Cambridgeshire County Council

Annual Carbon Footprint Report

2020 - 2021

Published January 2022

www.cambridgeshire.gov.uk/climate-change

Contents

1. Introduction

This is our annual carbon footprint report for the period April 2020 to March 2021. This report examines both the carbon footprint of Cambridgeshire County Council as an organisation, and that of the geographical area of Cambridgeshire as a whole.

The UK is already seeing the impact of climate change, with average annual temperatures 0.9°C higher in 2005-2014 compared with 1961-1990, more extreme weather events, and sea levels rising 1.4mm per year. In July 2019, Cambridge experienced the highest temperature ever officially recorded in the UK, at 38.7°C.

In 2019 the UK was the first nation to set a legally binding target to reduce GHG emissions to net zero by 2050. To achieve 'net zero' requires considerable changes including low-carbon power, extensive electrification of transport and heating, and behavioural changes to reduce demand.

Cambridgeshire County Council published our Climate Change and Environment Strategy in May 2020 and committed in our Action Plan to measure and report our greenhouse gas emissions.

We are delighted that we are starting to see reductions in emissions, but we recognise that there is much more to do. Many of the actions and projects now underway as a result of our Climate Change and Environment Strategy will lead to greater emissions reductions in future.

An unusual year

2020-21 was an exceptionally unusual year. 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.

The associated carbon emissions have therefore also seen dramatic reductions. Across the UK, emissions also reduced significantly in 2020 compared to 2019, but are expected to rebound in 2021 as the nation returns to previous levels of industrial and commercial activity.

At Cambridgeshire County Council we have seen many reductions in emissions related to the impact of COVID-19, particularly from transport and construction projects. Some of these reductions will inevitably be temporary, whilst some such as reduced travel may see a longer-term reduction.

2. Cambridgeshire County Council's Carbon Footprint

The carbon footprint of Cambridgeshire County Council (as an organisation) comprises emissions that occur as a result of the Council's own operations. We have calculated the carbon footprint of the County Council's own operations for the financial year 1 April 2020 to 31 March 2021.

The Council's own carbon footprint has been calculated in line with the UK Government's Environmental Reporting Guidelines for Voluntary Greenhouse Gas Reporting (BEIS & DEFRA, 2019). For further details on the methodology, scope, boundary of reporting and exclusions, please see chapter 0.

2.1 Key findings

2.1.1 Scopes 1 and 2 emissions

We found that our scopes 1 (direct) and 2 (purchased electricity) emissions amounted to **6,122 tonnes CO_2e** (gross). This includes emissions from gas and oil for heating our buildings, electricity for our buildings and street lighting etc. and emissions from fleet vehicles. The breakdown of this is shown in

Scope 1 and 2 emissions

down 20%

from last year

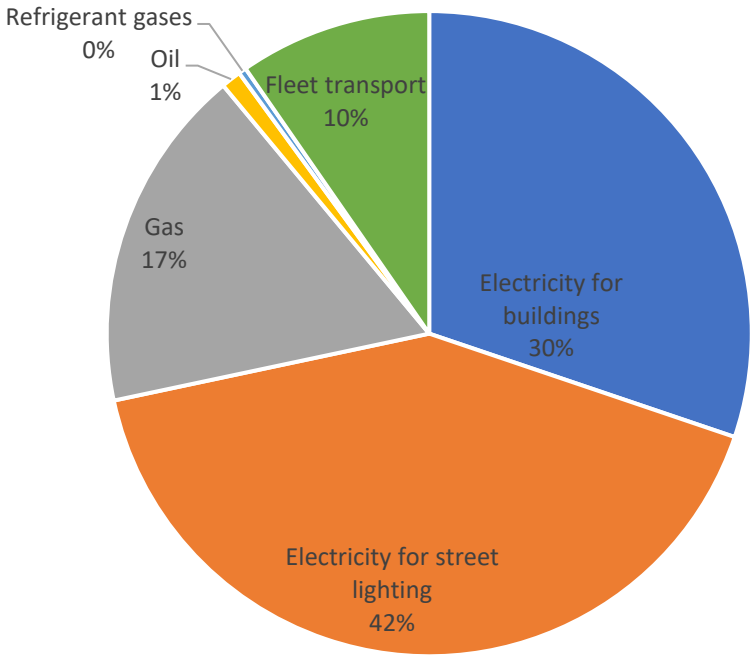


Figure 1. The largest share was for purchased electricity. This shows gross emissions, before any reductions or offsets.

Our scope 1 and 2 emissions together were 20% lower than the previous year. This is due to a combination of factors. Firstly, emissions from electricity for street lighting were 20% lower this year, due to both a 12% reduction in the amount of electricity used, and the national grid getting greener with more electricity generated from renewable sources. Emissions from electricity for our buildings were also 8% lower, despite a 1% increase in electricity usage in buildings. The very small increase in usage may be due to the increased requirement for ventilation during the COVID-19 pandemic. Gas usage in our buildings and resulting emissions was also reduced by 20% and oil reduced by 30%. Part of this reduction is due to the mild winter in 2020-21 meaning reduced need for heating.

Further reductions in emissions were seen in our fleet transport, as people made fewer journeys during the COVID-19 pandemic, with an 82% reduction in mileage in our pool cars, 48% reduction in fuel used for our social and education transport fleet, 39% less fuel used in other fleet cars and vans, and a 19% reduction in fuel used for our highways maintenance and gritting fleet, which combined with a switch to HVO biofuel for some vehicles, reduced the resulting emissions by 40% compared to the previous year.

Net GHG emissions for scopes 1 and 2, after taking into account purchasing of 100% renewable electricity, were reduced to 1,734 tonnes CO_2e. The breakdown of this is shown in

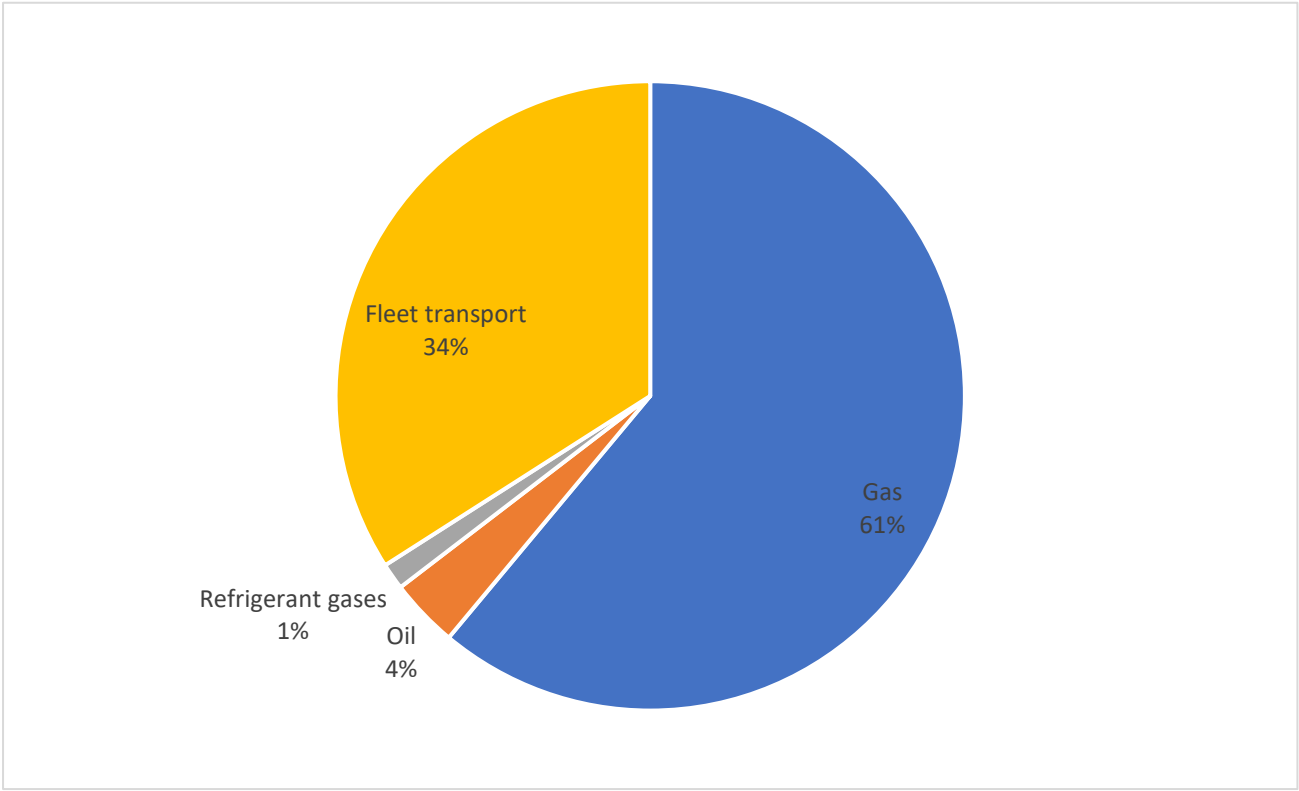


Figure *2* below, with the largest share coming from gas to heat our buildings.

