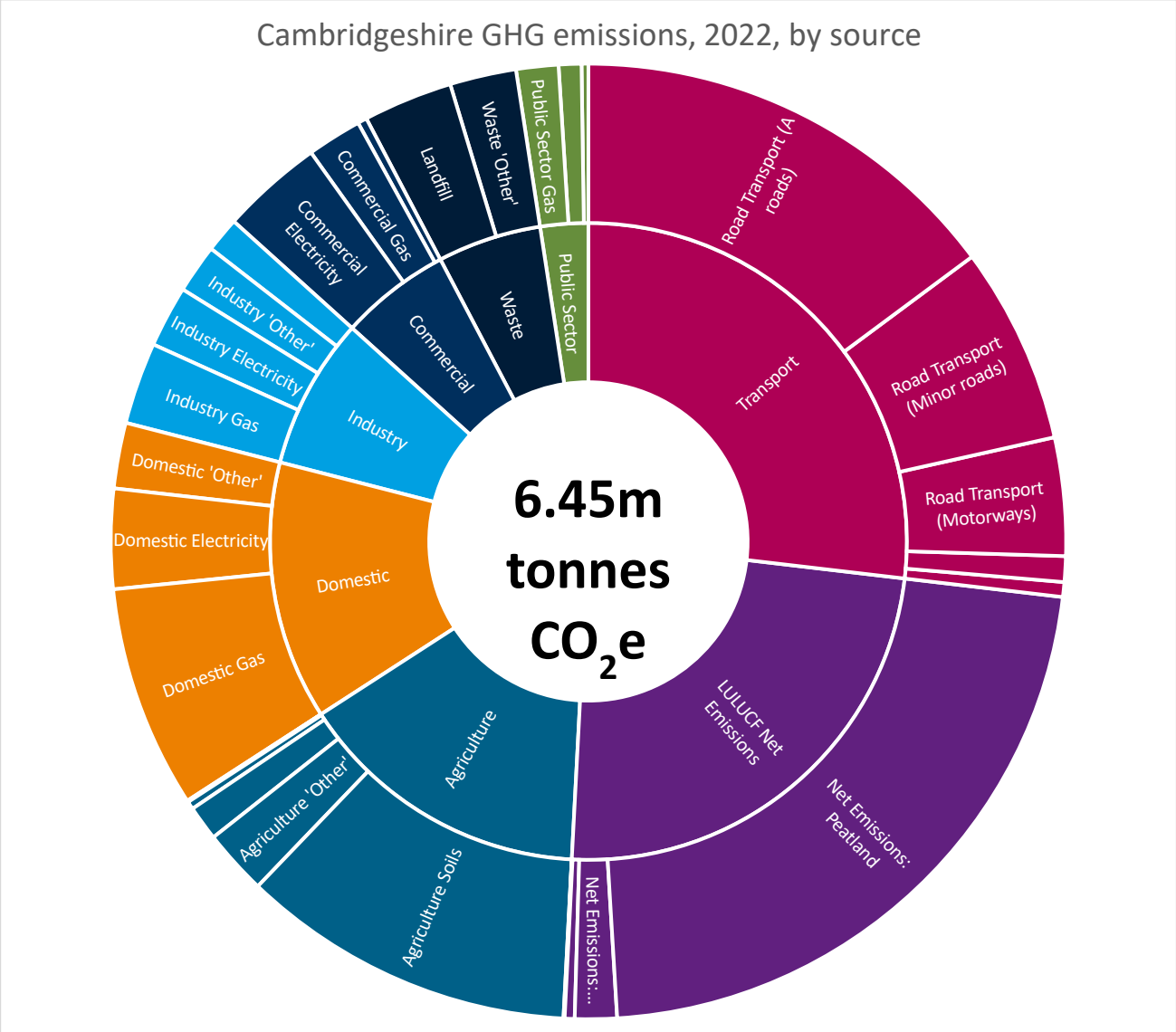

Figure 21: Cambridgeshire area GHG emissions, 2022, by source sector and activity

Land use and agricultural emissions are both very high in Cambridgeshire, partly due to the prevalence of peat soils (more information on this is in section 3.3) and also due to the county's rural economy being a significant producer of food.

Figure 22 below shows a breakdown of the county's GHG emissions by sector and District. This illustrates some of the differences between the different parts of the county. For example,

there is a higher share of LULUCF emissions in East Cambridgeshire and Fenland, due to the peatland areas there. Huntingdonshire and South Cambridgeshire have higher emissions from the transport sector, due to the major roads in those areas such as the A1. The city of Cambridge has a smaller footprint due to being a smaller size and a more urban area.

