



**An Assessment of the Carbon Footprint of Brampton**

**By B2Z Research Officer Lucy Ingham September 2022**

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## 1. Introduction

### 1.1 Report overview

This report aims to provide a rough estimate of the carbon footprint of Brampton, Carlisle. In doing this we hope to make information on the community's footprint more available to residents, enable people to take more control over their own footprint, and see how their actions can make a difference. This should act as a baseline for the future, although it is important to know that emission factors will change as our understanding of carbon auditing develops.

Throughout the report we look at an average resident's footprint with a consumption-based approach, which means the result is based on emissions from a person's lifestyle, including emissions from the supply chains of the products they buy (indirect emissions). To assess the emissions from agriculture and industry the report looks at emissions within the boundary of the Brampton parish from a production-based approach to carbon auditing (direct emissions). (Product Life Cycle Accounting and Reporting Standard, 2015).

The report provides an in-depth assessment of Impact online community footprint tool (University of Exeter), comparing results for Carlisle to a carbon baseline for Cumbria (Small World Consulting). From this we can interpret Impact's results as slight underestimates, but well within reason.

Impact found that the average carbon footprint in Brampton for a household is **15.9t CO<sub>2</sub>e per year (7.4t CO<sub>2</sub>e per person per year)**. And Agriculture contributes **9670 tCO<sub>2</sub>e per year (2.04 t CO<sub>2</sub>e per person per year)**.

Using Impact this report compares Brampton's footprint to other local towns and to the UK average to better understand the sectors that should be targeted. Also exploring reasons for these differences, such as affluence, tourism, isolation, and neglect.

Included are the results from a household survey from 2011 by Sustainable Brampton which highlights issues with housing in Brampton.

There are suggestions for Brampton to reduce its emissions for travel, housing and agriculture.

### 1.2. The world of carbon auditing

To take measures that reduce the effects of climate change we need to understand where carbon emissions are coming from and to what scale. Carbon auditing seeks to quantify this by giving objects and activities an emission factor. The equivalent carbon dioxide (CO<sub>2</sub>e) emissions of said activity can then be calculated and will depend upon the weight, volume, distance, or duration of the activity (Basic Information of Air Emissions Factors and Quantification, 2022).

However, there is a level of uncertainty in these emissions factors. For example, it is likely that emission factors for different agricultural methods are underestimated due to a lack of data. Research into the effect of farming practices is ongoing. (GHG Protocol Agricultural Guidance, 2022).

This report includes estimates for a person's carbon emissions and the various contributing sectors. For some context here are some emission rates of other things from Mike Burner Lee's book *How Bad are Bananas* (Lee, 2010):

A paper carrier bag produces 80g of CO<sub>2</sub>e

An ice cream from a van produces 500g of CO<sub>2</sub>e

A litre of petrol produces 3.15kg of CO<sub>2</sub>e

Being cremated produces 80kg of CO<sub>2</sub>e

An economy class return flight from London to Hong Kong produces 3.4t CO<sub>2</sub>e

Having a child produces 373 tonnes of CO<sub>2</sub>e

A bushfire produces 165 million tonnes of CO<sub>2</sub>e

### **1.3. Brampton 2 Zero Background**

Brampton 2 Zero (B2Z) CIC was set up by a group of local residents and launched in April 2022. Fuelled by a desire to tackle climate change, the aim is for Brampton to achieve net zero carbon emissions and to build a climate resilient community. The Brampton community has supported the work of Sustainable Brampton, Fell Foot Forward, and Brampton Parish Council, and we therefore we believe is ready for net zero.

B2Z have identified the need for action in 5 areas: Education, biodiversity, renewable energies, agriculture, and housing. With a range of projects underway such as a feasibility survey for a Brampton community energy scheme, a forest school at the Heugh, retrofitting of homes, a community orchard, and wetland development for carbon sequestration, community engagement is always a priority. Without a supportive community failure is inevitable. For example, an installation of PV solar panels that fuels a fleet of electric cars for a car club will only have an impact if people use them. Each project is complemented with surveys to gauge households' readiness for change and opinions.