We have started a programme of low carbon heating projects in order to further reduce gas and oil usage in future.

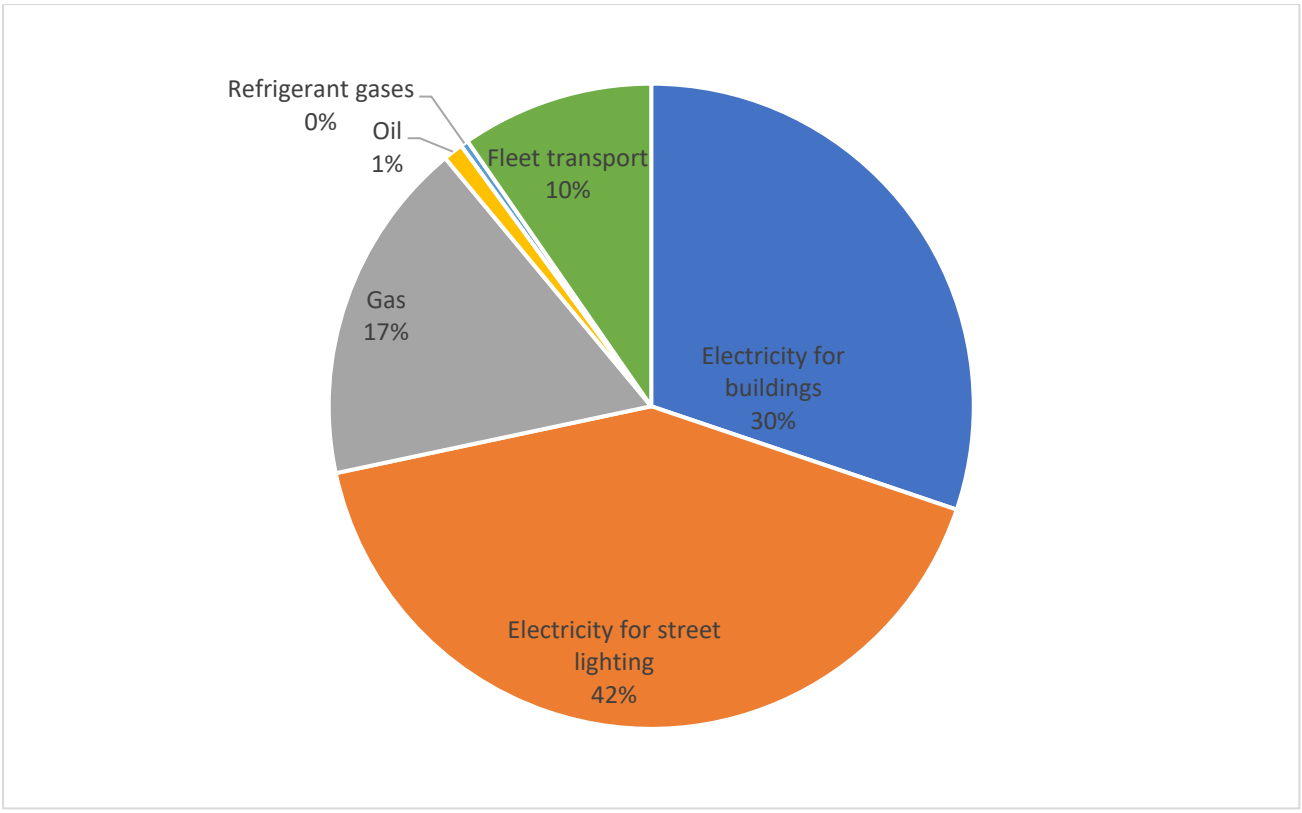


Figure 1: CCC Scopes 1 and 2 emissions sources, 2020-2021 (gross - before reductions)

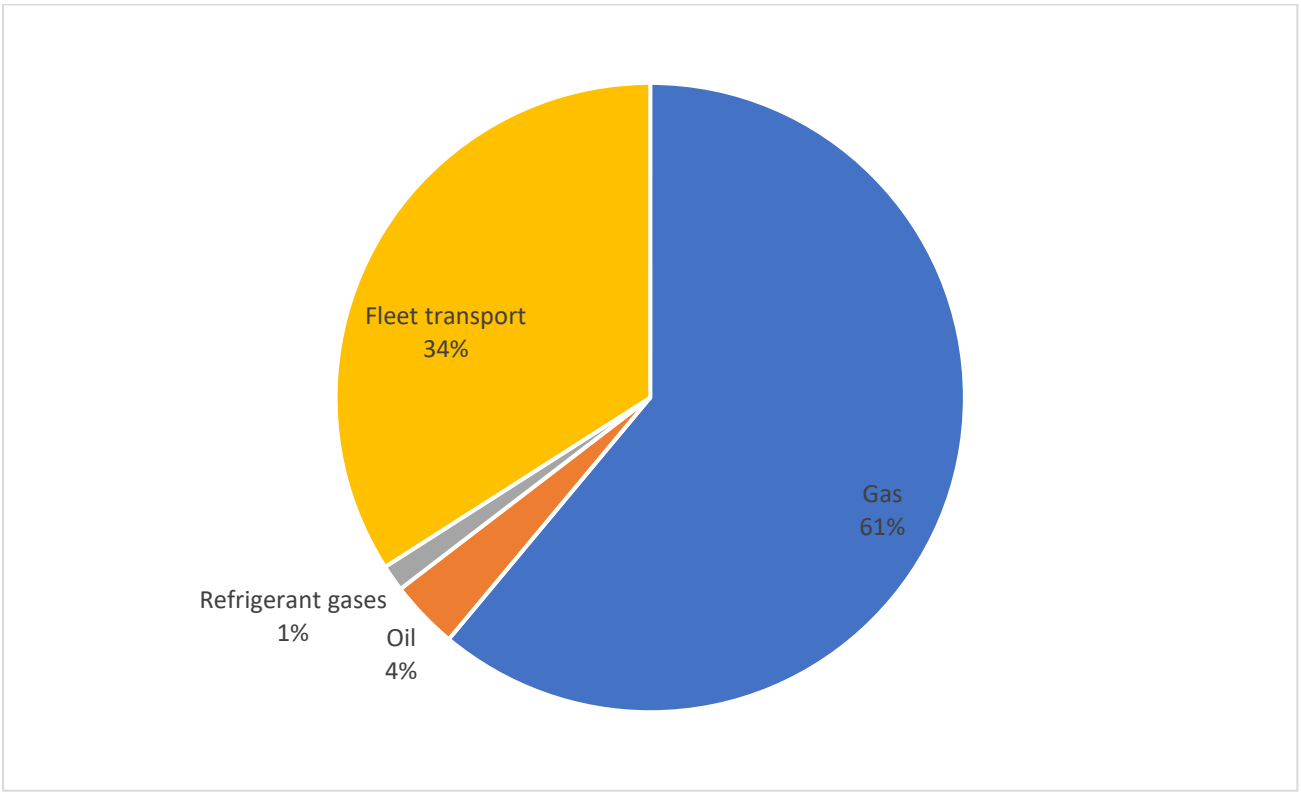


Figure 2: CCC Scopes 1 and 2 emissions sources, 2020 – 2021 (net – after reductions)

2.1.2 Scope 3 emissions

We have also calculated our scope 3 emissions where we can. This means emissions from assets outside of the Council's control, such as those of our contractors and suppliers.

The vast majority (95% or **107,355 tonnes CO_2e**) 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, agricultural emissions from the County Farms estate, and emissions associated with purchased goods and services delivered by third parties, such as capital construction works.

This year, for the first time, an estimate of emissions from land use, land use change and forestry (LULUCF), for land owned by the Council, is included in these figures. This is a significant change because it accounts for 24,490 tonnes CO_2e, largely due to the amount of cropland that the Council owns in its rural estate.

Some additional emissions associated with purchased goods and services are not included, because we do not have the relevant data to calculate these. However, this could potentially account for a significant quantity of additional unknown scope 3 emissions. Our action plan includes steps to identify more of this data in future.

2.1.3 All scopes

By also including those 'scope 3' (indirect) emissions sources for which we have data, the total amounted to **113,477 tonnes CO_2e** (gross). This is a 40% reduction compared to the previous year, which is mainly due to a reduction in construction activity during the 20-21 year, but also due to some changes in the available data.

The breakdown of all these known emissions sources is shown in **Error! Reference source not found.** and there is also a more detailed breakdown in Table 1 on page 8.

