



BROXTOWE BOROUGH COUNCIL

Scope 3 Carbon Footprint

FINAL

July 2024

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Who we are

The Carbon Trust's mission is to accelerate the move to a decarbonised future. Climate pioneers for more than 20 years, we partner with leading businesses, governments and financial institutions to accelerate their route to Net Zero. We are your expert guide to turn your climate ambition into impact.

To date, our global network of 400 experts has helped set over 200 science-based targets and guided more than 3,000 organisations and cities across five continents on their route to Net Zero.

Broxtowe Borough Council Scope 3 Carbon Footprint

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Broxtowe Borough Council Scope 3 Carbon
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Executive Summary



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Introduction

Broxtowe Borough Council (hereinafter referred to as “BBC”) has an organisational ambition to achieve Carbon Neutrality by 2027. Building on this, it also intends to set a Net Zero target.

As part of this ambition, BBC has already calculated a Scope 1, 2 and selected Scope 3 carbon footprint (Scope 3 emissions included are from business travel and upstream emissions from fuel and energy related activities) and now requires for the first time, and in order to establish a Net Zero target, a carbon footprint study to assess emissions sources further outside of its direct operational control, i.e. extended Scope 3 emissions. In this report, the results of the Scope 3 footprint calculation are presented for the following emissions categories: ***Purchased goods and services (inc. Capital goods), Housing and commercial properties , Fuel & energy related activities, Upstream transportation and distribution, Waste disposal, Water use, Business travel, Investments and Commuting.***

Whilst addressing direct organisational (Scope 1 and 2) emissions is usually a visible and distinct process, dealing with Scope 3 (indirect) and supply chain emissions includes activities that reside outside the immediate sphere of organisational influence, complicating the decarbonisation process. Such indirect emissions are also typically the largest source of emissions for many organisations (commonly between 60-90%), and their measurement is the first step towards reducing them effectively.

This report provides an initial screening and quantification of BBC’s Scope 3 footprint and identifies key contributors from the supply chain. The report also details high-level recommendations to help prioritise actions to improve the quality of data and methodologies used to calculate these Scope 3 emissions in the future.



Scope 3 Carbon Footprint

Overview

The footprint set out below represents BBC's first attempt to calculate its Scope 3 footprint. The data provided by BBC was typical for an organisation's first attempt.

The total Scope 3 carbon footprint for BBC in the financial year (FY) 2022/23 is calculated to be **20,672 tCO₂e**. The Council's Scope 3 footprint consists of 7 key emissions categories (see chart, right) relevant to its operations. Three of these emission categories account for 96% of total Scope 3 emissions:

- **Housing and commercial properties** , 15,415 tCO₂e (75%).
- **Purchased Goods & Services (PG&S)**, 2,695 tCO₂e (13%).
- **Investments**, 1,698 tCO₂e (8%).

The Council's Scope 1 and 2 emissions totalled 2,338 tCO₂e¹ (including Old Pumping Station and waste sites) for the same reporting period.

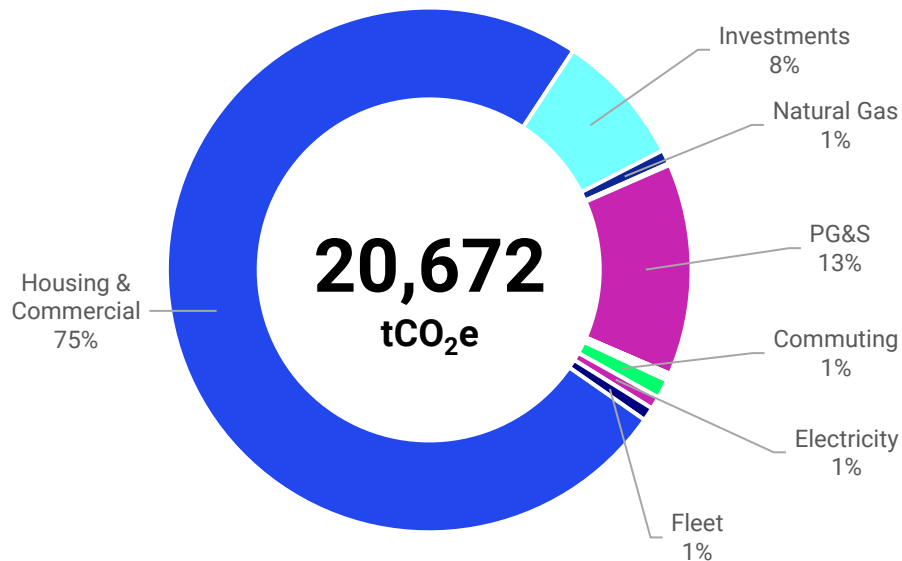
Scope 3 emissions account for 89% of BBC's total operational emissions.

Note:

- The Scope 3 Natural gas, fleet and electricity emission sources shown in the graph relate to the upstream emissions associated with Scope 1 and 2 consumptions.



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Housing and Commercial Properties

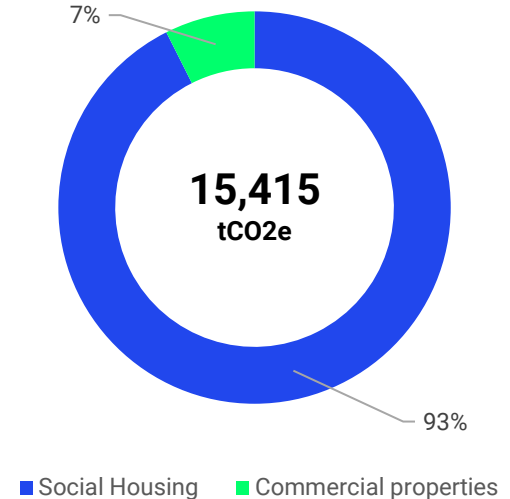
Overview

The carbon emissions associated with BBC's housing and commercial properties include both social housing and commercial properties owned by the Council. The commercial properties are in addition to the properties included in the operational emissions captured by BBC's Scope 1 and 2 carbon footprint.

In total, housing and commercial properties contributed **15,415 tCO₂e** to the total carbon footprint (75%). This makes housing and commercial properties the largest source of emissions in the BBC Scope 3 carbon footprint.

- Social housing contributed **14,271 tCO₂e** (93%), with 4,671 properties under the responsibility of BBC.
- Commercial properties contributed **1,144 tCO₂e** (7%), with 110 properties under the responsibility of BBC.

It is important to note that the figures for housing and commercial properties emissions involve a high degree of estimation. Tenants do not share energy consumption data with the Council and therefore no primary energy consumption data has been used. A detailed description of how emissions associated with Housing and Commercial Properties have been calculated can be found on pages 26-27.



Purchased goods and services

Overview

Purchased goods and services (PG&S) include cradle-to-gate (i.e. all emissions before the product is transported to the consumer) and transportation emissions associated with goods & services procured by BBC in the reporting period¹. **This forms the second largest component of the Scope 3 footprint (2,695 tCO₂e, 13%),** which is typical of a borough council with services delivered by external providers.

Spend-based proxies have been used to estimate PG&S emissions (i.e. £/tCO₂e). As explained on page 21, this method provides a rapid assessment of supply chain emissions to identify hotspots within a supply chain. However, there are several limitations in using economic proxies and BBC should recognise the high uncertainty associated with these.

