

Derbyshire County Council Carbon Reduction Plan

October 2019

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1 Introduction

Derbyshire County Council remains committed to putting the principles of sustainable development into action in everything it does. This is so that development meets the needs of today without compromising the ability of future generations to meet their own.

The Council is increasingly determined to have a positive effect on the environment and to avoid any unintended consequences through its actions. The Council has revised its corporate Environment Policy to strengthen its environmental commitments, no more so than in reducing the Council's impact on climate change.

The Council is now setting new environment and climate change targets for the future. Wider environmental commitments were set out in a series of pledges in the Council's Climate and Carbon Reduction Manifesto in May 2019, which place the Council at the forefront of climate change action. The Council will lead the way on tackling greenhouse gas emissions by:

- Using its influence and role as a community leader to work with partners, businesses and communities to tackle climate change through a common framework for action across the county.
- Getting its own house in order by reducing the emissions from its own estate and operations to net zero greenhouse gas emissions.

This Plan sets out the actions the Council will undertake to reduce emissions from its own operations to net zero.

2 Context

The Intergovernmental Panel on Climate Change (IPCC) Special Report 'Global Warming of 1.5°C' (2018) is clear on the causes and the effects of climate change on the world. The report states that the primary driver of long term global warming is carbon dioxide emissions (CO₂) and that global temperatures relate to increased cumulative CO₂ emissions from human activity, primarily from energy use. This will result in significant loss of ecosystems and biodiversity along with increased impacts on human health and the economy. The world is already around 1°C warmer than preindustrial times and is currently on track to reach between 3-4°C global temperature increase by 2100 if no action is taken.

The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (2015), to which the UK is a signatory, aims to:

“strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C.”

The UK will deliver on the Paris Agreement by vigorously pursuing a target to reduce greenhouse gas (GHG) emissions to ‘net zero’ by 2050, ending the UK’s contribution to global warming within 31 years. This was enshrined in law in June 2019 through amendments to the 2050 GHG emissions reduction target in the Climate Change Act 2008 from at least 80% to at least 100%, otherwise known as ‘net zero’.

In 2009, the Council responded to the Act by setting targets to reduce the emissions produced from its own estate and operations. GHG emissions have reduced by 48% between 2009/10 and 2018/19.

3 Aim

The aim of the Council’s Carbon Reduction Plan is to:

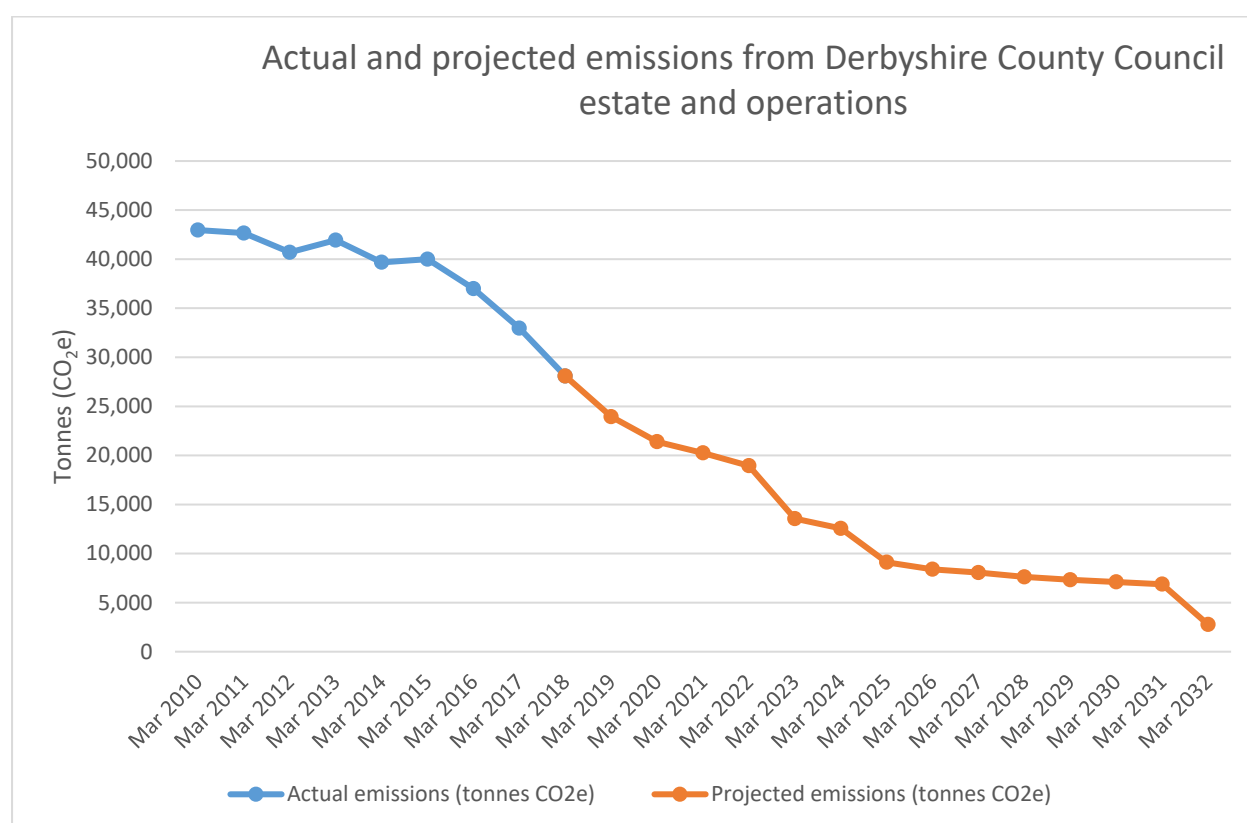
Reduce greenhouse gas emissions from its own estate and operations with the aim of having net zero greenhouse gas emissions by 2032