Net GHG emissions for all scopes, after deducting the emissions offset through our renewable electricity generation assets (saving 3,085 tonnes CO_2e) and for purchasing 100% renewable electricity (saving 4,388 tonnes), were **106,004 tonnes CO_2e**.

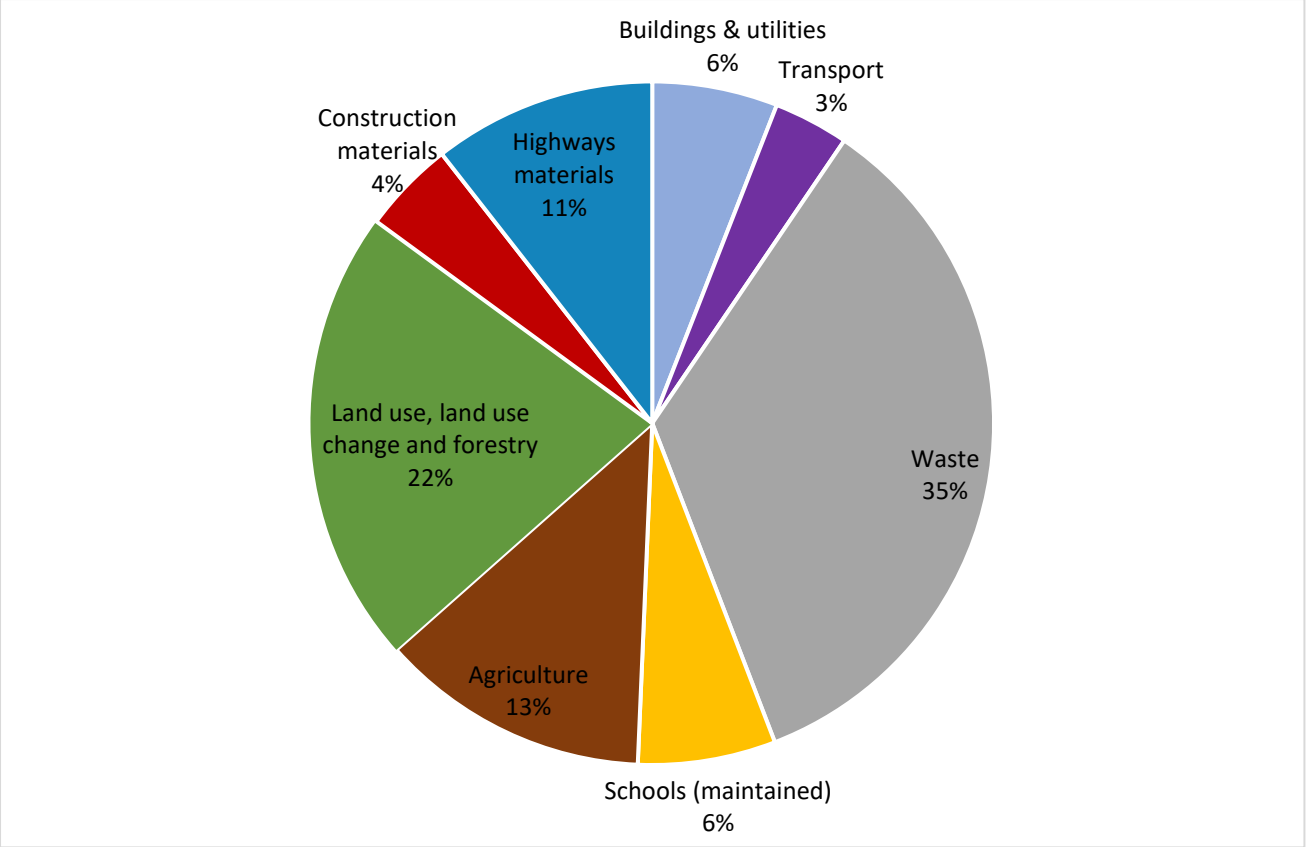


Figure 3: CCC GHG emissions, 2020-21, all 3 scopes

There were also 181 tonnes CO_2e emissions outside of scopes, from biofuels used in some of our highways vehicles.

A full list of what has been included and what is excluded, together with reasons for exclusions, is in section 0 below.

2.1.4 Trend over time

Figures 4 and 5 below show how the Council's GHG emissions for 2020-21 compare to previous years. The dramatic reductions, largely due to the impact of COVID-19, can clearly be seen.