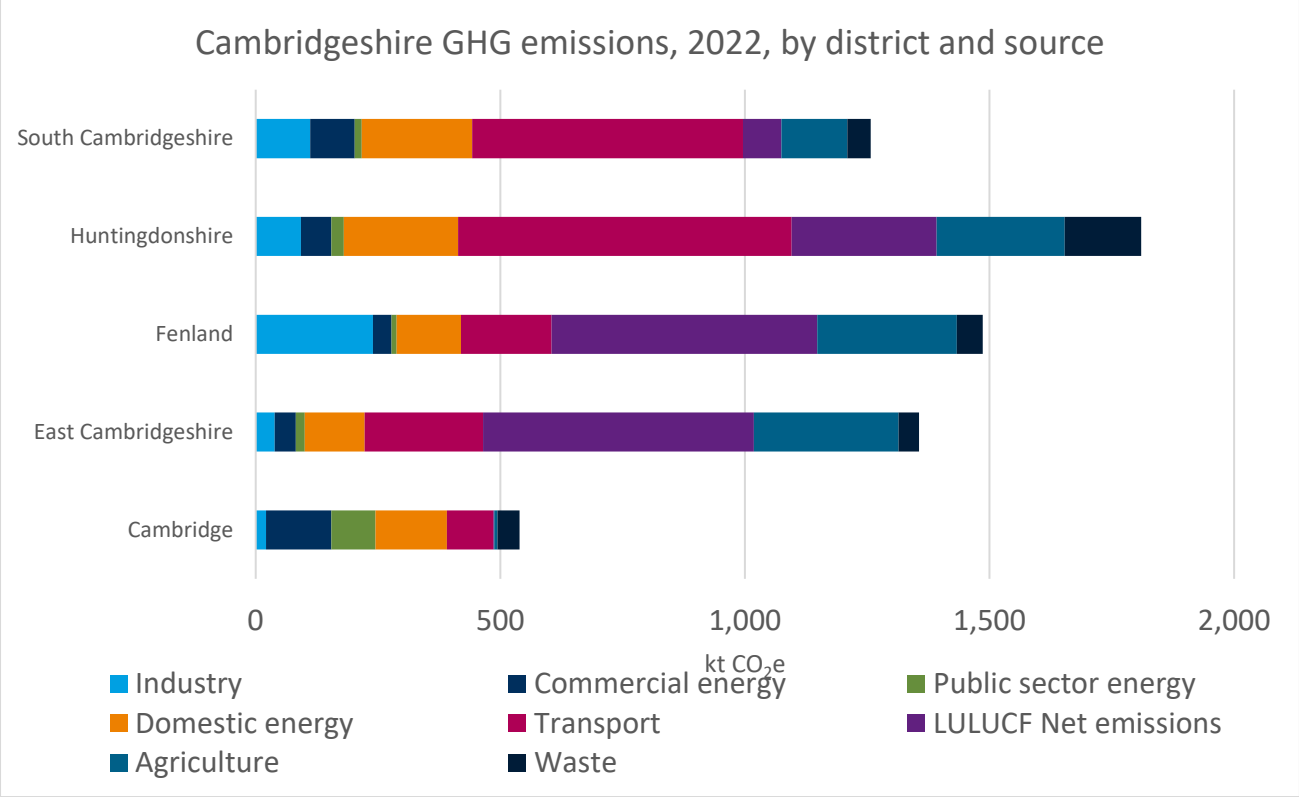

Figure 22: Cambridgeshire area GHG emissions, 2022, by District

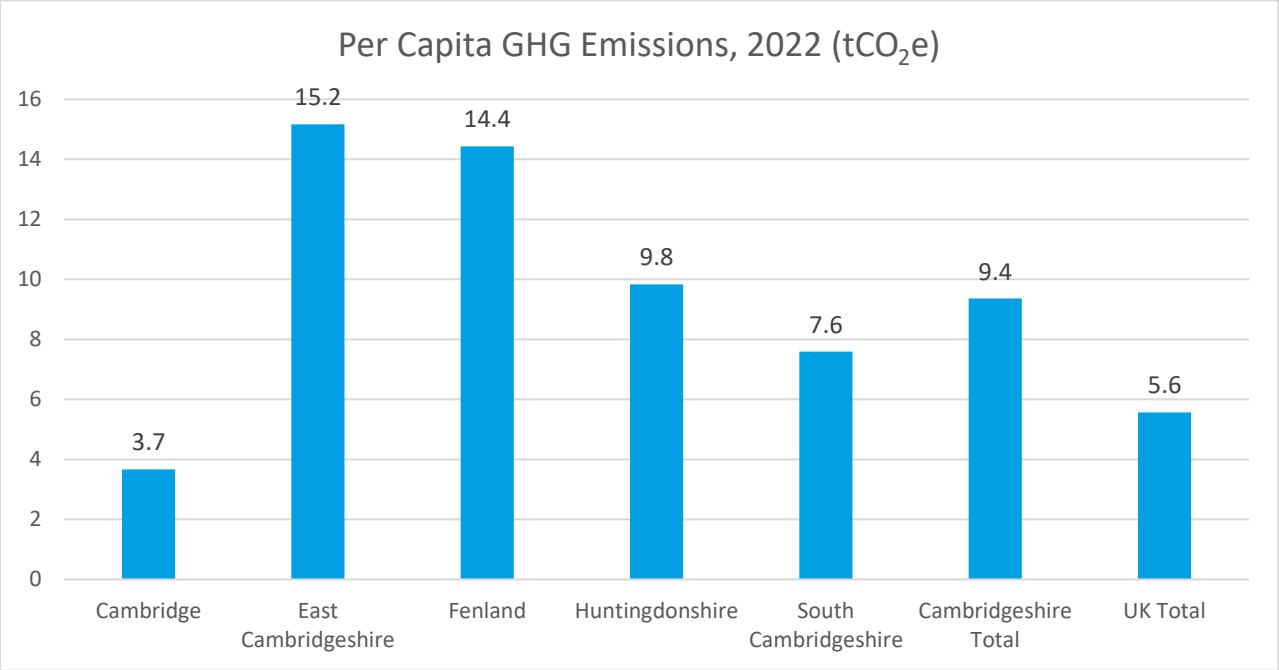

Figure 23: GHG emissions per capita in the five Cambridgeshire districts

Cambridgeshire's emissions per person in the population are 9.4 tonnes CO_2e in a year, which is higher than the UK average of 5.6 tonnes, due to being mainly a rural area and the larger emissions from land use, agriculture and transport in our county. However, in the city of Cambridge, emissions per person are lower than average, at 3.7 tonnes CO_2e per person, due to the higher population density there. This is illustrated in Figure 23.

3.2 Change in Cambridgeshire's GHG emissions from 2005 to 2021

There has been a **28% reduction in Cambridgeshire's GHG emissions between 2005 and 2022**. In 2005 the total emissions from the county were around 9 million tonnes CO_2e and they have now reduced to 6.45m.