In May 2019, the Council pledged to set out a plan and timetable to make Derbyshire County Council ‘carbon neutral’. This Plan lays out proposals to enable the Council to have net zero GHG emissions by 2032. It sets out GHG targets and details of how those targets could be achieved.

Projections suggest that that emissions could be reduced by 93% by 2031/32. By offsetting the remaining emissions through carbon capture and storage by trees, the Council could become ‘greenhouse gas neutral’ by 2032. Interim GHG reduction targets are given in the table below.

Year	Council emissions (tonnes CO ₂ e) ¹	Emissions reduction target (against a 2009-10 baseline)
2009/10	42,965	-
2021/22	18,944	55%
2026/27	8,056	81%
2031/32	2,760	93%

The graph below shows actual and projected emissions for the Council on an annual basis. Details of what is included in the GHG emissions data and how the emissions resulting from the Council operations and estate are calculated can be found at Appendix A.



4 Key actions to become carbon neutral

The Council records GHG emissions from its own estate and operations from property, streetlighting, core and grey fleets.

Emissions from property will be reduced through a combination of property rationalisation, behaviour change, energy efficiency measures, generation of

¹ CO₂e = carbon dioxide and equivalent greenhouse gases

renewable electricity on Council property and purchasing renewable energy generated elsewhere.

Emissions from streetlighting will be reduced through a programme of LED bulb replacement, part-night lighting and night-dimming and through the purchase of renewable electricity generated elsewhere.

Emissions from core fleet (vehicles owned by the Council) and grey fleet (vehicles owned by employees but used for business travel) will be reduced through the electrification of cars and vans, behaviour change and de-carbonisation of HGVs.

The estimated reduction in emissions from these actions are summarised at key milestone dates in the following table. The dates shown coincide with the end of the UK carbon budget periods set by the government. Some reduction in emissions from the Council estate will occur due to external factors. The amount of renewable electricity generated in the UK and fed into the national grid is increasing each year thus reducing the emissions from electricity used by the Council. This is known as 'the greening of the grid'. Technological developments increase the efficiency of vehicles each year thus reducing emissions for each mile driven. This is referred to as 'with improved vehicle efficiency' in the table below.