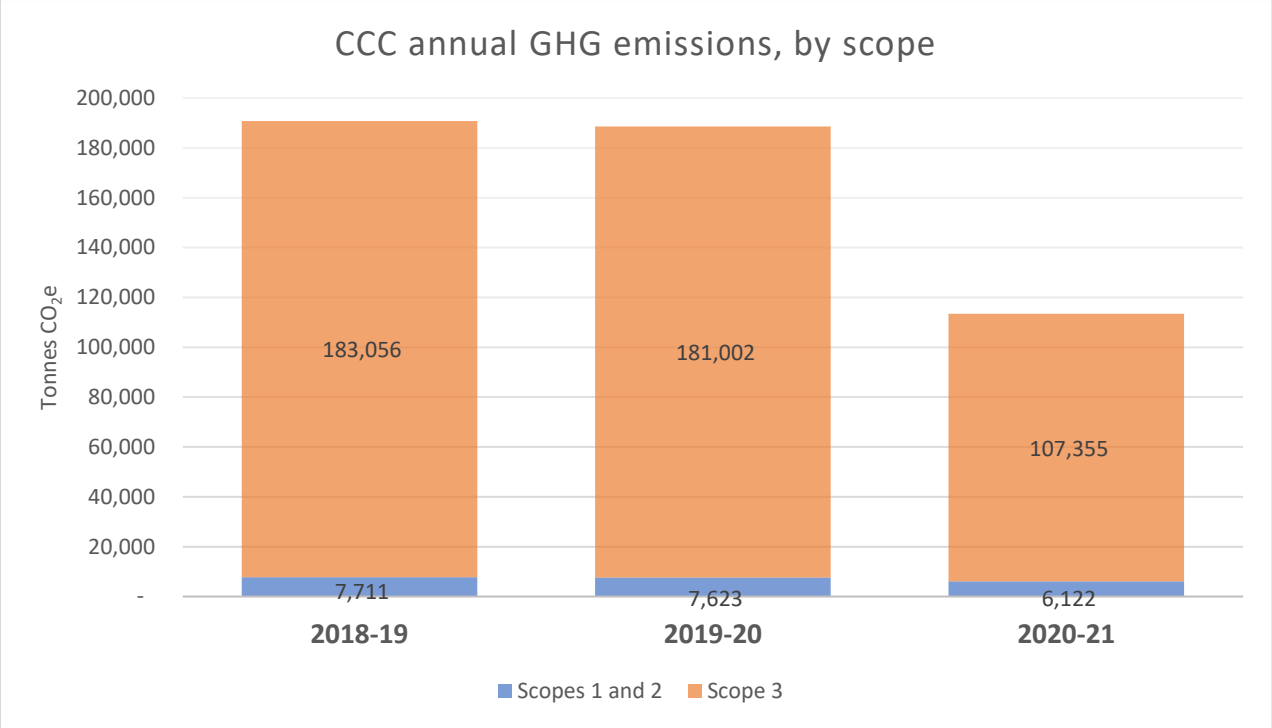


Figure 4. CCC annual GHG emissions trend over time

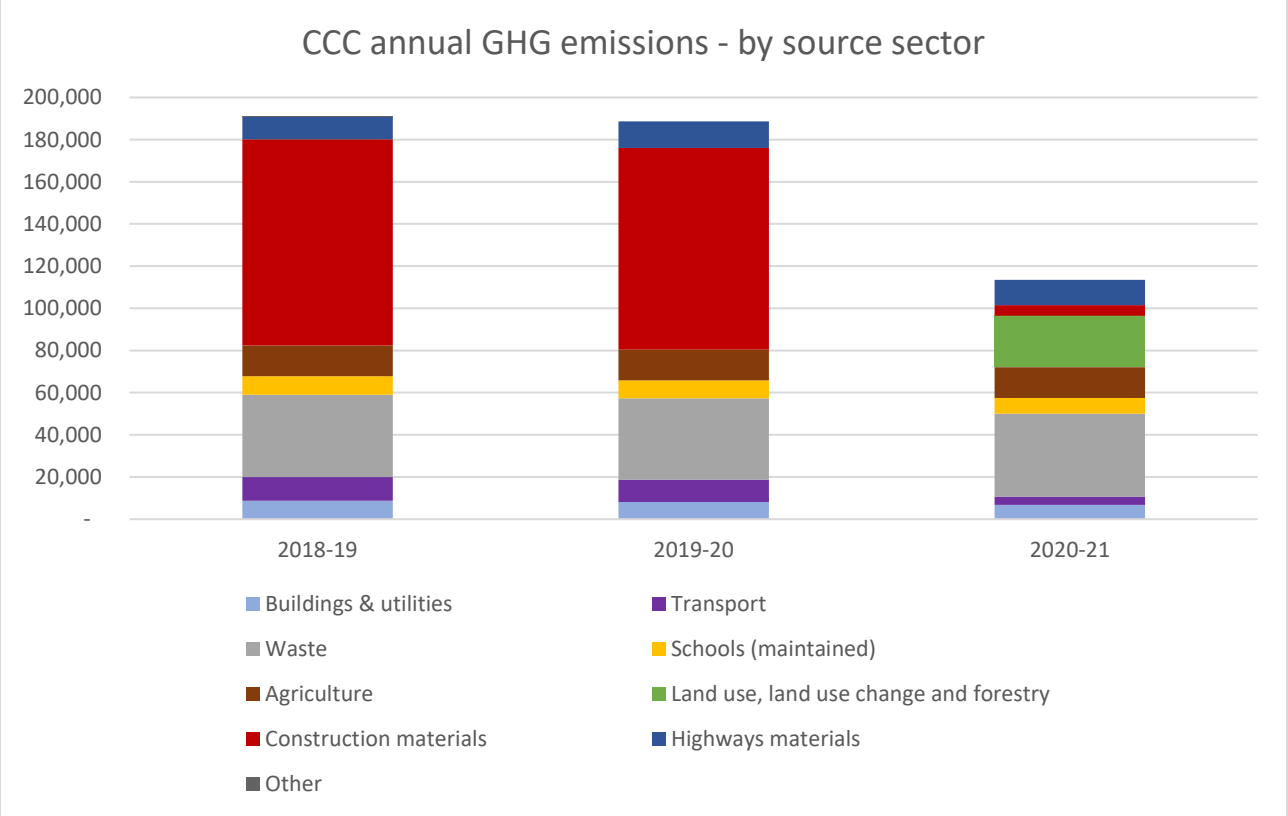


Figure 5. CCC annual GHG emissions by source sector

2.2 Full breakdown

Table 1: Cambridgeshire County Council Greenhouse Gas emissions 2020-21, breakdown by source and scope

	GHG emissions (Tonnes CO_2e)				
Category	**Scope 1**	**Scope 2**	**Scope 3**	**Total in scope**	**Outside of scopes**
Buildings & utilities	1,144	4,388	1,231	**6,763**	0
Gas	1,059		138	**1,197**	
Oil	61		13	**74**	
Refrigerant gases	24			**24**	
Water and sewerage			46	**46**	
Electricity for buildings		1,849	436	**2,285**	
Electricity for street lighting		2,539	599	**3,138**	
Transport	590		3,446	**4,037**	181
Business travel	121		1,083	**1,204**	
Employee commuting			1,139	**1,139**	
Highways	435		122	**557**	181
Public bus routes			868	**868**	
Social and education transport	34		8	**42**	
Construction transport			226	**226**	
Waste			39,320	**39,320**	0
Asbestos disposal			-	**-**	
CCC site waste			70	**70**	
Construction waste			32	**32**	
County waste disposal to landfill			31,989	**31,989**	
County waste disposal - recycling, composting and other			7,202	**7,202**	
Highways waste			26	**26**	
Schools (maintained)			7,397	**7,397**	0
Electricity			2,014	**2,014**	
Gas			4,464	**4,464**	
Oil			797	**797**	
Other heating fuels			122	**122**	
Construction materials			4,979	**4,979**	0
Highways materials			11,980	**11,980**	0
Agriculture			14,511	**14,511**	0
Livestock farming			324	**324**	
Arable farming			14,187	**14,187**	
Land use, land use change and forestry			24,490	**24,490**	0
CO_2 emissions from LULUCF			25,500	**25,500**	
CO_2 removals from LULUCF			-1,009	**-1,009**	
Total	**1,734**	**4,388**	**107,355**	**113,477**	**181**

2.3 Buildings and utilities

Buildings and utilities are responsible for 90% of all scope 1 and 2 emissions.

The biggest source of *gross* greenhouse gas emissions within the buildings and utilities category is electricity usage, using the location-based method, accounting for 4,388 tonnes CO_2e in scope 2 (including both buildings and street lighting). The Council purchased 18,821,129 kWh of electricity in 2020-21, 58% of which was for street lighting. This is 7% less than the amount purchased last year. However, the associated emissions from electricity are 15% lower than last year, due to the UK electricity grid being powered more by renewables and less by coal.

However, all of the gross CO_2e for scope 2 is reduced to zero in the *net* emissions, using the market-based method, by purchasing 100% renewable electricity through our supply contract. For transparency we are reporting both methods.

The next biggest source of GHG emissions related to buildings and utilities is gas, which accounts for 1,059 tonnes CO_2e in scope 1, plus 138 tonnes for 'well-to-tank' emissions in scope 3. Gas is currently used to heat many of our buildings. The Council purchased 5,759,521 kWh of mains gas in 2020-21. This is 20% less gas than last year, due to an reduced requirement for heating, likely to be because of milder weather in winter 20-21 compared to the previous year.

Oil, although more carbon intensive than gas, accounts for only 61 tonnes CO_2e, (plus 13 tonnes for WTT) because there were only four CCC sites that use oil. These used 248,635 kWh of heating oil in 2020-21. This is 30% lower than last year.

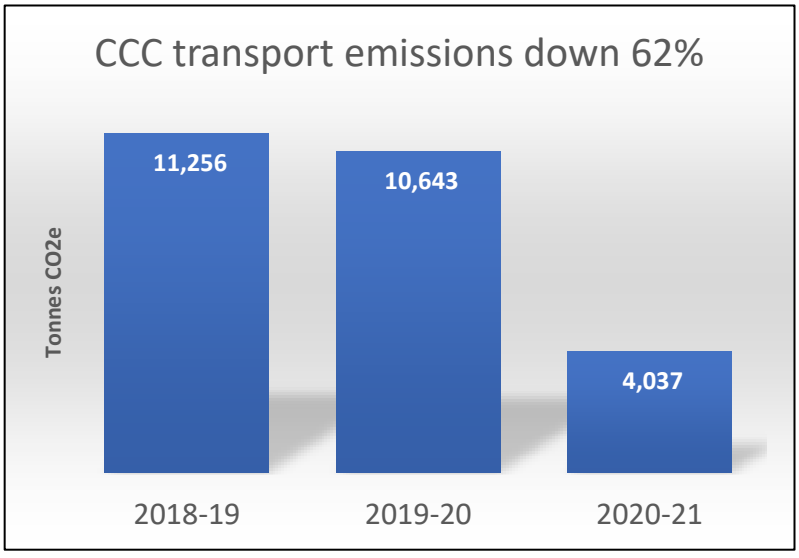
Finally, fugitive emissions of refrigerant gases from air conditioning units is estimated at 24 tonnes CO_2e, the same as last year.

This section does not include school buildings, which have been counted separately.

2.4 Transport

Transport accounts for 4,037 tonnes CO_2e, including 590 tonnes of scope 1 emissions. The majority of transport emissions are scope 3 because they are from vehicles not under the control of the Council.

Transport emissions have reduced by 62% compared to the previous year, likely to be largely due to the impact of the Covid-19 pandemic.



Of the scope 1 (direct) transport emissions, the largest share was from our Highways services, accounting for 435 tonnes CO_2e. This includes the road gritters pictured in Figure 6. Highways transport also accounted for 122 tonnes CO_2e in scope 3.

Figure 6: Some of CCC's Highways gritting fleet

Also in scope 1 transport is the social and education transport fleet, which produced an estimated 34 tonnes CO_2e emissions. Other social and education transport (including volunteers driving, some contracted out social care journeys and home to school transport by bus and taxi) are not currently included because we do not have the data to calculate these emissions.

Business travel (including pool cars, vans and other fleet vehicles) accounted for 121 tonnes CO2e in scope 1, and an additional 1,083 tonnes CO2e in scope 3, which includes emissions associated with business travel in employees' own vehicles and travel by public transport (trains, buses and taxis) and hotel stays. Journeys by public transport are estimated due to incomplete data.

The largest part of the transport section is the scope 3 (indirect) emissions from our employees commuting from home to work, which has been estimated at 1,139 tonnes CO_2e. This is a 78% reduction since the previous year. This estimate is based on 555 responses to the 2020 staff travel survey and has been extrapolated based on the total number of employees and assuming an average of 47 weeks worked per year. However, the relatively small sample size of the survey responses means that this is only a rough estimate.