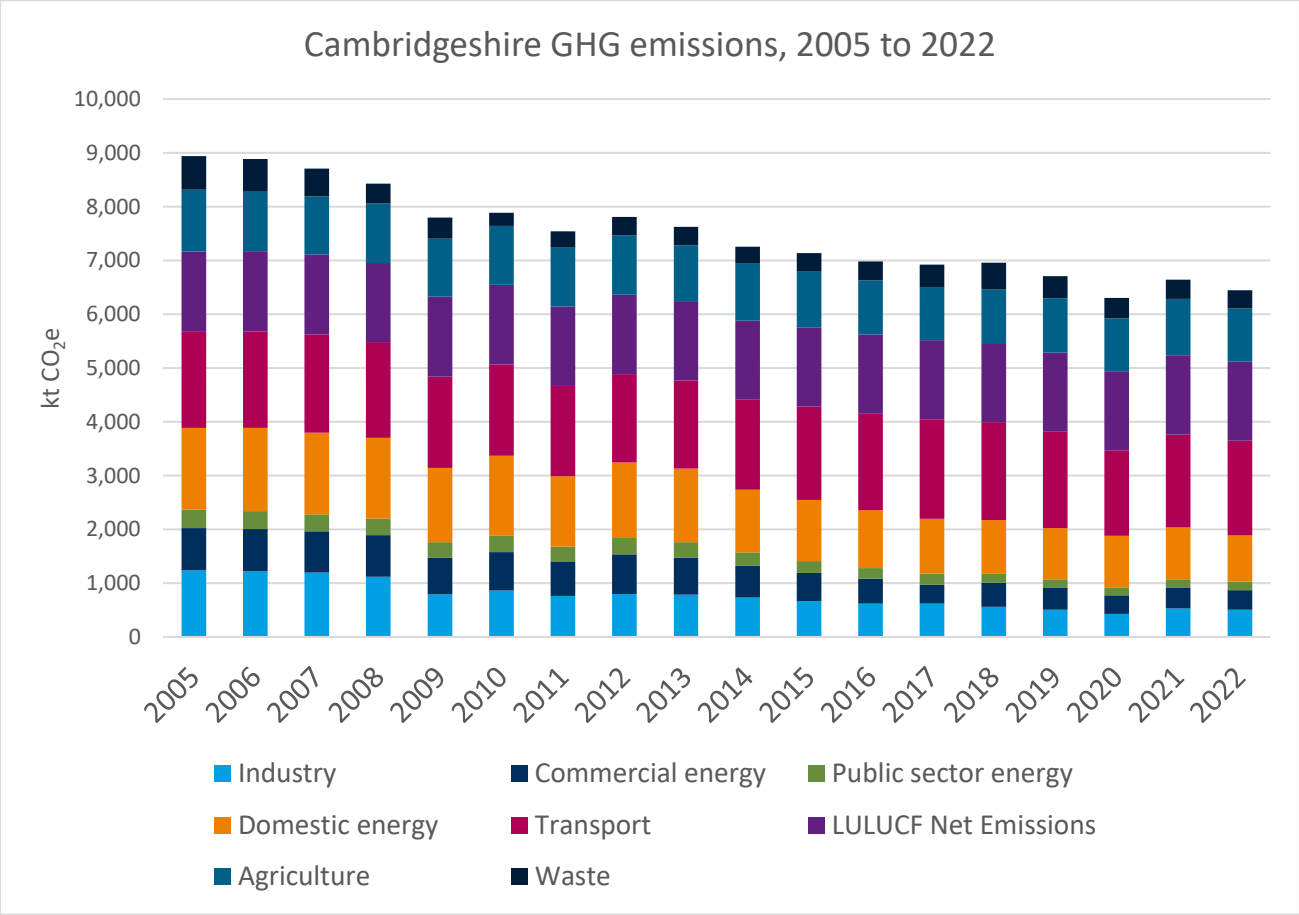

Figure 24: Cambridgeshire GHG emissions, 2005 to 2022

Emissions reductions have not occurred equally across all sectors though, with some changing much more than others. Since 2005, industrial emissions have fallen by 59%, commercial by 53%, public sector by 54% and domestic by 44%, but transport emissions have fallen by only 2% in those 17 years. This is shown in Figure 25.