### **1.4. Overview of Brampton**

#### **1.4.1. Geography and housing**

Brampton is a small market town Northeast of Carlisle, Cumbria, with the North Pennines area of outstanding natural beauty at its doorstep and Hadrian's wall running along the northern edge of the town. Brampton's centre is busy with local businesses and a monthly farmers market. It provides a hub for the community of Brampton and the surrounding villages, hamlets, and farms. The housing stock of Brampton has a significant amount of pre 1920's buildings, many of which are grade 2 listed.

ACTion carried out a rural community profile for the Brampton parish in 2013. Brampton has a higher portion of detached (28.1%) and semi-detached (32.2%) than Cumbria and England (Census 2011). Older houses and detached houses are often harder to heat and consume more energy in doing so. There is more socially rented housing in Brampton than privately, and a lower ownership than England (Census 2011). Although house prices are much lower in Brampton than the average for England, people generally earn less and so the affordability ratio (median house prices as a ratio of median incomes) is higher in Brampton, 16.8 opposed to 15.4 (Land Registry/ONS 2007/08). The condition of the housing stock in the Brampton parish in 2013 was comparatively good, with only 2.7% of houses lacking central heating compared to 4% of Cumbria (Census 2011 KS403EW). It is important to note that this does not include the surrounding villages of Brampton.

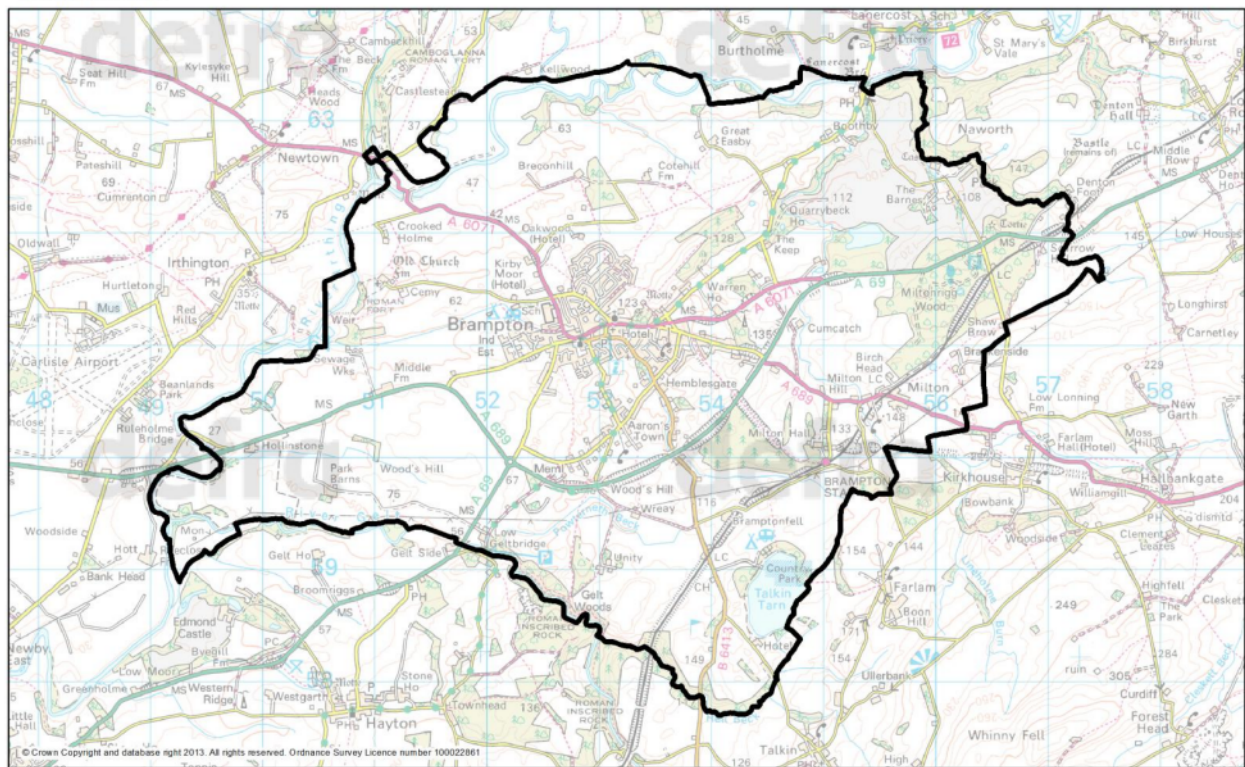
Brampton is defined in this report as:

#### **1.4.2. Population profile**

28% of the population of Brampton is over the age of 65. 22% of the total UK population is aged 60+ in 2018 so Brampton's population is ageing. Furthermore, the 2011 Census found that Brampton has a relatively high amount of vulnerable groups: 16.6% of households were single pensioners (England average 12.4%) and 25% of all families were lone parents (England average 24.5%). A sustainable community looks after its vulnerable, and is inclusive of all backgrounds (Rural Community Profile for Brampton (parish), 2013).

The population of Brampton is growing, often more affluent older families push out younger families and less privileged people, this is due a lack of affordable housing and training opportunities. The people moving to Brampton are generally UK born citizens and white. Only 2.6% of the population of Brampton is estimated to be from an ethnic minority, compared to the 20.2% in England (Census 2011). This could be because the community of Brampton lacks employment opportunities or because the people are not expecting of different cultures? Tolerance and respect of other cultures is a sign of a sustainable community (Rural Community Profile for Brampton (parish), 2013).

## Brampton Parish



Source: 2011 Census Output Area boundaries. Crown Copyright.  
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Produced by Oxford Consultants for Social Inclusion, www.ocsocial.co.uk, April 2013



According to the 2011 Census the employment rates of the residents of Brampton are very similar to England, around 70% economically active residents and 3.6% of people claiming job seekers allowance. Brampton has more people in part-time employment but also more people working more than 49 hours a week. The biggest employment sector is retail in Brampton, and there are less people working in professional or associate professional occupations.

### 1.4.3. Transport in Brampton

Car ownership is in line with the national standard with one car per household being the most common (2011 census), although it is more common in Brampton than Cumbria and it is less likely for a household to not have a car in Brampton than England. Car ownership has risen since 2011 from 1.05 to 1.22 in 2018 in the Northwest). Having more than one car is a show of affluence as the top 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, and 10<sup>th</sup> percentiles are more likely to have 2 cars than 1 car. Whereas the lower quartiles are more likely to have one car per household (National Travel Survey 2021)

Although Brampton is well connected, for example: 26% of people travel less than 2km from their home, or the average time to the nearest supermarket via public transport or walking is 8 minutes (DfT 2011), the percentage of people using public transport to get to work is only 3.1% compared to 11% for England overall.

There is a bus service from Newcastle to Carlisle that serves Brampton. Normally there is a bus every 30 minutes.

Brampton's rail station is about 2 miles out on the centre. There is just one line that runs from Newcastle to Carlisle. A train stops every 2 hours.

## 2. Impact online tool (Developed by Exeter University) LINK: <https://impact-tool.org.uk/>

### 2.1. Impact overview

Impact was created by the Centre for Sustainable Energy and the Centre for Energy and the Environment at the University of Exeter. Impact is committed to updating the estimations annually, although is restricted by the release of data.

There is a lack of estimates of footprints of areas geographically smaller than local authority. Impact's aim is to fill the gap and provide estimates for footprints as low as local parish level. This empowers communities to assess what they need to do at a local level to reduce this footprint and mitigate climate change (Impact Tool Method Paper, 2021).

The emissions factors used in Impact's calculations were from public sources; UK Government Energy and Industrial Strategy 2019, and IPPC's emissions factor database.

Calculating the footprint of an area isn't something that is new. Impact followed a similar method to PAS2070: specification for the assessment of greenhouse gas emissions of a city (2013) by the British Standards Institute.

The footprint calculations are based on publicly and privately available data such as national surveys and certificate data, it's intended to be a current estimate although many of the national surveys are updated irregularly for example the English Housing survey was last done in 2018 (Impact Tool Method Paper, 2021).

In order to get an estimate for the footprint of such a small output area data has been manipulated and assumptions have been made. For example, BEIS sub-national electricity consumption statistics is available at LSAO level (local authority i.e Carlisle), not parish specific. Combined data such as this has to be disaggregated. This is done in 2 ways, area-weighted and population-weighted. An area-weighted approach is used if local parishes are all very similar, and a population-weighted approach is used if local parishes have a mix of urban and rural (Impact Tool Method Paper, 2021).