Although the Cambridgeshire and Peterborough Combined Authority is the Transport Authority responsible for provision of public transport, they have delegated this responsibility back to Cambridgeshire County Council for 2020-21. We have therefore included the transport undertaken by passengers on those public bus routes which are subsidised by the Transport Authority, as a Scope 3 emissions source here, accounting for 868 tonnes CO_2e. Bus passenger numbers declined considerably in 2020-21 due to the COVID-19 pandemic, so for this year we have based our emissions estimate on the assumption that the distance travelled by the buses was the same, as the same routes were run. It is important to note that had these passenger journeys been made by car, total emissions would have been much higher (although outside of the Council's total).

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

2.5 Maintained schools

Schools emissions (which are all counted as scope 3) for all the Local Authority maintained schools in Cambridgeshire account for 7,449 tonnes CO_2e. This is 14% lower than the previous year, likely to be due to a combination of the greening of the UK electricity grid plus the impact of the 2020 lockdowns and partial school closures.

The largest share of this is 4,464 tonnes CO_2e from mains gas, followed by 2,066 tonnes CO_2e from electricity, and 797 tonnes CO_2e from heating oil.

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.

2.6 Waste

Waste accounts for the largest share (35%) of our known emissions in 2020-21, at 39,320 tonnes CO_2e.

The vast majority of this (estimated at 39,192 tonnes CO_2e) is due to the Council's statutory responsibility as the Waste Authority for treatment and disposal of waste from Cambridgeshire residents. In 2020-21 there were 303,598 tonnes of waste collected from both the household kerbside collections and the Council's nine Household Waste Recycling Centres. Of that, 48% went to landfill, mostly after initially going through a Mechanical-Biological Treatment (MBT) plant to reduce the volume, whilst 52% was either composted or recycled. 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.

The remainder of the waste category is from the waste generated at the Council's own sites, accounting for 70 tonnes CO_2e emissions, construction waste (32 tonnes) and highways waste (26 tonnes).

2.7 Agriculture

Agricultural emissions from the County Farms estate are estimated at 14,511 tonnes CO_2e, which is 13% of all known emissions in the Council's total carbon footprint for 2020-21. The vast majority of the County Farms estate is cropland, with a small area allocated to livestock.

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

Emissions from land use, land use change and forestry (LULUCF) have been included this year for the first time. 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).

This sector accounts for an estimated 24,490 tonnes CO_2e in the CCC carbon footprint, which is 22% of all our known emissions. This comprises an estimated 25,500 tonnes CO_2 from the 12,986 hectares of Council-owned cropland (arable farms) and 2,253 hectares of built-up land (buildings and highways) and deducting -1,009 tonnes CO_2 removed from the 270 hectares of Council-owned grassland (including livestock farms and parkland) and 163 hectares of forest / woodland.

2.9 Construction projects and highways

A share of our carbon footprint is from construction or building works. 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'.

The majority of construction works was building of new schools and major extensions to schools. In 2020-21, there was significantly reduced construction activity in our major capital projects compared to the previous year. This is the main reason for a very large reduction in associated emissions from construction materials, which in 2020-21 was 4,979 tonnes CO_2e – 95% less than the previous year.

This large reduction is in the context of a general slowdown in the construction industry in 2020-21 due to a combination of Covid-19 impacts and supply chain issues across the industry.

As for previous years, minor capital works such as renovations and maintenance of existing buildings, are not included in these figures because we do not have access to the relevant data on materials to be able to calculate the emissions.

Materials for Highways work, including resurfacing schemes and highways maintenance services and works, contributed an estimated 11,980 tonnes CO_2e. This is 5% less than the previous year. The largest share of this, by material, was from asphalt, followed by gas oil, concrete and steel. The associated activities included asphalt works, groundworks and surface treatment.

Major infrastructure projects other than those mentioned are not included in these figures because we do not have access to the relevant data on materials to be able to calculate the emissions.

2.10 Other purchased goods and services

Emissions from other purchased goods and services are unknown. This includes:

- Social care provision (other than our own buildings and staff travel);
- Legal, consultancy, insurance, pensions, investments, banking, telecommunications, post and other business services (other than our own buildings and staff travel);
- Education services (other than energy use in maintained schools);
- Office machinery, IT equipment, furniture and the like;
- Food and drink;
- 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.

2.11 Reducing our carbon footprint

There are two reasons for the difference between gross and net emissions; a reduction of 7,473 tonnes CO_2e.

Firstly, because we buy electricity generated from 100% renewable sources, although the gross emissions for electricity (based on grid-average carbon intensity – known as the location-based method) are 4,388 tonnes CO_2e, the net emissions (based on the supplier fuel mix for the tariff we purchase – the market-based method) are zero.

Secondly, our solar assets including the 12MW solar farm in Soham generated enough electricity to offset 3,084 tonnes CO_2e in 2020-21, which is enough to power more than 3000 homes.

Cambridgeshire County Council also already has several other key measures in place to reduce our gross 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.

Our programme of low carbon heating works will see our scope 1 carbon footprint reduce further over the next few years, as we replace gas and oil heating with low carbon Air Source Heat Pumps at more sites.

Without these projects, the Council's carbon footprint would have been higher. However, we recognise that there is more work to do. This is set out in our Climate Change and Environment Strategy and Action Plan.

3. Methodology

A carbon footprint is a measure of the greenhouse gases (GHGs) emitted into the atmosphere from sources in a specified region or organisation. The most common GHG is carbon dioxide (CO_2). Emissions of 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. Quantities of GHGs are multiplied by their GWP to give results in units of carbon dioxide equivalent (CO_2e).

Different activities emit different gases, for example, burning fossil fuels releases carbon dioxide, methane and nitrous oxide into the atmosphere.

Nationwide, emissions of CO_2 make up about 80% of GHG emissions, with the remainder from methane (12%), nitrous oxide (5%) and fluorinated gases (3%), when weighted by GWP, as shown in Figure 7.

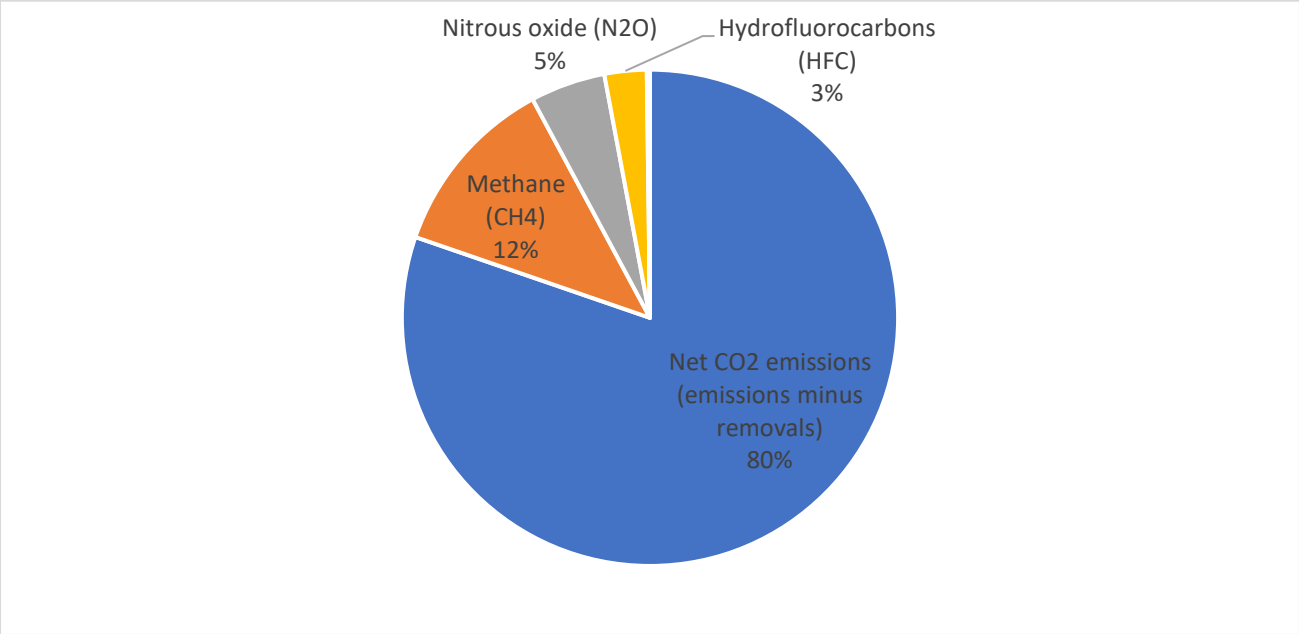


Figure 7: UK-wide Greenhouse Gas Emissions, 2019, by type of gas (tonnes CO_2e) (data from BEIS)

The Council's own carbon footprint has been calculated in line with the UK Government's Environmental Reporting Guidelines for Voluntary Greenhouse Gas Reporting[1], 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.