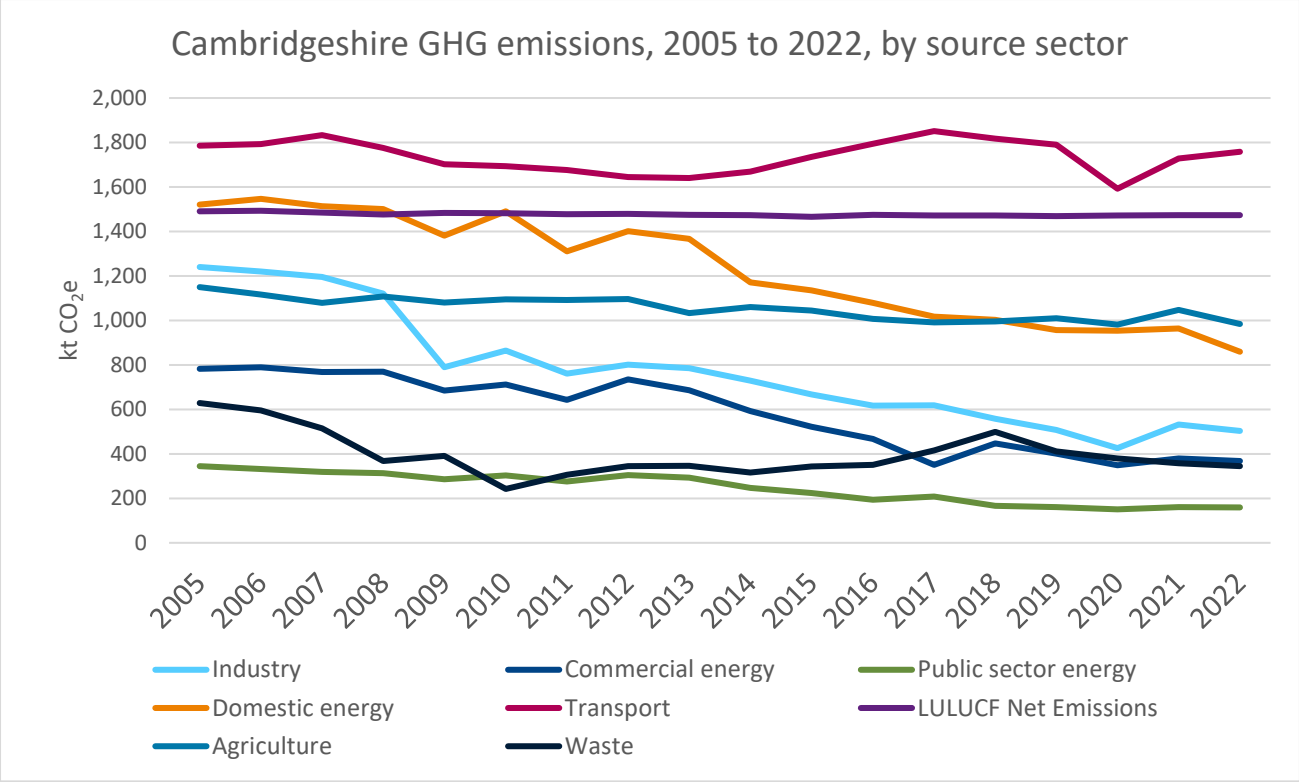

Figure 25: Cambridgeshire GHG emissions, 2005 to 2022, by source sector

Despite the gradual reduction in total emissions over the years, in 2020 there was a greater reduction, due to reduced transport and business activity as a result of the UK-wide lockdowns when the global COVID-19 pandemic hit. In 2021, activity and emissions began to return to more normal levels, and this has continued in 2022. This is in line with the picture across the UK.

Aside from LULUCF, the trend in Cambridgeshire is reflective of the national trend: emissions are slowly and steadily declining over the last few years, due mainly to the decarbonisation of the electricity grid.

3.3 Note on Land Use, Land Use Change and Forestry (LULUCF)

Land use, land use change and forestry (LULUCF) emissions can be caused by drainage and management of organic soils (peatland), land use change on mineral soils (soil disturbance, change in amount of biomass decomposition), biomass burning (wildfires), deforestation or peat extraction.

However, LULUCF is a carbon *sink* in some areas (absorbing more GHGs than emitted), due to forest growth, grassland (mineral soil) land use change, or rewetting / restoration of peatland.

LULUCF emissions are higher in Cambridgeshire than most of the UK, due to the large areas of peatland drained for agriculture, where the wasted peat loses carbon from the soil as CO_2. This is shown in the red and orange areas of the map below. However, LULUCF is a net sink

in many other regions of the UK (the blue areas of the map below), where CO_2 is removed from the atmosphere through forest growth and conversion of cropland to grassland.