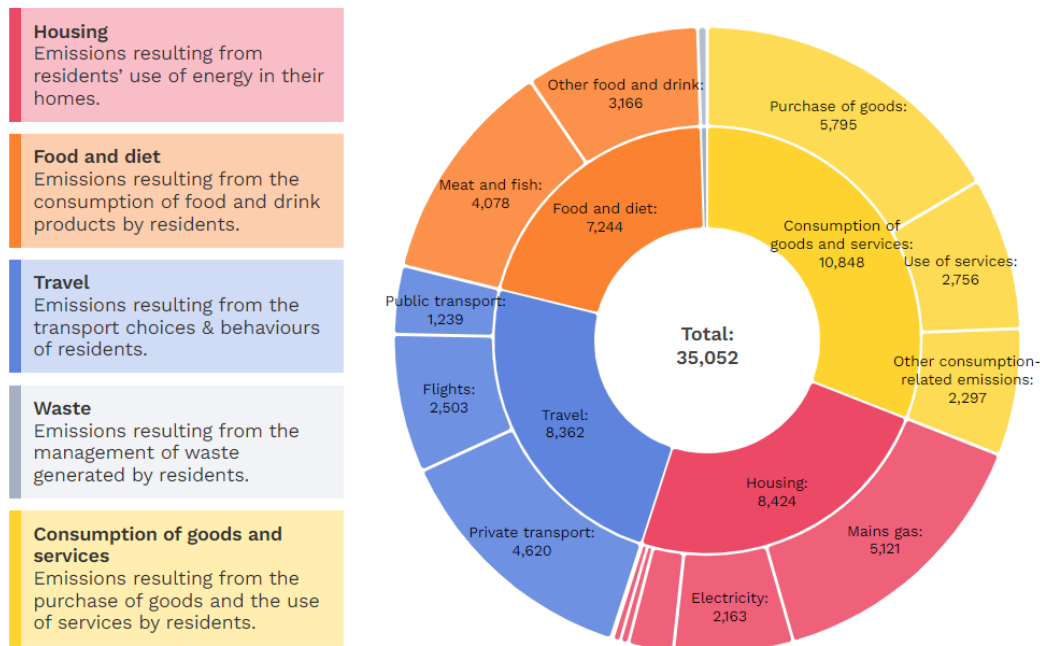
Impact uses Experian Mosaic for socio-demographic data that allocates every house into 1 of 15 classifications based on many factors such as: income levels, employment status, house type and age, number of children, values and attitudes etc...

From these classifications and calculations Impact make informed estimates for household carbon footprints.

Impact provides two estimates: consumption and territorial. Consumption-based carbon footprint includes everything a resident does/buys and all the emissions released in the supply chains. Territorial-based footprint looks at all the carbon emissions produced within a boundary which includes agriculture and industry (Impact Tool Method Paper, 2021). This report will look at both.

## 2.2. Brampton's consumption-based carbon footprint

### 2.2.1. Per household and per person carbon footprint



Impact estimate that a Brampton **household** has a footprint of **15.9t CO<sub>2</sub>e per year**.

Shows Brampton communities' consumption-based footprint as a total of 35,052t CO<sub>2</sub>e per year. It breaks it into sectors of housing, travel, food and diet, and consumption of goods and services. Housing makes up 24%, travel 24%, food and diet 21% and consumption of goods and services 31%. Private transport makes up 13% of total footprint, meat and fish 12%, purchase of goods 17%, and mains gas 15%. Source – Impact online tool.

Impact used population estimates for the UK from the office of national statistics 2020 that as far as I can see the smallest scale is LSAO (local authority).

According to the 2011 census the population of Brampton is 4627.

The population of Carlisle has grown since 2011 from 107,500 to 110000. This is a 2.32% increase.

Assuming Brampton had a similar rise in population, 2.32% increase on 4627 gives a population estimate of 4734 for Brampton.

Calculate the per person value:

$$35062/4734 = 7.4\text{t CO}_2\text{e}$$

For an average resident of Brampton their footprint is **7.4t CO<sub>2</sub>e per person per year**.