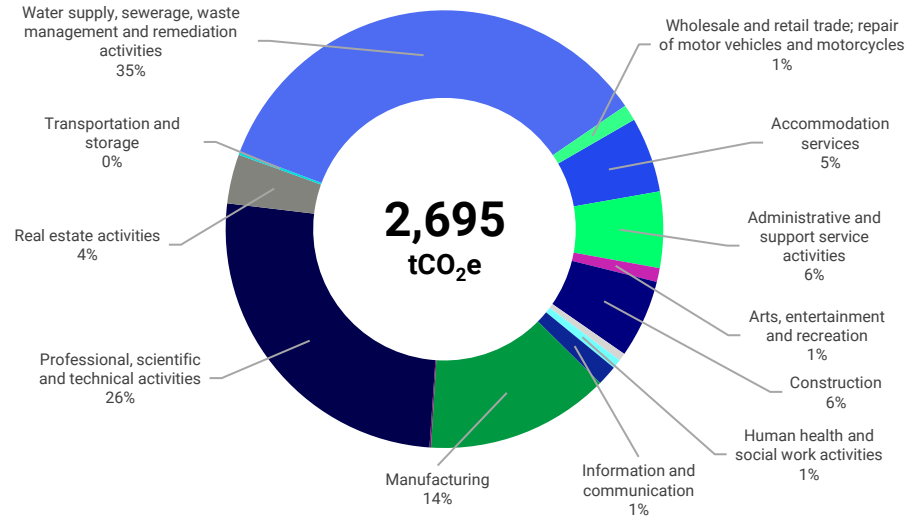
The largest proportion of emissions result from the following three categories:

- Water supply, sewerage, waste management and remediation activities.
- Professional, scientific and technical activities.
- Manufacturing.

Note: it has been assumed that all waste collection spend is additional to the waste generated in operation from the three main sites, which are included within a separate waste emissions calculation.



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¹ This methodology combines three GHG protocol emission categories: purchased goods and services, and capital goods, both of which cover cradle-to-gate emissions, and upstream transportation and distribution. Purchased goods includes capital goods, where internal reporting did not permit ready identification of expenditure on capital goods for disaggregation.

Recommendations



Housing and commercial properties

- **Reduce** the quantity of **estimated data** used in the calculations, such as floor area and heating source.
- Gather energy performance certificate (EPC) data for all properties, including **heat source** and **floor area**.
- Gain a better **understanding of primary energy usage** data.
- **Review heating sources** used within the housing stock and **influence** the move towards **low carbon heating and lighting** technologies, such as solar panels and LED lighting.



Purchased Goods and Services

- **Improve high-level categorisation** of expenditure to ensure **all data** included in the category is **representative** of each category type.
- **Cleanse data** ensuring **no double counting** of the **quantity data** within the boundary (e.g. water, fuel, waste and utilities).
- Introduce spend categorisation to internal financial systems to enable **alignment** of all contracts with Standard Industrial Classification (SIC) categories to **improve the data coverage and quality** of future carbon footprints.



Waste

- Ensure all sites have waste and water data owners.
- Work with the waste management company to understand the tailored emissions factor of different disposal methods.



Water

- Improve data collection to ensure accuracy. For example, monthly readings from each site.
- **Cleanse data to ensure no double counting** with quantity and spend data on water treatments included **within purchased goods and services**.



Investments

- Understand the carbon intensity of investments.
- Take all possible steps to divest from carbon intensive investments.



Business Travel

- Improve on spend based expenses data, working towards collecting distance travelled for each transportation mode.



Commuting

- Conduct an annual **commuting survey** with the aim of gathering a higher proportion of staff responses.
- Review the **provisions of car parking** and how to incentivise more sustainable modes of transport. Raise awareness of existing cycling facilities. ¹⁰



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Broxtowe Borough Council Scope 3 Carbon
Footprint

Introduction

Background

'A greener, safer, healthier Broxtowe where everyone prospers'

In July 2019, Broxtowe Borough Council declared a 'Climate Change Emergency' and committed to becoming carbon neutral by 2027 for its own operations.

Its latest Climate Change and Green Futures Strategy compiles 88 actions as part of its revised carbon management plan:

"The Council's overarching plan for its priorities, targets and objectives. The plan sets out priorities to achieve the vision for with focus on the priorities of Housing, Business Growth, Community Safety, Health and Environment."

Following a Carbon Footprint report completed by Carbon Trust for the baseline year 2018/19, conducted in 2020, BBC will extend the calculation to a full Scope 3 footprint for the Council.



The strategic aims for the Climate Change Strategy are:



- To become carbon neutral by 2027 for the Council's own operations.
- To establish a baseline for all carbon scopes and then to propose a date for net zero using science based targets for the Council's own operations.
- To align to the UK's net zero Commitment of 2050 for the Borough and establish the actions and potential budget required to achieve this (working to an earlier date if possible).

Background

Broxtowe Borough Council: working towards Net Zero

Emissions produced from anthropogenic sources and activities have resulted in an increase in the average global temperature; and over the next century average global temperatures are anticipated to increase by a further 2 to 4°C. This will have an inevitable effect on the planet's climate and natural cycles, including an increase in flooding, sea level rise, drought, wildfires and permafrost thawing.

BBC has previously calculated its organisational carbon footprint (Scope 1 and 2 including Scope 3 business travel and upstream emissions from fuel and energy related activities) and is now expanding the footprint scope to include emissions sources beyond its direct operational control. This footprint report is the first to include all applicable Scope 3 emissions source categories including: ***Purchased goods and services (inc. Capital goods), Housing and commercial properties , Fuel & energy related activities, Waste disposal, Water use, Business travel, Investments and Commuting.***

Whilst addressing direct organisational (Scope 1 and 2) emissions is usually visible and distinct, Scope 3 and supply chain emissions include activities outside an organisation's sphere of influence. These indirect emissions are typically the largest source of emissions for many organisations, and their measurement is the first step towards reducing them effectively.

This report aims to fill this knowledge gap by identifying **Scope 3 carbon emission hotspots**. By conducting this analysis, BBC will be able to prioritise areas for further development, focusing on actions that will have the greatest impact in the fight against climate change.





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Broxtowe Borough Council Scope 3 Carbon
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Methodology

Greenhouse Gas Protocol



The Carbon Trust has calculated BBC's carbon footprint in accordance with the Greenhouse Gas (GHG) Protocol – the most widely used and accepted methodology for GHG accounting.¹

The GHG Protocol categorises emissions into three Scopes, this report focuses on **Scope 3** sources:

Scope 1	Emissions directly emitted by the organisation such as gas burnt in a gas boiler, tail pipe emissions from a vehicle owned by the organisation, e.g. refuse truck, etc.
Scope 2	Emissions indirectly emitted from the consumption of purchased electricity, heat or steam used in buildings the organisation operates.
Scope 3	All other indirect emissions, such as the extraction and production of purchased materials and fuels, transport related activities in vehicles not owned or controlled by the reporting entity, water consumption, waste disposal etc.

¹ Greenhouse Gas Protocol, <https://ghgprotocol.org/>

Carbon Footprinting


Boundary setting and included emissions



Scope 1
Direct

Owned transport 	Fuel combustion 	Process and fugitive emissions 
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Scope 2
Indirect

Purchased electricity 	Purchased heating / cooling 
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Scope 3
Indirect

Upstream					Downstream				
Purchased goods & services 	Waste from operations 	Fuel & energy related activities 	Business travel 	Employee commuting 	Downstream leased assets (Housing and commercial properties) 	Downstream transport & distribution 	Franchises 	End of life treatment 	
Capital goods 	Upstream transport & distribution 	Upstream leased assets 			Investments 	Processing of sold products 	Use of sold products 		

Avoided emissions

Renewable energy 
--

The emissions sources included within this graphic align with the sources outlined within the GHG protocol. The categories highlighted in blue are included in this carbon footprint report.