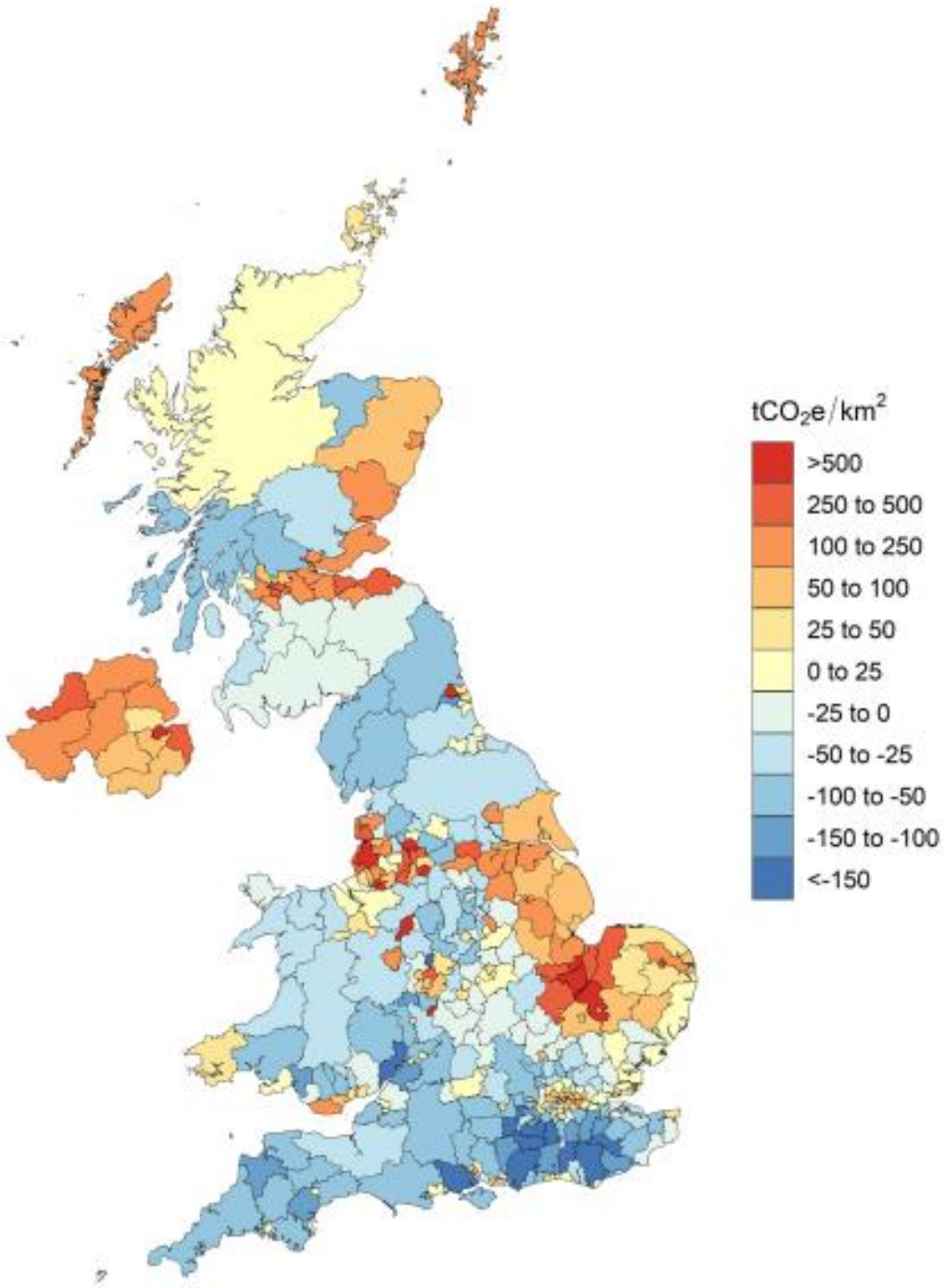

Figure 26: Emissions or removals of GHGs from land use, land-use change and forestry per local authority area (tCO_2e/km^2) in 2022. Image from DESNZ.

4. Glossary

Expression	Meaning
Carbon	Used as abbreviation for carbon dioxide or carbon dioxide equivalent
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent: A standard unit for measuring carbon footprints. It expresses the impact of each different greenhouse gas in terms of the amount of CO_2 that would create the same amount of warming, using GWPs.
GHG	Greenhouse gas: a gas that absorbs and emits radiant energy within the thermal infrared range. Greenhouse gases cause the greenhouse effect.
Greenhouse effect	The heating of the earth's surface caused by solar radiation trapped by atmospheric gases (rather like a greenhouse roof).
GWP	Global Warming Potential: this is a measure of how efficient a chemical is at trapping heat in the atmosphere relative to carbon dioxide. For example, methane has a GWP of 28 and nitrous oxide has a GWP of 265. (Intergovernmental Panel on Climate Change) By definition, CO_2 has a GWP value of 1. Quantities of GHGs are multiplied by their GWP to give results in units of carbon dioxide equivalent (CO_2e).
kt	kilotonne = 1000 metric tonnes
LULUCF	Land Use, Land use change and forestry.
Net zero	Achieving an overall balance between emissions produced and emissions taken out of the atmosphere. This can take place on different scales and is sometimes achieved through offsetting.
Offset	An action intended to compensate for GHG emissions by an equivalent quantity of reductions elsewhere or removals.
Sequestration	The long-term removal, capture or sequestration of carbon dioxide from the atmosphere to slow or reverse atmospheric CO_2 pollution and to mitigate or reverse global warming.
WTT – Well to tank	The emissions associated with extracting, refining and transporting fuels to the point of purchase.
Zero carbon	No emissions of GHGs at all

5. Further information

Please visit https://www.cambridgeshire.gov.uk/climate-change