### 2.2.2. Housing footprint

3.8t CO<sub>2</sub>e per household per year

$$8424/4734 = 1.78\text{t CO}_2\text{e per person per year}$$

60.5% of this comes from mains gas

26.3% of this comes from electricity

10.5% comes from oil

### 2.2.3. Travel footprint

3.8t CO<sub>2</sub>e per household per year

$$8362/4734 = 1.76\text{t CO}_2\text{e per person per year}$$

55% of this is from private travel

29% of this is from flights

16% of this is from public transport

#### **2.2.4. Consumption of goods and services footprint**

4.9t CO<sub>2</sub>e per household per year

10848/4734 = 2.29t CO<sub>2</sub>e per person per year

53% of this is from the purchase of goods

26.5% of this is from use of services

20.5% of this is from other consumption related emissions

#### **2.2.5. Food and diet footprint**

3.3t CO<sub>2</sub>e per household per year

7244/4734 = 1.53t CO<sub>2</sub>e per person per year

57.6% of this is from meat and fish

42.4% of this is from other food and drink

### **2.3. Brampton's Territorial-based carbon footprint**

The territorial footprint is the emissions of the land and the land use, rather than the residents' lifestyles (Product Life Cycle Accounting and Reporting Standard, 2015).

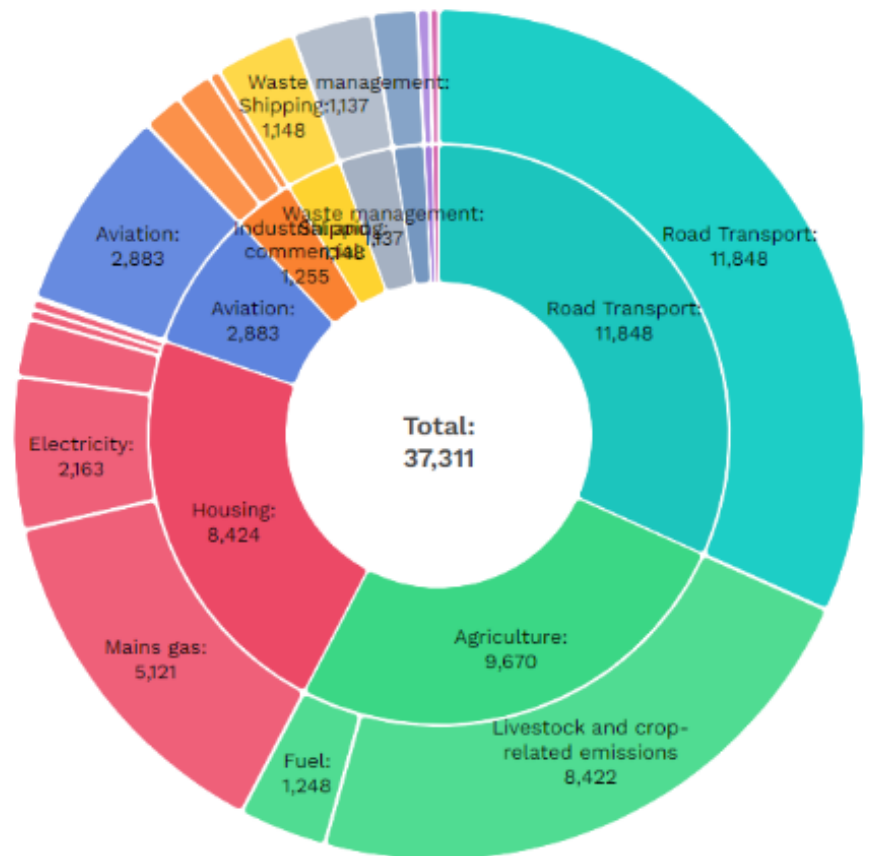
It is still necessary to consider what contributes to these emissions as there are many things to learn from it.

#### **2.3.1. Road transport**

Road transport is the biggest factor with an impact of **11848t CO<sub>2</sub>e per year (2.5t CO<sub>2</sub>e per person per year)**. This figure includes all road activity from visitors, cars passing through, lorries and residents. The A69 run through Brampton and is a vital road link. Having more rail stations would lower emissions from the roads as people would be less likely to drive cars. Trains have a lower emissions factor (UK GHG conversion factors 2022).