Summary of key actions to become carbon neutral

Source of emissions	Key Action	Emissions (tonnes CO ₂ e)				
		Baseline emissions (2009/10)	Actual emissions (2018/19)	Projected milestone emissions (2021/22)	Projected milestone emissions (2026/27)	Projected emissions (2031/32)
Property	Property rationalisation			-157	-488	
	Behaviour change			-638		
	Low cost energy efficiency				-950	
	Deep retrofit				-1,640	
	Microgeneration				-42	
	Large scale renewables				-1,545	
	Purchase renewable electricity					-137
	Purchase renewable gas					-3,894
Sub-total (with greening of the grid)		15,666	10,023	9,800	4,703	664
Streetlighting	LED, part-night & dimming programmes			-2,526		
	Purchase renewable electricity				-4,035	
Sub-total (with greening of the grid)		18,121	6,617	4,035	0	0
Core fleet	Increase electric pool cars			+32	+108	
	Electrification of vans			-60	-300	-300
	Decarbonisation of HGV >17t				-120	-200
	Decarbonisation of HGV 7.5-17t				-40	
	Decarbonisation of HGV 3.5-7.5t				-72	-120
Sub-total (with improved vehicle efficiency)		4,589	2,564	2,595	2,122	1,487
Grey fleet	Reduction in mileage			-250	-369	-132
	Increased use of electric pool cars			-120	-400	
	Electrification of grey fleet				-500	-500
Sub-total (with improved vehicle efficiency)		4,589	2,854	2,514	1,232	609
Grand Total		42,966	22,059	18,944	8,056	2,760
% reduction		-	48%	55%	81%	93%

5 Reducing emissions from Council property

Although GHG emissions resulting from heating and powering the Council's buildings (excluding schools) have reduced by 21% between 2010 (15,666 tCO₂e) and 2018 (12,322 tCO₂e), they account for around 44% of the overall emissions from the Council's operations. As such, for the Council to achieve net zero GHG emissions, a concerted effort is required to both reduce energy consumption through improved efficiencies and to increase the amount of renewable energy generation.

In March 2019, Cabinet approved the Council's new Asset Management Framework (AMF), which sets out how the effective use of land and property assets will support the delivery of the Council's strategic goals, including its ambition to become an Enterprising Council. The AMF sets out 5 property asset management objectives and how they will contribute to the Council's net zero GHG ambition.

The AMF also identifies the need for a number of procedures, policies and protocols to deliver strategic property asset management, ensuring consistency and the optimum use of land and property assets, many of which are currently in development. These policies will also ensure that energy related matters are taken in to consideration within the life cycle of the property, from its acquisition to its disposal.

5.1 Key actions to reduce emissions from Council property

Key actions to reduce emissions from Council property between 2019 and 2032 are given below.

Property rationalisation

Key actions	Continuing to dispose of buildings which have been identified as surplus or are currently vacant and awaiting disposal
Emissions reduction	645 tCO ₂ e
Notes	<ul style="list-style-type: none"> • Further properties may be identified as service reviews are undertaken and property needs are identified in line with the AMF and resulting protocols • Some uncertainty remains regarding ownership of buildings in the future resulting in challenges for decision making about energy efficiency measures • The acquisition of new buildings is not factored into calculations

Behaviour Change

Key actions	<ul style="list-style-type: none"> • Deliver an extensive programme of awareness raising and behaviour change to all employees and building users
Emissions reduction	638 tCO ₂ e
Notes	<ul style="list-style-type: none"> • Previous initiatives include an 'Eco-champion training' programme; production and distribution of environmental mini-guides and carbon reduction training • Full and half day training is being provided by the Local Authority Energy Partnership of which the Council is a partner with the potential to cut emissions between 5-15% per person • A report by Npower and The Centre for Economics and Business Research on "Carbon Psychology" suggests that analysing employee behaviour and using a scientific model to combine psychology and behavioural economics to provide a bespoke strategy can bring about behavioural change in the organisation to reduce emissions by between 6-10%

Deep retrofit

Key actions	Deep retrofit of buildings taking a whole building approach using a range of energy conservation measures, materials and construction methods to bring about an overall improvement in the building's energy performance
Emissions reduction	1,640 tCO ₂ e
Notes	<ul style="list-style-type: none"> • Based on the Council's worst energy performing buildings GHG emissions could be reduced by 30% • This figure is a blanket estimate across the highest energy consuming buildings and any projects would be subject to further building energy analysis, feasibility and business cases

Low cost energy efficiency

Key actions	Insulating pipework, setting and checking boiler controls, installing lighting controls and installing loft insulation
Emissions reduction	950 tCO ₂ e
Notes	<ul style="list-style-type: none"> This figure is a blanket estimate across the whole operational estate and any projects would be subject to further feasibility and business cases