The emissions boundary has been selected to focus on activities within estates and facilities, transport, and indirect emissions from purchased goods and services, leased assets, business travel and waste.

Renewable generation

Boundary setting and included emissions

Solar panels were installed on the council offices in Beeston in 2014 with a capacity of 46.9kW. **During 22/23, they generated 34MWh of electricity.**

Other Council owned properties, e.g. social houses, also hold renewable technologies, however, the low carbon technology register, which lists these and includes properties with solar panels for electricity and hot water, does not include the capacities of the solar panels or generation data – meaning the impact of these installations could not be measured.

The reduced electricity consumption at sites with solar panels will be reflected in the actual usage of the properties, however, it is unknown if any excess electricity generation is being fed back into the grid.

Obtaining data for the renewable technologies installed across BBC's estate is something which is being explored for future footprinting exercises.



Carbon Footprinting

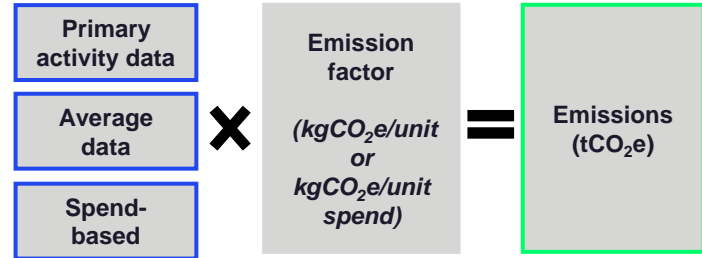
Calculations and units

A carbon footprint is calculated by multiplying activity data (e.g. litres of vehicle fuel, kWh of electricity/gas) by an associated emissions factor:

- Emissions factors are updated annually and published by the UK Government’s Department for Energy Security and Net Zero (DESNZ).
- Proxy factors can be used in place of the DESNZ factors to approximate emissions from the available input data (e.g. contractual spend, for purchased goods/services).

When calculating emissions, the availability of certain data can influence what calculation method is used. Whilst BBC has strived to provide the most accurate data possible, certain data has been assumed due to a lack of availability or quality. Estimates have been carefully reviewed and applied where appropriate.

Greenhouse gases are not limited to CO₂ and under the Kyoto protocol, the emissions of several other GHGs must be considered when producing a footprint, as shown in the graphic on the right. Each GHG has a specific global warming potential (GWP), which is a measure by the amount of heat absorbed by a GHG. All gases are measured in tCO₂e – tonnes of carbon dioxide equivalent; this reflects the global warming potential of each gas relative to CO₂.



tCO ₂ e	GWP	Source
CO ₂	1	Fossil fuel combustion
N ₂ O	310	Agriculture and soil management
PFCs	~10,000	Aluminium and semi-conductor production
HFCs	1,500–15,000	Refrigeration and air conditioning
SF ₆	23,900	Electricity supply equipment
CH ₄	21	Agriculture and waste
NF ₃	16,100	Semi-conductor and electronics production

Data Collection Summary



Emissions Source	Data Source(s)	Units	Assumptions/Uncertainties
Gas, Electricity, Other Fuels	<i>BBC Scope 1 and 2 Emissions</i>	kWh, miles & Litres	<ul style="list-style-type: none"> Scope 1 and 2 consumptions natural gas and electricity (kWh) and petrol & diesel (litres) were provided. Including Old pumping Station and waste sites (differing slightly from BBC's published S1&2 figures). Includes mileage estimation for BBC's electric van fleet, assumed to all be average sized vans.
Water	<i>BBC Water-plus payments Feb 2022 onwards</i>	m ³	<ul style="list-style-type: none"> m³ consumption provided by water supplier. Relatively low consumption reported for April, assumed to be included in other months.
Waste	<i>Email: Operational waste data request</i>	L	<ul style="list-style-type: none"> Waste volumes for 3 sites (Beeston Council Offices, Bramcote Crematorium and Kimberley Depot) based on waste disposal contracts. Waste spend also captured within purchased goods and services.
Commuting & WFH	<i>Commuting Survey (1-128)</i>	Miles & Hours	<ul style="list-style-type: none"> Commuting survey captured FTE, distance travelled to office, mode of transport and number of commuting days per week. Assumed 252 working days per year. Due to functionality of model, E-Scooter inputted as motorbike and tram inputted as train. Commuting survey captured employees working from home behaviours, including number of hours of additional heating in the winter season and type of (WFH) appliances used. A working from home day on average equals 7.4 hours of equipment usage and electricity consumption. Winter season assumed to be 4 months of the year.
	<i>Summaries FTE 22-23</i>	Employee count	<ul style="list-style-type: none"> Commuting survey comprised of 120 complete responses, representing roughly 25% of the BBC workforce – extrapolating these results to the remaining 354 employees (75%) of the workforce comes with large uncertainties.
Business Travel	<i>Copy of Mileage Info - Carbon Trust 22-23</i>	Miles	<ul style="list-style-type: none"> Employee mileage data was provided by BBC, split out by vehicle and fuel type. Assumed to be average sized cars.
	<i>Copy of Expenses Info_Carbon Trust 22_23</i>	£	<ul style="list-style-type: none"> Expense data included within purchased goods and services inputs in the model. All subsistence spend assumed to be food and drink.

Data Collection Summary



Emissions Source	Data Source(s)	Units	Assumptions/Uncertainties
Housing and commercial properties	<i>Commercial Properties_ land-and-public-buildings-open-data-2022_data</i>	N/A	<ul style="list-style-type: none"> Commercial properties listed, coded green with floor area provided in the FRA file and the remaining properties to be estimated using property type. Yellow colour coded properties included within scope 1 and 2 – therefore not included.
	<i>FRA list - GF properties</i>	Ft ² & m ²	<ul style="list-style-type: none"> 110 commercial properties listed; with floor areas provided for 82 properties. Estimated floor area for 28 properties using site type and category. Assumed typical energy performance for all sites
	<i>Broxtowe county EPC data download</i>	m ²	<ul style="list-style-type: none"> Used https://epc.opendatacommunities.org/ to download the average floor area for domestic properties within the borough.
	<i>Housing Report</i>	Property type & heating source	<ul style="list-style-type: none"> Using average floor area in borough from EPC download for different property types . Unknown heat source assumed to be gas as a conservated estimate. Used typical energy performance for all houses with exception of the ground source heating source being categorised as good. Assumed no electricity consumption for garages. See Housing and commercial properties for more details.
Purchased Goods & Services	<i>Spend and Creditors analysis v3</i>	£	<ul style="list-style-type: none"> High level spend categories matched to SIC categories, with BBC systems using supplier as an identifier. High level review of spend data within each category to spot any anomalies. With the nature of financial reporting (debits and credits) unable to assign individual spend lines to SIC categories therefore some spend lines might be incorrectly coded within the wider categorisation.
	<i>Creditors analysis v2 - utilities only</i>	£	<ul style="list-style-type: none"> File highlighting the utilities spend captured within the Housing and commercial properties emissions source and therefore removed from the PG&S source to avoid double counting.
Investments	<i>Email: Investments for CT</i>	£	<ul style="list-style-type: none"> Mid-year positional value of instant recall and longer-term investments held by the council.
Renewables	<i>Email: On site renewable technology</i>	kWh	<ul style="list-style-type: none"> Installed capacity of solar panels on council offices roofs. More solar panels in low carbon technology register but unable to provide the kWh capacities.