Shows Brampton's territorial based total emissions as **37,311 tCO<sub>2</sub>e per year**, broken down into categories. The biggest contributor to Brampton's footprint is road transport which contributes 32% of the total emissions. Agriculture is the second biggest contributor at 26% of the total, most of which comes from livestock and crop related emissions. Housing makes up 23%, aviation 8%, industrial and commercial 3%, shipping 3%, and waste management 3%. Source - Impact online tool.



### 2.3.2. Agriculture

Agriculture is the next biggest contributor at **9670 t CO<sub>2</sub>e per year**. For reference this works out at **2.04 t CO<sub>2</sub>e per person per year**. How Brampton's land is managed by farmers and landowners can have a big impact on emissions and even remove carbon from the atmosphere. 87% of these emissions are from livestock and crop related emissions and only 13% from carbon released in the burning of fossil fuels for the machinery used in farming. This means that there is great potential to reduce the carbon footprint of this area. Working with farmers to change practices is crucial to reducing the industries environmental impact. With pressure to produce good yields to feed a growing population fertilizer companies sold chemical fertilizer as the answer. It is now understood that fertilizer along with ploughing, pesticides, over-grazing, and monoculture are bad for soil health (Montgomery, 2017). Soil is alive and full of organic matter which means it holds carbon, more than 3 times than the atmosphere. Degrading soil releases the carbon into the atmosphere. Planting trees in hedgerows, returning pockets of land to natural habitat, protecting wetlands, and rotational grazing will all have a positive effect on soil health and therefore increase the carbon storage (Montgomery, 2017).

### 2.3.3. Aviation and shipping

The Impact methodology explains that aviation and shipping were included in the territorial based footprint as it would be helpful to see the effect of these sectors. Data for aviation and shipping is not available locally so the national figure was divided by the national population and then multiplied by the population of Brampton (Impact Tool Method Paper, 2021). Aviation has a large impact on the footprint contributing **2883t CO<sub>2</sub>e per year (0.61t CO<sub>2</sub>e per person per year)**. These emissions are from planes and produce that is flown or shipped to the UK (national emissions data reported by the NAEI and appointed on a population basis).

### 2.3.4. Industrial and commercial fuel use

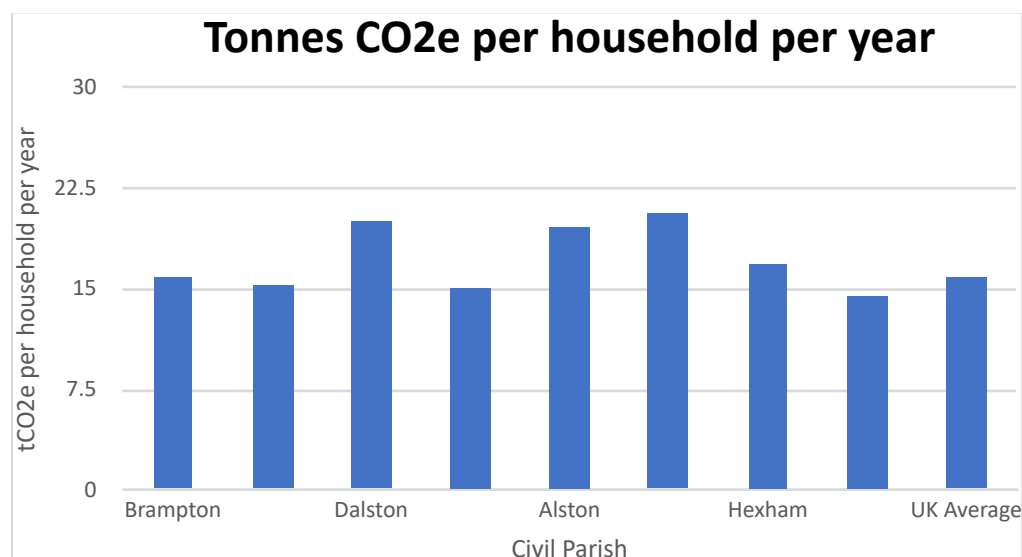
Fuel consumption data is incomplete to maintain commercial confidentiality. Local authority emissions data was used instead. There is a low amount of industrial activity in Brampton, mainly just small local businesses. Of note Horn and Bauer, WCF Ltd, Lowther Used Furniture, and Priority Products as well as Brampton Medical Practice, Brampton Community Centre, Brampton Primary School and William Howard School.