Renewable energy from microgeneration sources

Key actions	Quadruple the amount of installed microgeneration installed on the Council's operational buildings
Emissions reduction	42 tCO ₂ e
Notes	<ul style="list-style-type: none"> The Council currently has 54kWp of installed capacity from small-scale energy generation using solar and wind power generating around 50,145kWh each year

Renewable energy from large scale energy generation sources

Key actions	Install 8.1MW of solar photovoltaic panels on Council owned sites generating around 6.98GWh of electricity
Emissions reduction	1,545 tCO ₂ e
Notes	<ul style="list-style-type: none"> The Council has previously undertaken a scoping study to identify Council owned sites that may have been suitable for sub 5MW ground mounted solar PV systems. At that time, 2 sites, which had the capacity for a 3.7MW and 4.4MW, were deemed suitable. Identified schemes did not proceed as the Government announced the early closure of the subsidies The figures quoted above provide an example of what levels of energy can be generated and the associated reduction in GHG emissions Revenue funding is being sought to procure a consultant to undertake feasibility and initial business case development of micro and large scale renewable energy projects

Procurement of renewable electricity

Key actions	Procure a renewable electricity tariff through the Council's utility supply contract
Emissions reduction	Varies according to how much renewable electricity is purchased
Notes	<ul style="list-style-type: none"> Renewable Energy Guarantees Origin certificates (REGOs) allow electricity suppliers to prove to their final customers that a given share of energy was produced from renewable sources. One REGO certificate is issued for each MWh of renewable output to generators of renewable electricity The cost of purchasing the REGO is £0.30 per MWh. Based on 2017/18 consumption, this would add a further £4k onto the total electricity spend, which in 2017/18 was £1.5M As REGOs do not reduce energy consumption, it is not recommended that they are purchased as a way in which to become a nearly zero carbon organisation. However, REGOs could be purchased once all other energy efficient and renewable energy generation projects have been undertaken Once other measures have been undertaken, the Council would need to procure 729MWh of electricity at an additional cost of £218 for the REGOs

Procurement of Green Gas

Key actions	Procure green gas through the Council's gas supply contract
Emissions reduction	Varies according to how much green gas is purchased
Notes	<ul style="list-style-type: none"> There is limited availability of green gas Based on 2017/18 consumption, the procurement of green gas would have incurred an additional £298k on the £888k gas bill Should green gas be purchased once energy efficiency measures have been installed as outline above, then the additional annual cost could be in the region of £181k

Greening of the grid

Key actions	No action required by the Council
Emissions reduction	112t/CO ₂ e by 2026 (if proposed measures are undertaken)
Notes	<ul style="list-style-type: none"> It is suggested by industry that the carbon intensity of the electricity grid will be half of current levels by 2030

The outline projects highlighted above give an indication of the initiatives that should be taken forward to work towards carbon neutrality across the Council's estate. These measures could reduce property related emissions from 15,666 tCO₂e in 2009/10 to 664 tCO₂e in 2031/32 with a 37% reduction by 2022; 70% by 2027 and 95% by 2032. The majority of those savings come from renewable electricity projects and greening of grid electricity.

These proposals assume that current sources of energy for heating (gas, oil and solid fuel) remain the same. To further reduce emissions, alternatives to gas, oil and solid fuel need to be sought for the Council's operational buildings. A feasibility study looking at the re-heat of County Hall is to be undertaken and will include renewable energy systems. The findings of this will help inform the future viability of renewable heat systems in the Council's estate.

6 Reducing emissions from streetlighting

Emissions from streetlighting have reduced by 63.5% between 2009/10 and 2018/19 and account for approximately a third of the Council's total emissions. The reductions have been achieved through a programme which replaces sodium bulbs with LED lighting, part-night lighting and night-time dimming. This programme is due to be completed by 2022, after which time there are no further planned reductions other than the greening of the grid. Indeed, electricity use for streetlighting may begin to increase after this time as new developments will require new streetlighting.

6.1 Key actions to reduce emissions from streetlighting

Key actions to reduce emissions from streetlighting between 2019 and 2032 are given below.