Carbon Footprinting



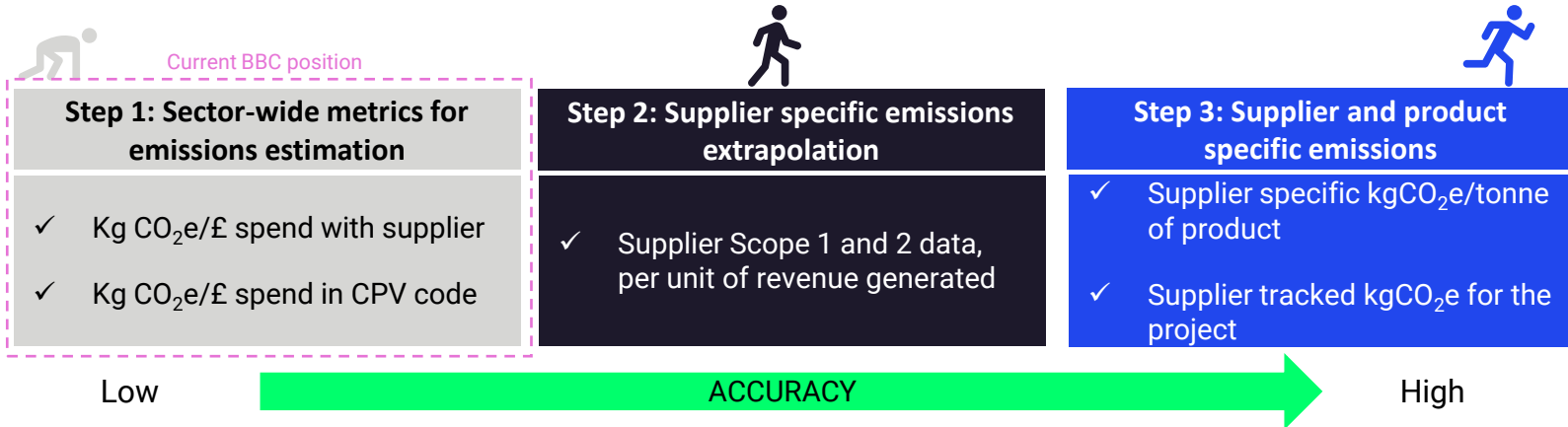
Purchased goods and services emissions estimation

Purchased Goods & Services data was provided by BBC within a spreadsheet titled 'Spend and Creditors analysis v3'. Analysis was conducted on the dataset to align the format to enable emissions quantification by matching existing procurement data to [Standard Industrial Classification](#) (SIC) codes using the supplier as an identifier.

Once all data had been matched to SIC codes, data flagged as overlapping with other emissions sources in the footprint was removed from the procurement analysis, to avoid double counting of these emissions.

It should be noted that this approach was undertaken due to resource & data constraints within the scope of this project, and comes with a high degree of uncertainty regarding the goods/services actually procured, with the assumption that the primary SIC code assigned to a supplier aligns to the good/service being procured by BBC.

Steps to understand purchased goods and services emissions



Carbon Footprinting

Housing and commercial properties emission estimation approach



**4,781 properties
included in housing and
commercial stock**



**Used estimated and
known floor areas for
each property type**



**Estimated energy
consumption using floor
area as proxy**

Property type		Number
Social Housing	Houses	1543
	Flats	2438
	Bungalows	690
	All social housing	4671
Commercial properties		110
Total		4781

In 2022/23, BBC was responsible for approximately 4,671 social housing properties and 110 commercial properties. The social housing properties were categorised into 1,543 houses, 2,438 flats and 690 bungalows. The social housing figures were calculated after removing non-domestic properties, such as garages, which were assumed to have minimal energy usage and therefore excluded. The commercial properties included 7 community centres and various investment properties.

The housing and commercial properties' electricity and gas consumption was estimated using published energy benchmarks and the average floor area for each dwelling type within the whole Broxtowe area. As the Council was unable to gather data required to calculate the energy use for each individual property, using the local average floor area for each property type as a proxy, the energy usage was estimated for all 4,671 social housing properties. Each house was assumed to be a semi-detached property and unknown heating sources were assumed to be gas-fired boilers.

Most commercial properties had known floor areas and the remaining floor areas were estimated using the average floor area for the same or a similar commercial property. The 110 commercial properties are in addition to the properties accounted for within BBC's Scope 1 and 2 boundary.

Broxtowe Borough Council Scope 3 Carbon
Footprint

Carbon Footprint

Scope 3 Carbon Footprint

Overview

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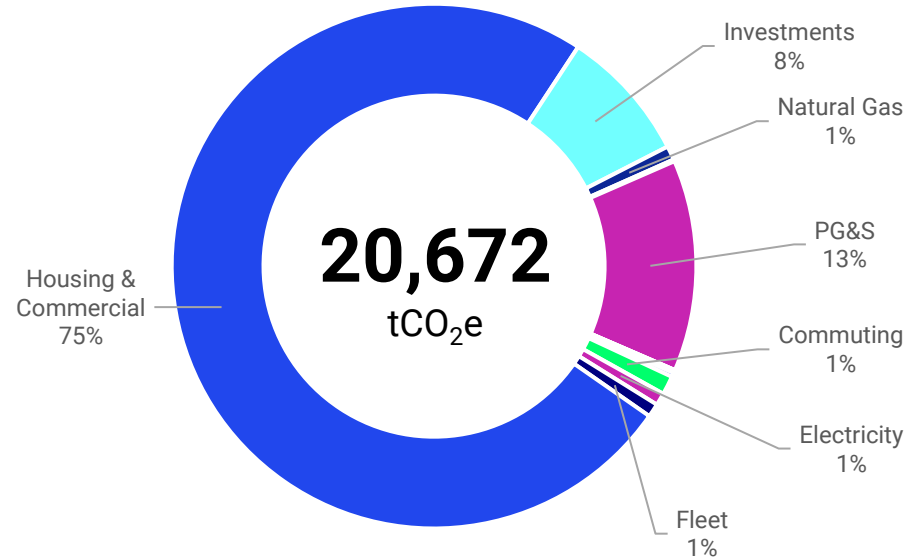
- **Housing and commercial properties** , 15,415 tCO₂e (75%).
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Housing and commercial properties

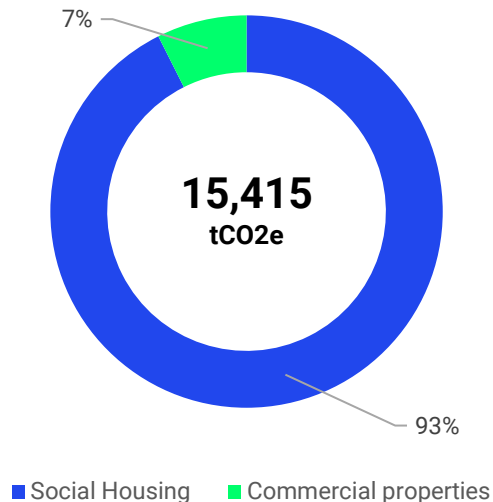
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Housing and commercial properties

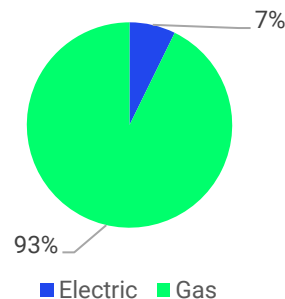
Social housing

Within BBC's social housing stock of 4,671 properties the majority (93%) are heated by gas-fired boilers. Gas heating is more carbon intensive than electric heating. This is shown in the graphs on the right, as gas heating holds a higher proportion of the total carbon emissions relative to its share of heating source.