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.

[1] 2019 Environmental Reporting Guidelines, Chapter 3

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. green energy tariff, solar generation), then also report net emissions.

The reporting period is the financial year 1 April 2020 to 31 March 2021.

The carbon conversion factors used for this reporting period are mostly the 2020 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 in section 3.2 below.

3.1 Scopes

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 Table 2 below.

Table 2: Scopes

Scope	Definition
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).

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.

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 the approach generally taken in international accounting standards.

3.2 Boundary of reporting, and data sources

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 3.

Table 3: CCC Emissions Sources Included

Area	Activity	Methodology / Data source	Accuracy / Confidence level
Buildings and utilities	Gas burned for heating and hot water at CCC-controlled buildings	Usage data from utility bills	High
Buildings and utilities	Oil burned for heating and hot water at CCC-controlled buildings	Usage data from utility bills	High
Buildings and utilities	Electricity used at CCC-controlled buildings	Usage data from utility bills	High
Buildings and utilities	Electricity used for CCC street lighting, traffic signals and similar	Usage data from utility bills	High
Buildings and utilities	Refrigerant gases leakage from air conditioning units in CCC-controlled buildings	Estimated based on last year's data, which was based on leakage assumed from top-ups at servicing, applied to CCC list of A/C units, type of refrigerant gas and capacity.	Medium
Buildings and utilities	Water supply and wastewater collection and treatment	Usage data from utility bills. Some of this is estimated.	Medium
Buildings – maintained schools	Gas burned for heating and hot water at Cambridgeshire schools, where purchased through ESPO.	Gas usage data. (Some schools will not have gas data because they do not use any gas, for example those with oil heating. A small number of schools we do not have data for.)	Medium
Buildings – maintained schools	Electricity used at Cambridgeshire schools, where purchased through ESPO.	Electricity usage data.	High

Area	Activity	Methodology / Data source	Accuracy / Confidence level
Buildings – maintained schools	Oil and LPG used for heating at some Cambridgeshire schools.	Heating fuels usage data provided by the schools.	Medium
Transport	Travel in CCC pool cars. Travel in hire cars.	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.	Data from a combination of fuel card reports for some vehicles and estimated mileage for others. Fuel consumption data and type of fuel is used where known. Actual mileage records used if no fuel usage data available. Estimated mileage used if neither fuel usage nor actual mileage available.	Medium
Transport	Highways maintenance vehicles and gritting fleet.	Data from fuel usage.	High
Transport	Employee travel on CCC business in own vehicles	Data from miles claimed on employee expenses system.	High
Transport	Travel by public transport incl flights, trains, buses and taxis, where known	Currently only have partial data on this. Some train and bus travel estimated from spend.	Low
Transport	Hotel stays on CCC business	Currently only have partial data on this. Estimated from spend.	Low
Transport	Subsidised public bus routes	Responsibility of the C&P Combined Authority, delegated back to CCC. Estimated based on route distances calculated from maps and assumed that average passenger travels 50% of total route distance. *Passenger numbers were significantly lower in 2020-21 but emissions assumed same as previous year as routes remained the same.*	Medium

Area	Activity	Methodology / Data source	Accuracy / Confidence level
Transport	Employee home to work commuting	Estimated based on annual staff travel survey in October. A sample of employees provided detailed information on their modes of travel and distance travelled for one week. Assumed this was representative of all employees and based on a typical week. Extrapolated to all employees and assumed working 47 weeks per year.	Low
Waste	Waste produced from CCC sites – general waste, recycling and confidential paper waste	Data from waste transfer notes / invoices.	High
Waste	Disposal / treatment of Cambridgeshire waste (as the statutory waste authority)	Based on waste volumes collected by all the City and District Councils in Cambridgeshire, and from all of the Household Waste Recycling Centres in Cambridgeshire, and proportions of waste recycled, composted and landfilled. Landfill gas emissions modelled using similar method to that of CUSPE report (Weber, et al., 2019), applied to updated data set. Composting emissions estimated based on Cambridgeshire share of UK population and national emissions data.	Medium
Agriculture	County farms / rural estates	Estimated based on area of land used for livestock, number of cattle, number of sheep, and area of land used for crops, with UK average GHG emissions rates for these uses (based on UK GHG inventory) applied.	Low
Land use, land use change and forestry (LULUCF)	Area of land used as cropland, grassland, wetlands, forestland and settlements	Estimated based on area of land owned by CCC of each type, and emissions factors calculated from the UK GHG Inventory.	Low

Area	Activity	Methodology / Data source	Accuracy / Confidence level
Purchased goods and services	Construction and buildings works – major capital projects	Inventory of each material used and quantity (tonnes) data from project information and/or capital works contractors (where available). Materials used multiplied by the relevant conversion factors for each material. This data was available for the majority of the total spend on major capital works, with the remaining spend assumed to have a similar composition of materials and emissions estimated on a pro rata basis.	High
Purchased goods and services	Highways works	Data provided by our highways contractor (Milestone) for the works they did on our behalf.	High

3.3 Exclusions

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

Table 4: Exclusions

Area	Activity	Reason for exclusion
Buildings and utilities	Diesel used for on-site generators	No data currently available. Unable to estimate. Expect this to be very low.
Buildings and utilities	Energy used at 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.	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	Gas used at those schools that do not purchase energy through ESPO.	We do not have access to this data.
Schools	Electricity used at those schools that do not purchase energy through ESPO	We do not have access to this data.
Schools	Oil and other heating fuel data for some schools	We only hold partial data for heating fuels used at schools.
Schools	All data for Academy schools.	These schools are outside of Council control.
Transport	Social and education transport by contractors (including home to school transport). Social and education transport by volunteer drivers.	We do not have access to this data.
Transport	Travel by public transport other than that included in scope above.	We do not have access to this data.
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 not mentioned in scope above e.g. batteries, WEEE, skip waste, green waste.	We do not have access to this data.
Waste	Collection and transport of Cambridgeshire waste	This is not CCC's responsibility.
Waste	Transport, disposal and treatment of private / third party commercial waste	This is not CCC's responsibility.

Area	Activity	Reason for exclusion
Purchased goods and services	All other goods and services purchased by CCC not accounted for elsewhere	Only spend data available. No accurate method available to convert spend to emissions.
All	All other activities not mentioned in scope above.	No known GHG emissions other than those already listed.

4. Cambridgeshire's 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 following methodologies to identify the carbon footprint of the geographical area:

- CO_2 emissions by local authority area, data published by the UK Government (BEIS)
- Apportioning a share to Cambridgeshire of UK-wide non-CO_2 GHG emissions

4.1 CO_2 emissions data for Cambridgeshire

The Government Department for Business, Energy and Industrial Strategy (BEIS) currently publishes detailed data at a local authority (district) level, on emissions of carbon dioxide (Department for Business, Energy and Industrial Strategy, 2019), but does not provide data at a local authority level on emissions of other greenhouse gases. Carbon dioxide (CO_2) emissions account for around 80% of nationwide GHG emissions.

2019 is the most recent year of data currently available. Cambridgeshire has seen a 24% reduction in CO_2 emissions between 2005 and 2019. Most of the reductions are due to the decarbonisation of electricity generation for domestic, commercial and industrial usage.