Completion of LED, part-night and night-dimming programme

Key actions	Completion of LED, part-night and night-dimming programme
Emissions reduction	2,526 tCO ₂ e
Notes	<ul style="list-style-type: none"> This programme is due for completion by March 2022

Procurement of renewable electricity

Key actions	Procurement of renewable electricity supply
Emissions reduction	4,091 tCO ₂ e
Notes	<ul style="list-style-type: none"> There are no further technological improvements currently available to reduce GHG emissions once the LED programme is complete This measure would be subject to a feasibility and business case

7 Reducing emissions from Council-owned fleet

Emissions from the Council's fleet of vehicles fell from 4,589 tonnes of CO₂e in 2010 to 2,662 tonnes CO₂e in 2018, a reduction of 42%. In 2018, the core fleet consisted of:

- 263 medium/large diesel vans
- 68 HGV rigid vehicles (>3.5-7.5tonnes)
- 5 HGV rigid vehicles (>7.5-17tonnes)
- 58 HGV rigid vehicles (>17tonnes)

7.1 Key actions to reduce emissions from Council-owned fleet

Key actions to reduce emissions from Council-owned fleet between 2019 and 2032 are given below.

Heavy Goods Vehicles replacement programme

Key actions	Begin a programme to replace HGVs in 2024 with low-carbon emission vehicles combined with use of satellite navigation, awareness of driver style and use of a Vehicle Management System
Emissions reduction	64 tCO ₂ e per year
Notes	<ul style="list-style-type: none"> • Low emission HGV vehicles are still not widely available although several councils are trialling different alternatives powered by biofuel, hydrogen or electricity • It is anticipated that the availability, reliability and effectiveness of these vehicles will improve sufficiently that the Council will begin a replacement programme in 2024 following trials of different vehicles subject to development of a feasibility and business case • The Council currently keeps HGVs for ten years and these are replaced on a rolling programme

Light Goods Vehicles replacement programme

Key actions	Begin a programme to replace 20 diesel vans each year with electric vans, following trials of different vehicles, in 2021
Emissions reduction	60 tCO ₂ e per year
Notes	<ul style="list-style-type: none"> • The motor industry predicts that electric light goods vehicles will play an increasingly important role in the UK van market over the next few years with a large increase in the choice of vehicle available as issues regarding range-anxiety, charging and weight are overcome • A large increase in the number of electric light goods vehicles would require significant investment in the charging infrastructure at Council depots as well as 'home-charging' of council-owned vehicles

Introduction of electric pool cars

Key actions	Increase the number of electric pool cars to replace some of the grey fleet mileage
Emissions reduction	73 tCO ₂ e per year
Notes	<ul style="list-style-type: none"> Seven electric vehicles are planned for 2019/20 with more planned for the following financial year The extent to which electric pool cars are to replace the grey fleet is subject to further consideration

8 Reducing emissions from the grey fleet

The grey fleet is the vehicles owned by employees but used for business travel. Grey fleet mileage fell by 22.3% between 2009-10 and 2018-19. However, during this period emissions fell by 36% due to the increased efficiency of vehicles. The technological improvements in vehicles are set to continue alongside the growth in electric car ownership. By 2040, no new fossil fuel cars or vans will be sold in the UK with most of the sales being replaced by sales in electric vehicles.

Electrification of grey fleet

Key actions	A gradual increase in the numbers of electric vehicles owned by staff and used for business travel
Emissions reduction	100 tCO ₂ e per year
Notes	<ul style="list-style-type: none"> By 2022-23 it is anticipated that at least 5% of mileage year on year will switch from fossil fuel to electric vehicles

Reduction in grey fleet mileage

Key actions	A reduction in mileage of 3% each year for ten years through an awareness and behaviour change programme e.g. through increasing use of video-conferencing to reduce the need to travel
Emissions reduction	751 tCO ₂ e over ten years
Notes	<ul style="list-style-type: none"> A behaviour change programme would need to be undertaken to achieve this

9 Other Council emissions

Emissions from schools within the Council portfolio are not included in the data presented above, although the data is collected. When schools leave the Council portfolio to become Academies, their emissions are no longer the responsibility of the Council. This can lead to a false impression that emissions from schools are reducing more rapidly than the reality. Initial modelling of the data to 2032 indicates a gradual reduction in emissions from schools. Further modelling will be undertaken and a separate carbon reduction plan for schools will be developed.

The Council currently measures the key sources of emissions from its estate and operations but recognises that there are also less significant sources of emissions which are not currently measured (at Appendix A). It will become increasingly important to address emissions from sources other than property, streetlighting and fleet. Where possible remaining emissions will be quantified and action plans developed to reduce them. Actions are already being taken such as the electrification of equipment, e.g. lawnmowers, and procurement which takes sustainability into account.