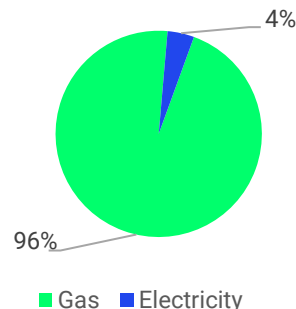
The methodology uses floor area, heating source, dwelling type and energy efficiency rating (typical or good). To increase the accuracy of the calculation in future, using primary data (gas and electricity consumption) would be the best practice methodology. This would reduce the amount of estimation in the calculation and be a truer reflection of the emissions associated with energy consumption of BBC's housing stock.



Social housing stock (4,671)
by heating source



Carbon emissions (14,271 tCO₂e)
by heating source



Assumptions:

- When **heating source** was **unknown**, a **gas-fired boiler** was assumed.
- **All properties** assumed to have **typical** energy efficiency rating, **except** the property using **ground source heat**. As ground source heat is a more carbon efficient heating source it has been assumed to have a **good** efficiency rating, to reflect the low carbon heating.
- **Excluded garages** from housing stock; garages assumed to **negligible electricity or heat consumption**.

Housing and commercial properties

Commercial properties

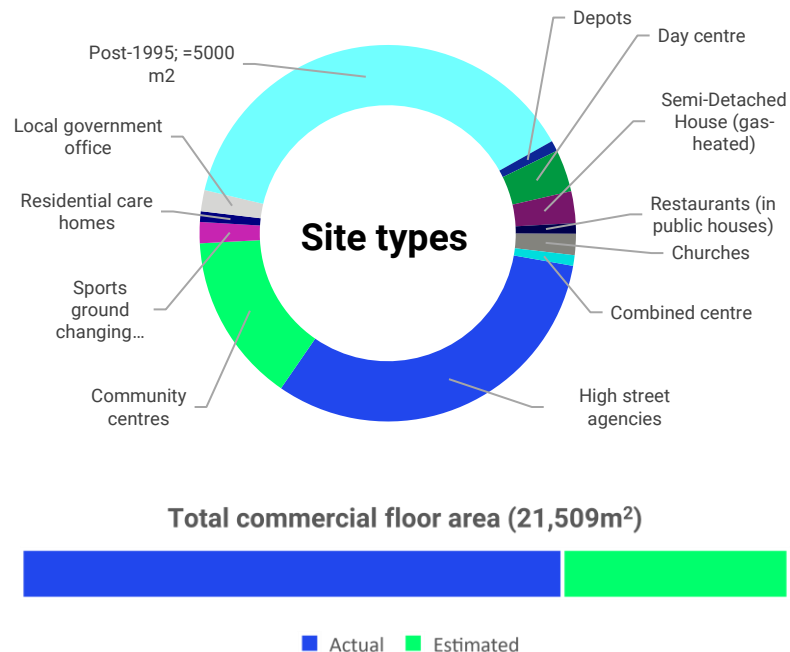
Included in housing and commercial properties are 110 commercial properties, which the Council leases to third parties. The required inputs include site category, site type, energy performance and floor area. All commercial properties were assumed to have typical energy performance ratings, site type was determined using the group and individual site descriptions. Of the 110 properties, 82 had known floor areas and the remaining floor areas were estimated using the floor area of the known average for that site type, or a similar site type as a proxy.

The commercial properties are made up of 12 different site types such as community centres and retail units – see chart opposite for a full breakdown. The majority are industrial buildings, labelled as post 1995 = 5000m² and high street agencies. However, the floor area varies depending on the type of property, so the number of each site type won't necessarily reflect the emissions associated with that category. For instance, multiple retail spaces will typically produce less carbon dioxide emissions than one individual leisure centre.

The total floor area for all commercial properties is estimated to be 21,509 m². A large proportion is estimated due to data availability.

Recommendations:

- For future footprint assessments, **reduce** the proportion of **estimated floor area** to **improve accuracy** of the calculated emissions.
- Improve the energy performance of the commercial properties



Purchased goods and services

Overview

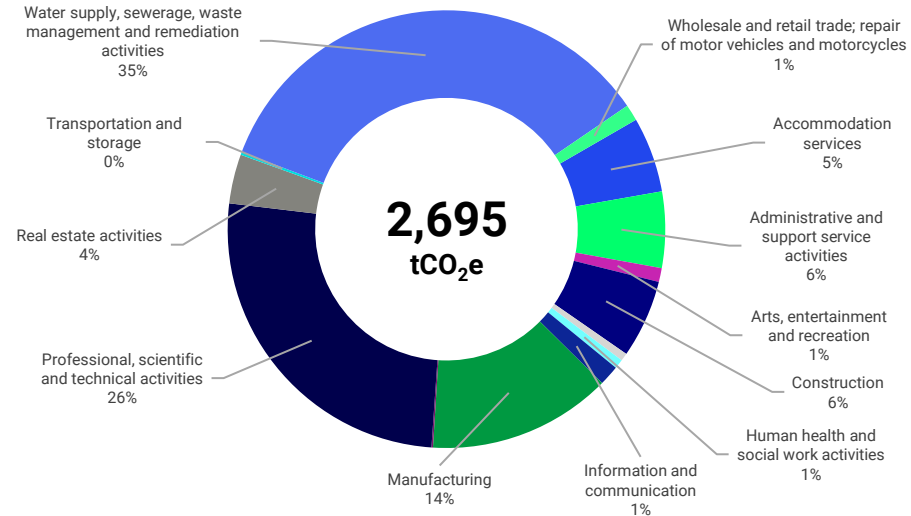
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As is typical for a first baseline Scope 3 carbon footprint, spend-based proxies have been used to estimate PG&S emissions (i.e. £/tCO₂e). This method provides a rapid assessment of supply chain emissions to identify hotspots within a supply chain. However, there are several limitations in using economic proxies and BBC should recognise the high uncertainty associated with these.

The largest proportion of emissions result from the following three categories:

- Water supply, sewerage, waste management and remediation activities.
- Professional, scientific and technical activities.
- Manufacturing.

Note: it has been assumed that all waste collection spend is additional to the waste generated in operation from the three main sites, which are included within a separate waste emissions calculation.



¹ This methodology combines three GHG protocol emission categories: purchased goods and services, and capital goods, both of which cover cradle-to-gate emissions, and upstream transportation and distribution. Purchased goods includes capital goods, where internal reporting did not permit ready identification of expenditure on capital goods for disaggregation.

Investments

Funds, trusts and other financial vehicles

BBC had a range of instant recall and longer-term investments totalling just under £29m during the reporting year, **resulting in estimated emissions of 1,698 tCO₂e**.

Similar to purchased goods and services, spend-based proxies have been used to estimate investment emissions (i.e. £/tCO₂e). This method, which is typical within a first baseline Scope 3 footprint calculation, provides a rapid assessment of investment emissions to identify their materiality within the Scope 3 footprint. However, the limitation in using economic proxies is that this approach makes no differentiation between the carbon intensity of similar types of investments, i.e. emissions are directly related to the value of the investment.