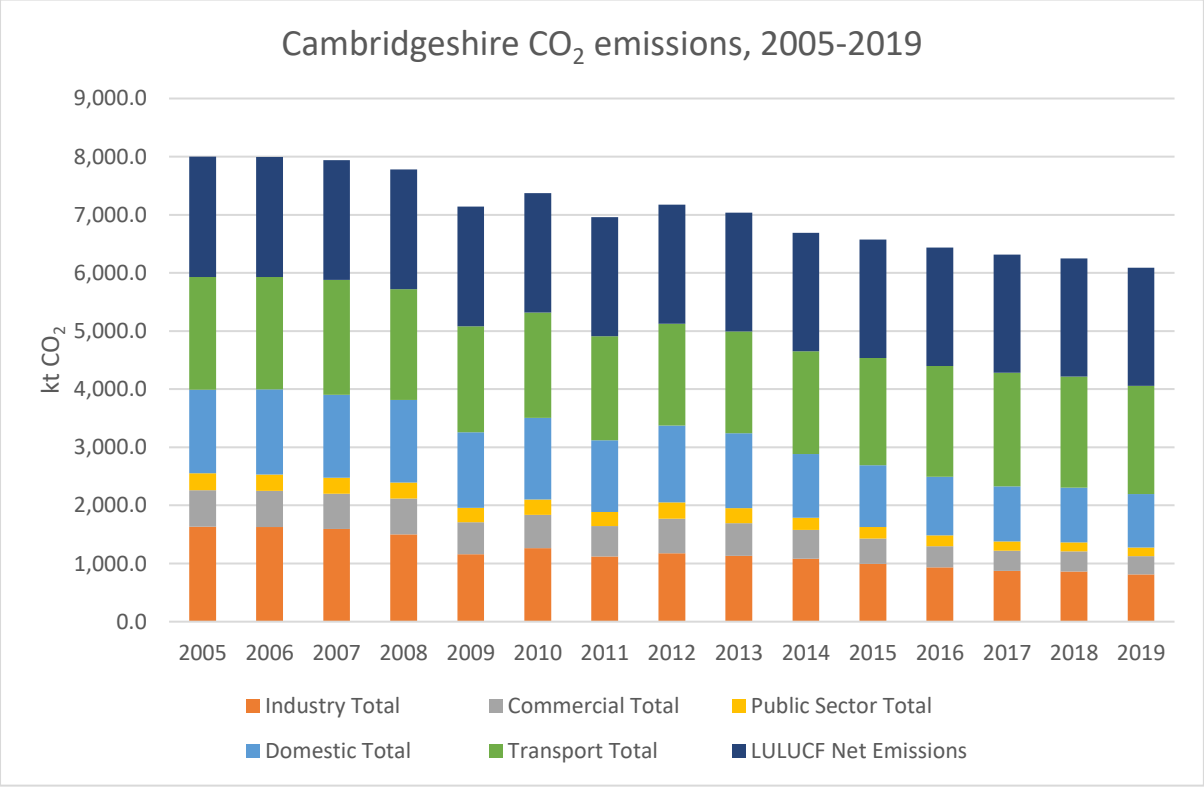


Figure 8 Cambridgeshire CO_2 emissions, 2005-2019 (data from BEIS)

The total CO_2 emissions from Cambridgeshire in 2019 was just under 6.1 million tonnes, and the largest share of that was from the Land Use, Land Use Change and Forestry (LULUCF) sector, followed by transport.

This data has been revised significantly since the previous year's publication, with the largest differences being from methodology improvements in the LULUCF sector. The LULUCF sector is now the largest source of emissions in Cambridgeshire. This is mostly due to the large areas of drained peatland in the region, where the wasted peat loses carbon from the soil as CO_2. However, LULUCF is a net sink in many other regions of the UK, where CO_2 is removed from the atmosphere through forest growth and conversion of cropland to grassland. This is illustrated in Figure 9 below. In Cambridgeshire, CO_2 emissions per capita and per km^2 area were considerably higher than the national average, with much of the excess due to the LULUCF sector. Excluding LULUCF, Cambridgeshire's CO_2 emissions were under 4.1 million tonnes.

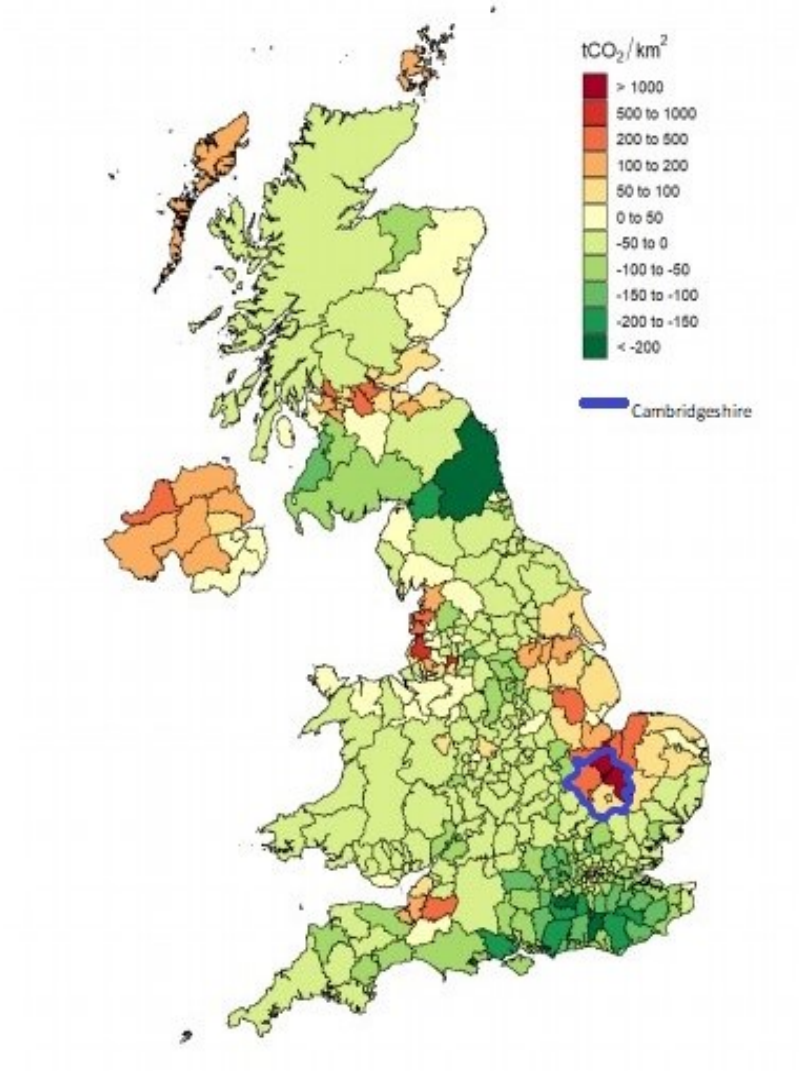


Figure 9 Emissions or removals of CO_2 from LULUCF by LA area in 2019 (data and image from BEIS)

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

Emissions from agriculture (other than land use) and waste are not included in these figures because they primarily produce methane and this data is for CO_2 only.

The graph below shows a breakdown of the county's CO_2 emissions by sector and District.

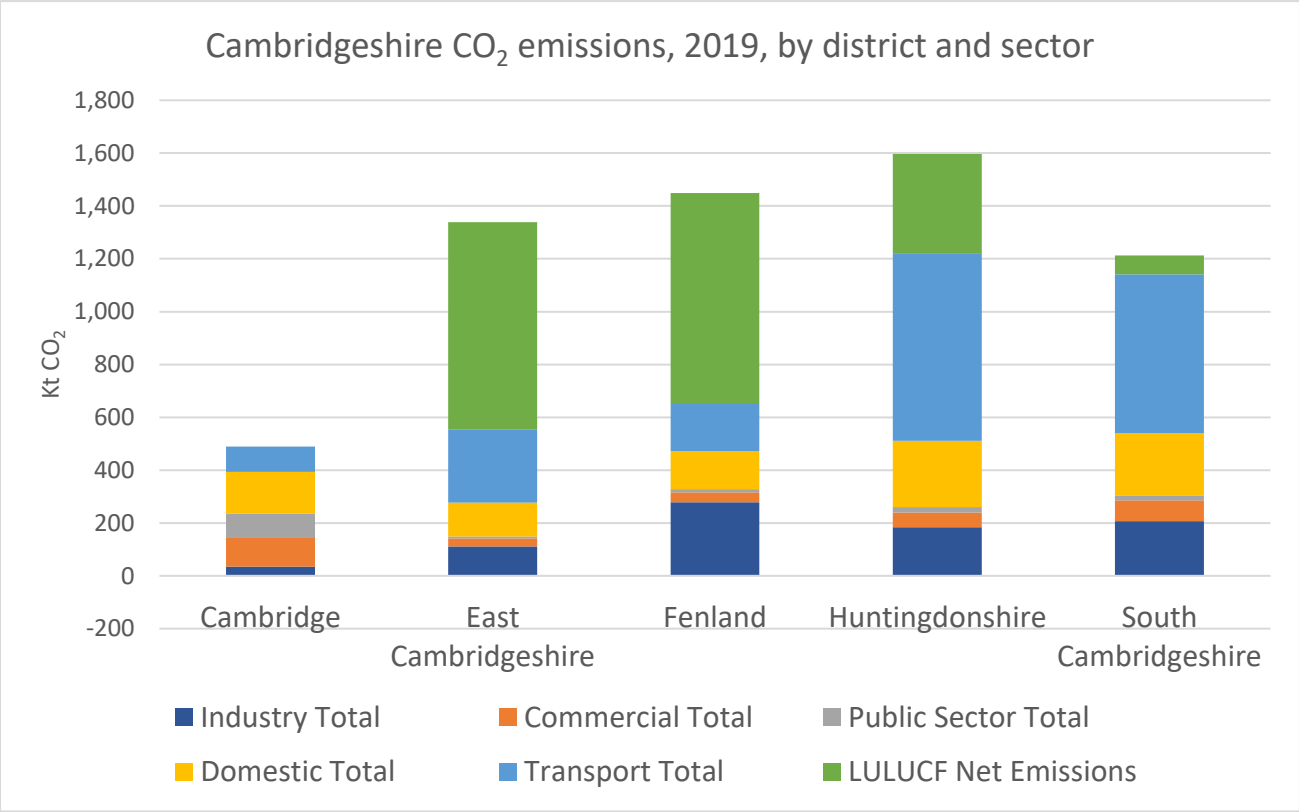


Figure 10

4.2 All GHGs in Cambridgeshire

Emissions of other (non-CO_2) GHGs from the county, such as methane or nitrous oxide, have been estimated based on combining UK emissions data with Cambridgeshire's land area, population and CO_2 emissions data for each sector.