Scene Connect are a social enterprise company focussed on community energy who are working with Brmapton 2 Zero on a community energy project and an electric car club. Using Energy Performance Certificates and energy bills from site specific visits they have compiled some data into a report on businesses in Brampton. Their estimates on the emissions from non-domestics buildings is a total of **595.5 tCO<sub>2</sub>e per year** (Brampton 2 Zero Low Carbon Options Appraisal, 2022).

### 3. Comparing towns near Brampton on Impact

Selected towns based on local knowledge of the area. Towns were identified that had a similar feel to Brampton. The carbon footprint of a community is affected by many things such as the size of a town and how well connected it is, the age of the buildings, and the demographic and affluence of the people (Williams, 2015).

#### 3.1. Graph of the consumption-based carbon footprints of local towns to Brampton



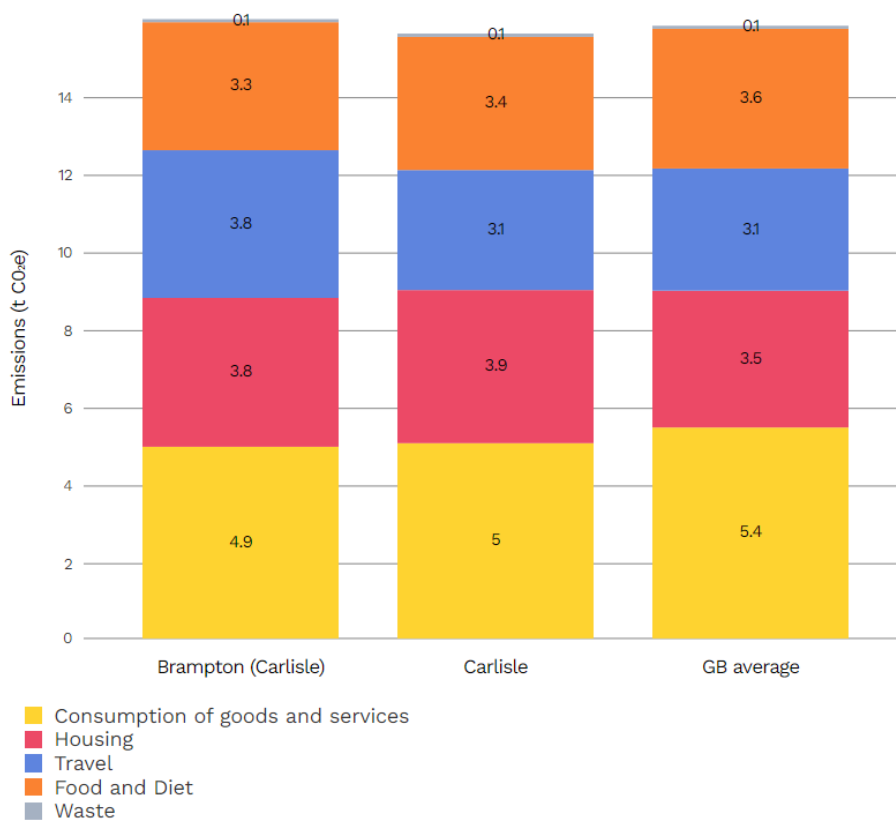
#### 3.2. Comparison of Brampton to Carlisle and UK national average

Graph shows that Brampton's footprint, for a rural town, is on the lower end of the spectrum. Dalston, Alston and Keswick have significantly higher footprints than the other rural towns. Brampton has slightly higher emissions than Wigton, Penrith, and Haltwhistle. This means there is definite potential for improvements with small changes. For some context, the footprint for an average resident of Sheffield city is 10.4t CO<sub>2</sub>e per person per year. The data is from Impact online community carbon calculator developed by the Centre for Sustainable Energy (CSE) and the Centre for Energy and the Environment at the University of Exeter.