Recommendations:

- Ahead of future Scope 3 reporting BBC should seek to **understand the carbon intensity** of its **investments**.
- Take all possible steps to **divest from carbon intensive investments** (e.g. fossil fuel companies) and **increase its financial investments in climate solutions** to help promote green jobs and a just and green economy.

Upstream energy-related activities

Overview

Fuel and energy related emissions relate to the full lifecycle emissions not accounted for within the Scope 1 and 2 footprint.

BBC provided its Scope 1 and 2 consumption to enable Scope 3: Fuel and energy related activities to be calculated.

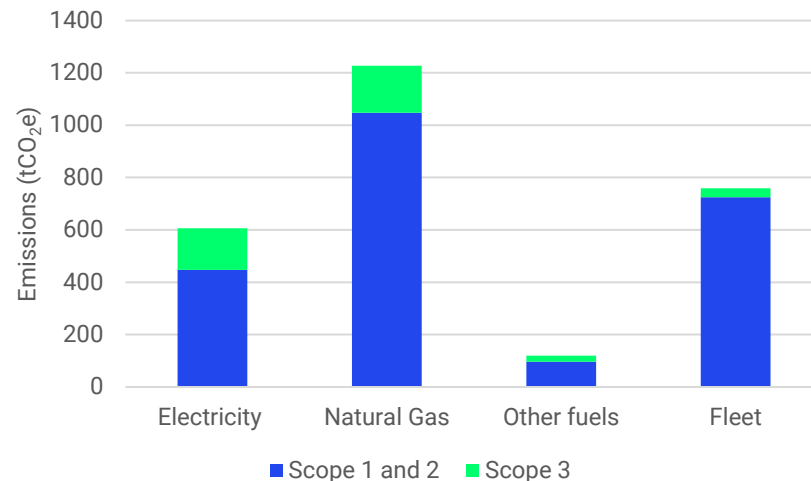
Whilst Scopes 1 & 2 cover the emissions associated with the direct consumption of the energy related activities, there are emissions that result from the upstream transportation & distribution of raw materials associated with natural gas, electricity, and other fuel consumption (including fuel used in fleet).

These emissions were **calculated as 533 tCO₂e**, or 2% of the overall Scope 3 footprint.

The magnitude of the upstream emissions (Scope 3) directly correlates with Scope 1 and 2 emissions, and this category can be decarbonised by reducing consumption and using less carbon intensive energy sources.



Energy related activity by scope



Things to note:

- Any **green or renewable tariff** electricity, is **not reflected** as this analysis follows a **location-based methodology** (using grid average factors).
- Consumption from the **Old waste site and Pumping stations** are **included**, which differs from the Scope 1 and 2 footprint boundary.
- Refrigerants/ F-gases are not included within these Scope 1&2 emissions or the fuel and energy related activity category.

Commuting

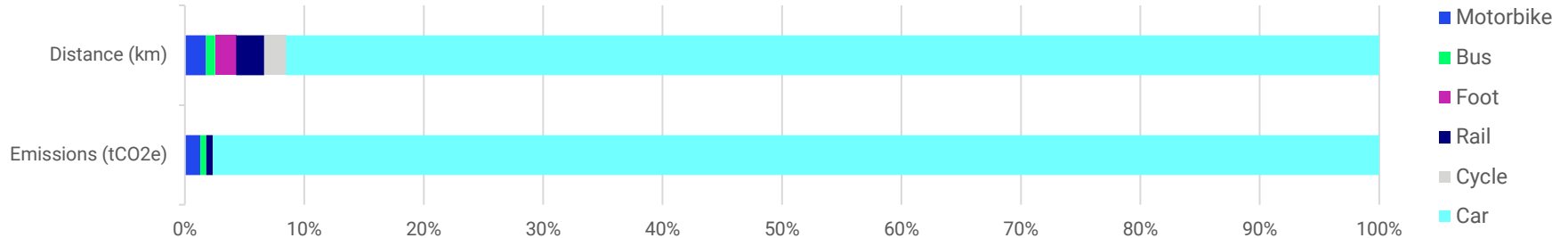
Transport and working from home



BBC has gathered employee commuting and working from home behaviours through a commuting survey. The survey was sent out to Broxtowe Borough Council staff, over a 4-week period. Gathering 120 complete responses (equivalent to 25% of the workforce). Emissions for the remaining 75% (remaining 354 employees) were extrapolated from this data to estimate an overall commuting tCO_{2e} figure for BBC.

Emissions associated with employees **commuting including working from home** were estimated as **261 tCO_{2e}**, ~1% of the overall Scope 3 footprint for BBC.

Total commuting distance and emissions by type of transport



Assumptions:

- Used 120 employee completed commuting responses to scale up to all 474 BBC employees (25% actual vs 75% estimated data.)
- Assumed 252 working days per year.
- Due to functionality of model, E-Scooter assumed to be as motorbike and tram assumed to be train.
- A working from home day on average equals 7.4 hours of equipment usage and electricity consumption.
- Winter season assumed to be 4 months of the year.
- Full heating and electricity usage attributed to the BBC employee working from home regardless if other people present in the home.

Transport

Business travel

Business Travel emissions for BBC, defined as emissions resulting from travel that employees are required to make for work purposes (excluding their daily commute and travel in Broxtowe Borough Council-owned fleet vehicles), are **estimated to be 54.9 tCO₂e**, representing <1% of BBC's Scope 3 emissions.

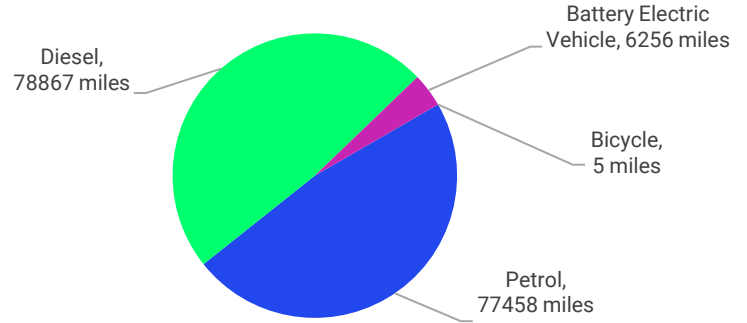
Data was provided by BBC for employee mileage claims for business travel, by car and cycle travel. The majority of this travel comes from the use of diesel and petrol cars, accounting for 96% of mileage and 99% of business travel emissions. Electric vehicles were responsible for 4% of mileage but only 1% of emissions due to the lower carbon intensity of this travel mode.

Note:

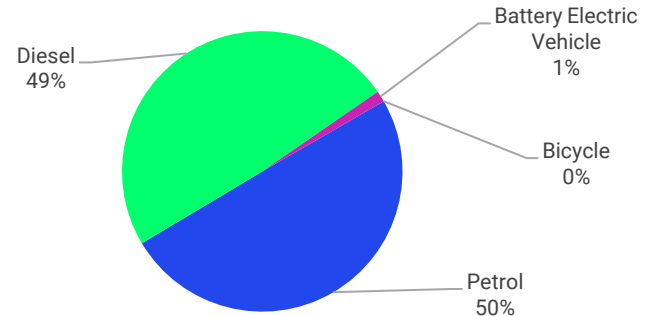
- All **additional expenses claims** were provided as spend data and therefore **included within the purchased goods and services** calculation.