The results of these calculations put these emissions of other GHGs at 1.214m tonnes CO2e in 2019.

The non-CO_2 emissions are then added to the CO_2 emissions to give the total GHG emissions for Cambridgeshire as **7.3m tonnes CO_2e**. A breakdown by sector is shown in Figure 11 and Figure 12.

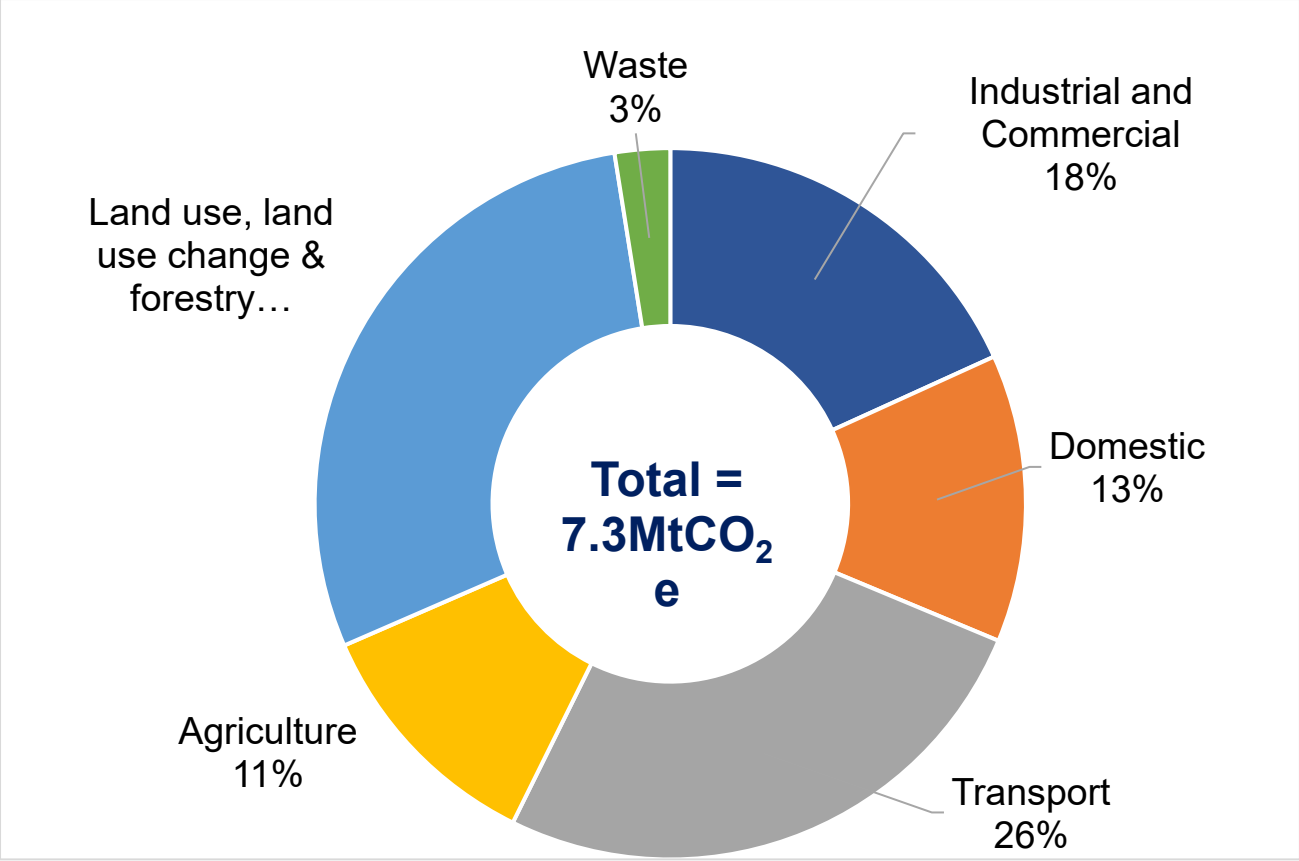


Figure 11 Cambridgeshire GHG emissions, 2019, by sector (combination of BEIS data and our calculations)

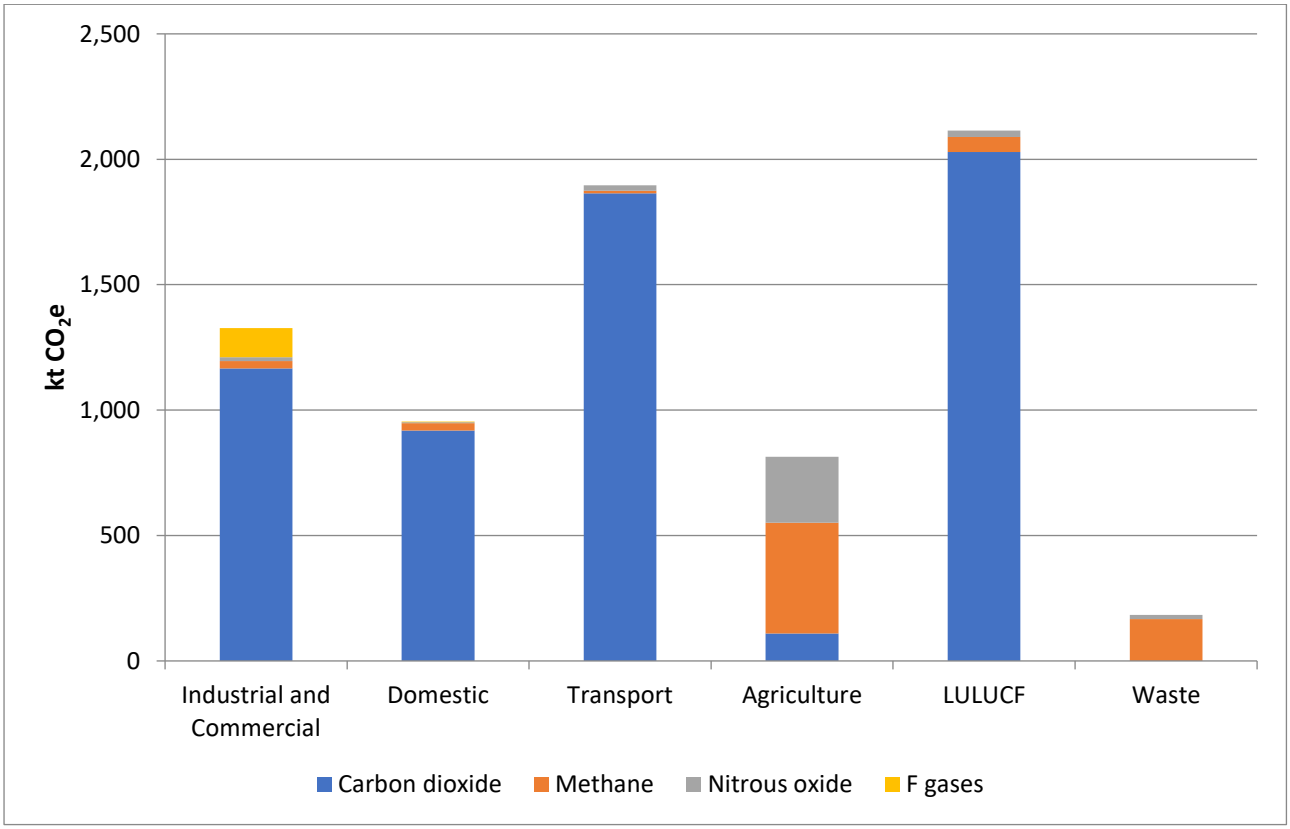


Figure 12 Cambridgeshire GHG emissions, 2019, by sector and gas (combination of BEIS data and our calculations)

5. Glossary

Expression	Meaning
Carbon	Used as abbreviation for carbon dioxide or carbon dioxide equivalent
Carbon Budget	An amount of carbon dioxide that a country, company, or organization has agreed is the largest it will produce in a particular period of time.
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 34 and nitrous oxide has a GWP of 298. (Intergovernmental Panel on Climate Change, 2014) 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.
Mitigation	Methods to reduce or prevent greenhouse gases entering the atmosphere.
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 often 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