10 Carbon sequestration

Projections indicate that by 2032 it is feasible for the Council to reduce its emissions by 93% with remaining emissions of 2,760 tonnes CO₂e/year. Future technological solutions and funding sources may allow for these remaining emissions to be avoided. However, in the instance that they cannot be avoided it will be necessary to sequester or 'store' the equivalent amount of carbon. It is recommended that any carbon sequestration used in the calculations of emissions should be on the Council's estate.

11 Moving forward

Technological advances, behaviour changes, societal norms and our understanding of climate change and GHG emissions will change throughout the period of this plan. An annual review of the Council's emissions and future projections will therefore be undertaken to ensure the plan remains up to date and fit for purpose.

All actions are subject to further feasibility studies and business cases and individual detailed actions plans will be drawn up for each action.

Whilst individual actions will be undertaken by all departments, the monitoring of emissions will be overseen by the Environmental Sustainability Group. An annual report, summarising actions undertaken and the impact on emissions will be produced in the autumn of each year.

Appendix A

1. **Terminology:** ‘Carbon neutral’ is considered a synonym for ‘net zero carbon’. Any carbon offsetting or carbon sequestration included in the calculation of emissions will take place within the county.
2. **Carbon Neutral Definition:** In order to mitigate the effects of climate change, CO₂ emissions need to be reduced to net zero. Carbon neutrality is achieved when emissions produced are offset by the amount of emissions taken from the atmosphere or by eliminating carbon emissions altogether.
3. **Net Zero Greenhouse Gas (GHG) emissions definition:** this can be confused with net zero carbon emissions, but when used accurately, includes all GHG emissions not just carbon dioxide. This is the same concept as net zero carbon emissions but conveys a net zero emissions target for CO₂ and all non-CO₂ gases.
4. In this instance carbon dioxide and equivalent greenhouse gases include the following greenhouse gases as covered by the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆) and nitrogen trifluoride (NF₃).
5. Council activities are identified as Scope 1, 2 or 3 according to the UK Government’s definition²:
 - 5.1 Scope 1 are direct emissions from those activities owned or controlled by the Council, e.g. emissions from solid fuel burners.
 - 5.2 Scope 2 emissions or ‘energy indirect emissions’ are those released into the atmosphere that are associated with the Council’s consumption of electricity, heat, steam and cooling. These indirect emissions are a consequence of the Council’s energy use but occur at sources it does not own or control.
 - 5.3 Scope 3 or other indirect emissions are a consequence of the Council’s actions that occur at sources it does not control and which are not classed as Scope 2 emissions, e.g. grey fleet travel, waste disposal, materials or fuels the Council purchases.
6. The GHG emissions from the Council’s estate and operations will include emissions from:
 - 6.1 Energy used in street and road lighting (excluding traffic lights)

²

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726911/2018_methodology_paper_FINAL_v01-00.pdf

- 6.2 Energy used to power and heat our property and buildings (via electricity and gas metering and billing and from oil and solid fuel bills)
 - 6.3 Core fleet (vehicles owned by the Council) using miles travelled
 - 6.4 Grey fleet (vehicles owned by staff and used for business) using mileage claims
 - 6.5 Miles travelled by rail
7. GHG emissions will not be collected from:
- 7.1 Embedded emissions from items we purchase (these remain with the manufacturer in the place and country where the item was made)
 - 7.2 School transport
 - 7.3 Traffic lights
 - 7.4 Hire cars
 - 7.5 Plant and machinery
 - 7.6 Waste
 - 7.7 Water
 - 7.8 Refrigerant and other fugitive emissions
 - 7.9 Air travel
 - 7.10 Staff travel to and from work
 - 7.11 Emissions from schools are not included in the figures as schools leaving the local education authority portfolio artificially reduce the emissions total from this sector. Schools' data is collected through energy bills and mileage data and is analysed separately.
8. Carbon sequestration is not currently used by the Council to offset its emissions. However, as emissions become increasingly difficult to eliminate, it will become necessary to offset its emissions and to use carbon capture and storage methods.
9. GHG emissions are calculated using the Government's annual conversion factors which convert kWh, tonnes of fuel or mileage into Kg of carbon dioxide or equivalent greenhouse gases.