Business Travel distance (miles)



Business Travel emissions (tCO₂e)



Waste

Waste emissions are associated with the third-party disposal and treatment of waste generated by BBC. BBC generated 215 tonnes of waste across 3 sites (Beeston Council Offices, Bramcote Crematorium and Kimberley Depot) in the reporting year. The associated treatment and disposal resulted in **4.5 tCO₂e** of emissions, or <0.1% of the Scope 3 footprint.

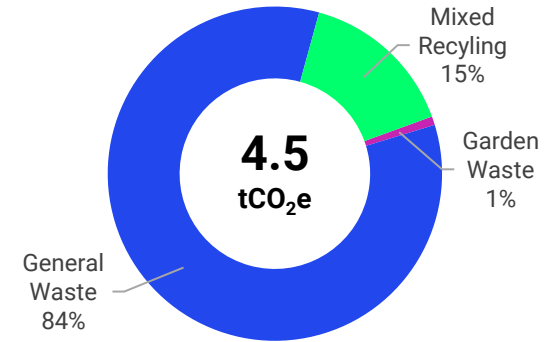
The majority of waste volumes (178.5 tonnes or 83%) comes from general waste which is incinerated, producing 84% of emissions. The remaining waste emissions for the 3 sites stem from mixed recycling and garden waste, totalling 36.5 tonnes of waste producing 0.7 tCO₂e. No waste data for any other BBC sites was captured in this year of reporting. BBC should ensure that any waste from additional sites is recorded in future reporting.

Emissions reported here are associated with the transportation of waste only, in accordance with DEFRA's Environmental Reporting Guidelines. These do not account for the emissions and social impacts associated with the burning of waste; these can be significant (e.g. 1 kg of plastic burnt releases 2.9 kg of CO₂e¹) and efforts should be made to ensure that waste quantities are minimised and recycling rates are maximised.

Although the emissions are small relative to BBC's overall footprint, improvements to BBC's waste operations would bring other sustainability benefits to ecosystems and the natural environment, aligning with a number of the United Nations' [SDGs](#) – see opposite. Additionally, implementing waste reduction and management initiatives impacts employee behaviour, and a commitment to reducing waste will result in tangible differences employees notice.



Emissions by waste type



¹ https://www.eionet.europa.eu/etcs/etc-wmge/products/etc-wmge-reports/greenhouse-gas-emissions-and-natural-capital-implications-of-plastics-including-biobased-plastics/@download/file/ETC_2.1.2.1_GHG_EmissionsOfPlastics_FinalReport_v7.0_ED.pdf

Water

Wastewater carbon emissions are directly proportional to the water consumption within BBC operations, and the treatment of wastewater generated from BBC operations. It is assumed that 95% of water used is sent to waste treatment.

Water consumption emissions accounted for **11 tCO₂e**, or 0.05% of the overall BBC Scope 3 footprint. BBC's residential care homes and offices are responsible for the majority (57%) of these emissions.

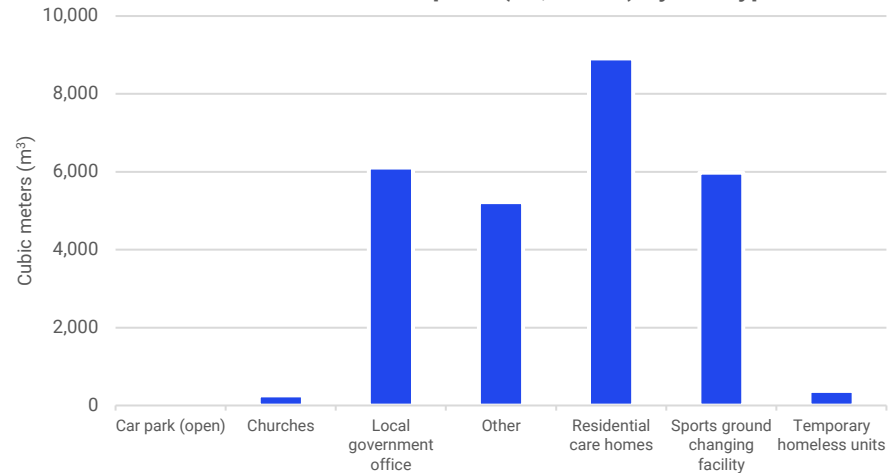
The supply and treatment of water accounts for a small proportion of BBC's Scope 3 footprint. The most impactful way to decarbonise this category is for BBC to reduce water consumption which can have significant environmental, economic, and societal benefits. For example, by installing water efficiency measures such as automatic or low-flow taps and showers.

Assumptions:

- Assumed that **95% of water used** is sent to **waste treatment**.
- Water **consumption** was unusually **low in April 2022**. Any potential missing consumption assumed to be captured in prior/future months.



Total water consumption (26,865m³) by site type



Source files:

- BBC Water-plus payments Feb 2022 onwards
- Water Plus Payments areas for Climate Team 2024



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Broxtowe Borough Council Scope 3 Carbon
Footprint

Recommendations and Next Steps

Recommendations



Housing and commercial properties

- **Reduce** the quantity of **estimated data** used in the calculations, such as floor area and heating source.
- Gather energy performance certificate (EPC) data for all properties, including **heat source** and **floor area**.
- Gain a better **understanding of primary energy usage** data.
- **Review heating sources** used within the housing stock and **influence** the move towards **low carbon heating and lighting** technologies, such as solar panels and LED lighting.



Purchased Goods and Services

- **Improve high-level categorisation** of expenditure to ensure **all data** included in the category is **representative** of each category type.
- **Cleanse data** ensuring **no double counting** of the **quantity data** within the boundary (e.g. water, fuel, waste and utilities).
- Introduce spend categorisation to internal financial systems to enable **alignment** of all contracts with Standard Industrial Classification (SIC) categories to **improve the data coverage and quality** of future carbon footprints.



Waste

- Ensure all sites have waste and water data owners.
- Work with the waste management company to understand the tailored emissions factor of different disposal methods.



Water

- Improve data collection to ensure accuracy. For example, monthly readings from each site.
- **Cleanse data to ensure no double counting** with quantity and spend data on water treatments included **within purchased goods and services**.



Investments

- Understand the carbon intensity of investments.
- Take all possible steps to divest from carbon intensive investments.



Business Travel

- Improve on spend based expenses data, working towards collecting distance travelled for each transportation mode.



Commuting

- Conduct an annual **commuting survey** with the aim of gathering a higher proportion of staff responses.
- Review the **provisions of car parking** and how policies might be implemented to incentivise more sustainable modes of transport.

Housing and commercial properties

Next steps



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Short-Term (1-2 years)

Improve methodology using BBC specific EPC data to improve housing and commercial properties data quality and completeness used to estimate energy consumption.

Gather BBC's full council housing and commercial properties portfolio from the EPC open data source. Including all relevant data points, including:

- EPC rating
- floor area
- dwelling type
- heating source

Improving the data completeness and quality will allow a more representative estimation of the energy consumption of the properties and better targeted action.

Longer-Term (2-5 years)

Collect real time energy consumption for all properties within BBC's housing and commercial properties .

Develop an internal framework for the collection of energy consumption for all properties, eliminating the need to estimate energy consumption and resulting emissions – this will require internal resources to be allocated.

Gathering consumption data and heating source information will allow educated carbon saving efforts. Highlighting emission hotspots for energy and carbon saving efforts to be prioritised and the council can promote specific low carbon initiatives.

Purchased goods and services

Next steps



Short-Term (1-3 years)

Improve purchased goods and services emissions calculations by moving from a spend-based methodology to a hybrid (quantity & spend based) methodology.

Using spend-based conversion factors is the emission calculation method with the greatest level of uncertainty as it simply multiplies the value of spend by a national-level emission factor for the category of goods or services, i.e. it is not specific to the supplier of the goods or services.

Improving the accuracy of the methodology will allow for a more representative calculation of the emissions associated with the purchased goods.

Medium-Term (3-5 years)

Use a fully quantity-based methodology and begin supplier engagement to incorporate supplier specific emission factors – see the [GHG Protocol Scope 3 Calculation Guidance](#) on this.

Using the quantity of products bought as a calculation method is more representative of the carbon associated with the products. Focusing on the activity and the specific emissions resulting from BBC's spend.

As carbon footprinting becomes more common place it will generate the ability for suppliers to share their organisational and product emissions.

Long-Term (3-10 years)

Identify emission hotspots within BBC's value chain. Working with existing suppliers to reducing their own footprint.

Phase in requirements for BBC suppliers to address their carbon footprints, to a level that is within their means.

This engagement should be done on a sector-by-sector basis. For 2022/2023, the areas to prioritise would be:

- Building and Housing Materials
- Maintenance & Repairs

Upstream energy-related activities

Recommendations

Upstream energy and fuels are related to emissions from the production (extraction, processing and transport) of fuels and energy purchased and consumed by BBC. These are emissions from “Well-to-Tank” and “Transmission and Distribution” losses of Scope 1 and 2 emissions that are not accounted for under Scope 1 and 2. Therefore, **BBC’s energy consumption rate and choice of fuel will directly impact the magnitude of upstream energy emissions**. By tackling the Scope 1&2 emissions through **energy efficiency measures, heat decarbonisation and on-site renewable energy efforts**, the Council will concurrently reduce the emissions associated with this category.

Energy Efficiency

A primary method to reduce carbon emissions from energy consumption is to improve the energy efficiency of a building. For buildings owned and operated by the Council, there is a strong opportunity to reduce heating demand and improve the thermal performance of these buildings. Energy efficiency measures include secondary glazing, insulation, lighting controls, sub-metering and behaviour change of building users.

Heat decarbonisation

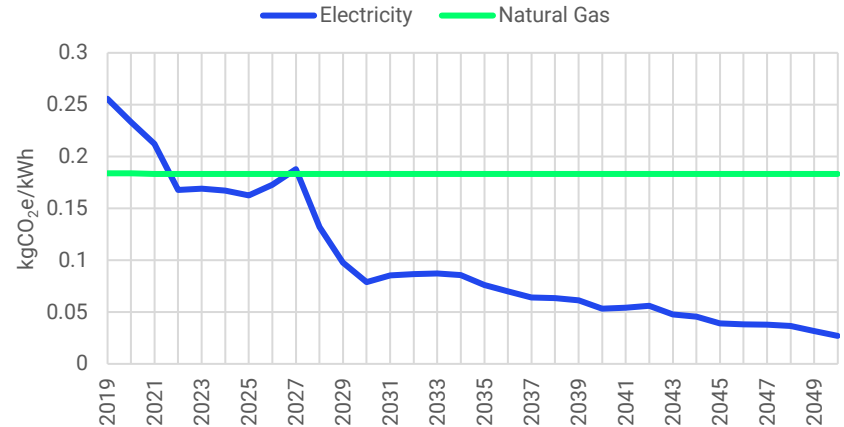
As the UK switches more of its energy production to renewable sources, less carbon dioxide will be produced by the generation of electricity. This means over time the grid electricity that is used by consumers will become less carbon-intensive, with the UK Government aiming to deliver a decarbonised electricity grid by 2035. By electrifying the heat sources across BBC will ensure their emissions decrease in the future. Heat pumps provide a renewable way to heat buildings with their primary energy source drawing from a wide range of sources including air, ground and water. Alternatively, connecting to a renewable district heating network is also likely to lead to significant emission reductions.

On-site renewables

Renewables such as solar and wind should be explored further to reduce BBC’s operating emissions and support the acceleration of wider grid decarbonisation.



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Projected carbon intensity of electricity and natural gas
(Future Energy Scenarios, Falling Short)



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Appendices

Appendix A

Abbreviations

BAU	Business as usual
BBC	Broxtowe Borough Council
CIBSE	Chartered Institute of Building Services Engineers
CO₂e	Carbon dioxide equivalent
CT	Carbon Trust
EEIO	Environmentally Extended Input-Output
EPC	Energy Performance Certificate
EV	Electric vehicle
FTE	Full-time employee
GHG	Greenhouse gas
GWP	Global warming potential
kWh	Kilowatt hour
PG&S	Purchased goods & services
SIC	Standard Industrial Classification
T&D	Transmission & distribution
tCO₂e	Tonnes of carbon dioxide equivalent
WFH	Working from home
WTT	Well-to-tank



Appendix B

Emission Categories exclusions

A scoping exercise was performed with Broxtowe Borough Council to determine emission sources relevant to their operations. All scope 3 emission sources deemed relevant, and material have been included in this report. Rationale for excluded emission sources is provided:



Emission source	Rationale for exclusion
Scope 1 and 2 emission categories	Outside the scope of this study.
Upstream leased assets	Included in scope 1 and 2 emissions reporting under an 'operational control' boundary approach.
Downstream transportation and distribution	Not applicable to operations: BBC does not sell products
Processing of sold products	Not applicable: BBC does not sell products
Use of sold products	Not applicable: BBC does not sell products
End of life treatment	Not applicable: BBC does not sell products
Franchises	Not applicable: BBC does not have any franchises

Appendix C

Data Quality and Sources



Emissions Source	Data Source(s)	Units	Data Quality (R/A/G)	Impact on Footprint (R/A/G)
Gas, Electricity, Other Fuels, Fleet	BBC Scope 1 and 2 Emissions	kWh, miles & Litres	G	G
Commuting & WFH	Commuting Survey (1-128)	Miles & Hours	G	G
Business Travel	Mileage Info - Carbon Trust 22-23 & Expenses Info_Carbon Trust 22_23	Miles & £	G	G
Housing and commercial properties	FRA list - GF properties	Ft ² & m ²	A	R
	Broxtowe county EPC data download	m ²	A	R
	Housing Report	Property type & heating source	A	R
Purchased G&S	Spend and Creditors analysis v3	£	R	R
	Creditors analysis v2 - utilities only	£	R	R
Investments	Investment portfolio value breakdown	£	A	A
Water	BBC Water-plus payments Feb 2022 onwards	m ³	A	G
Waste	Email: Operational waste data request	L	A	G

Note:

- The RAG analysis refers to the data's suitability for carbon footprinting and is not a reflection of BBC's internal data processes and management.

Appendix D

Emissions Breakdown by scope and source



Emissions Source	Scope 1	Scope 2	Scope 3	Total
Electricity (Location-based)		448	158	606
Natural Gas and Gas oil	1,048		179	1,227
F-Gas			0	0
Other fuels	96		24	120
Fleet	725		172	898
Business Travel			55	55
Procured Goods & Services			2,695	2,695
Water			11	11
Waste			5	5
Housing and commercial properties			15,415	15,415
Commuting			261	261
Investments			1,698	1,698
Total	1,870	448	20,672	22,990



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