Interesting that "Consumption of Goods" is slightly better in Brampton. This could mean that the residents are more conscious of the environmental impact of the things they buy. Also, would be influenced by the amount of "spare" money people have to buy things. The less spare money people have the less stuff they are likely to buy and therefore have a lower impact on global warming from this sector (Pattison, 2017). However, the relationship is complex. For example, as perceptions are shifting and sustainable goods are becoming more mainstream, there is a new class of people that are privileged but choose to spend their money on goods that have a lower carbon factor. These goods are sadly often relatively expensive (Pattison, 2017).

Brampton does especially well compared to national average for Food and diet which is perhaps a credit to the farmer's market where local produce can be bought.

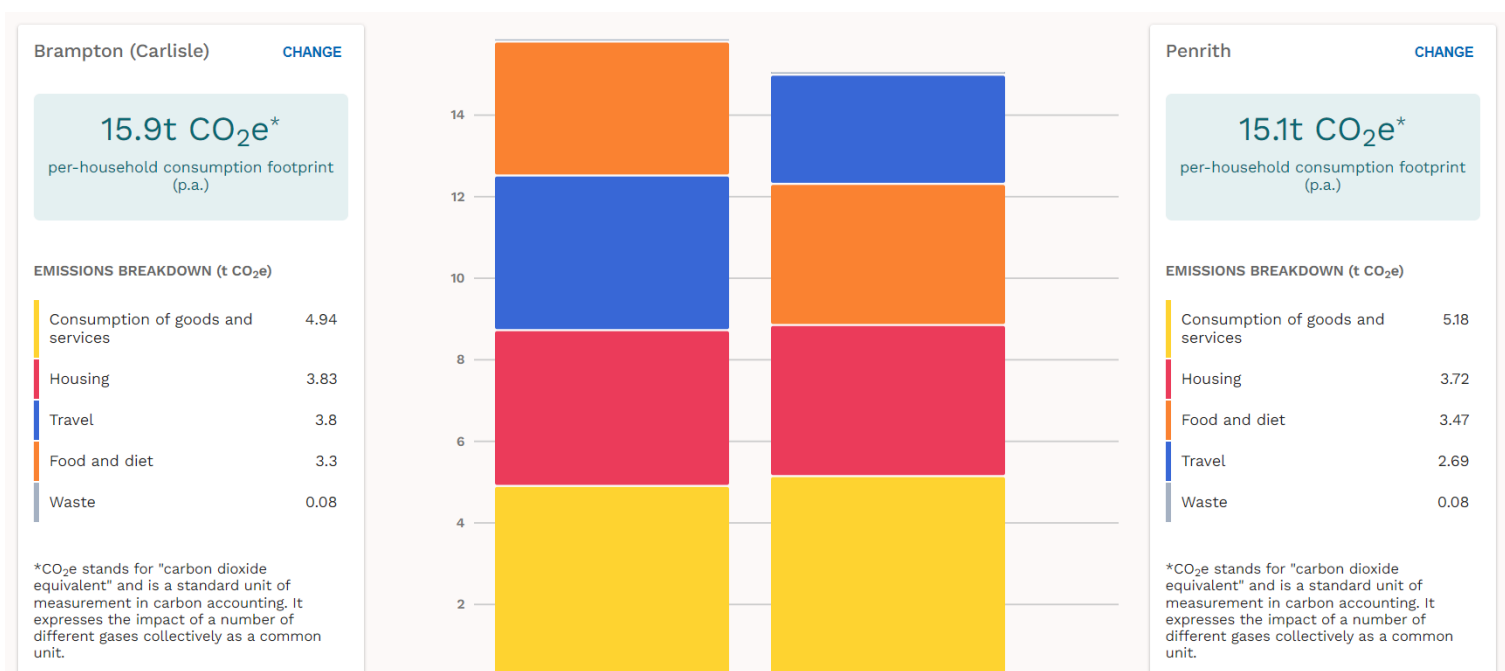
The carbon footprint of Brampton is in line with Carlisle and the UK average. Housing and travel are the areas that Brampton produce a relatively high amount of carbon in. Source – Impact. For reference, a return economy class flight to Hong Kong from London produces roughly 3.4t CO<sub>2</sub>e (Lee, 2010)



Travel is higher in Brampton due to services like supermarkets being further away and public transport being less frequent. This highlights the value of reliable public transport. If the demand for bus routes is not there in Brampton then an electric car club could well be the answer.

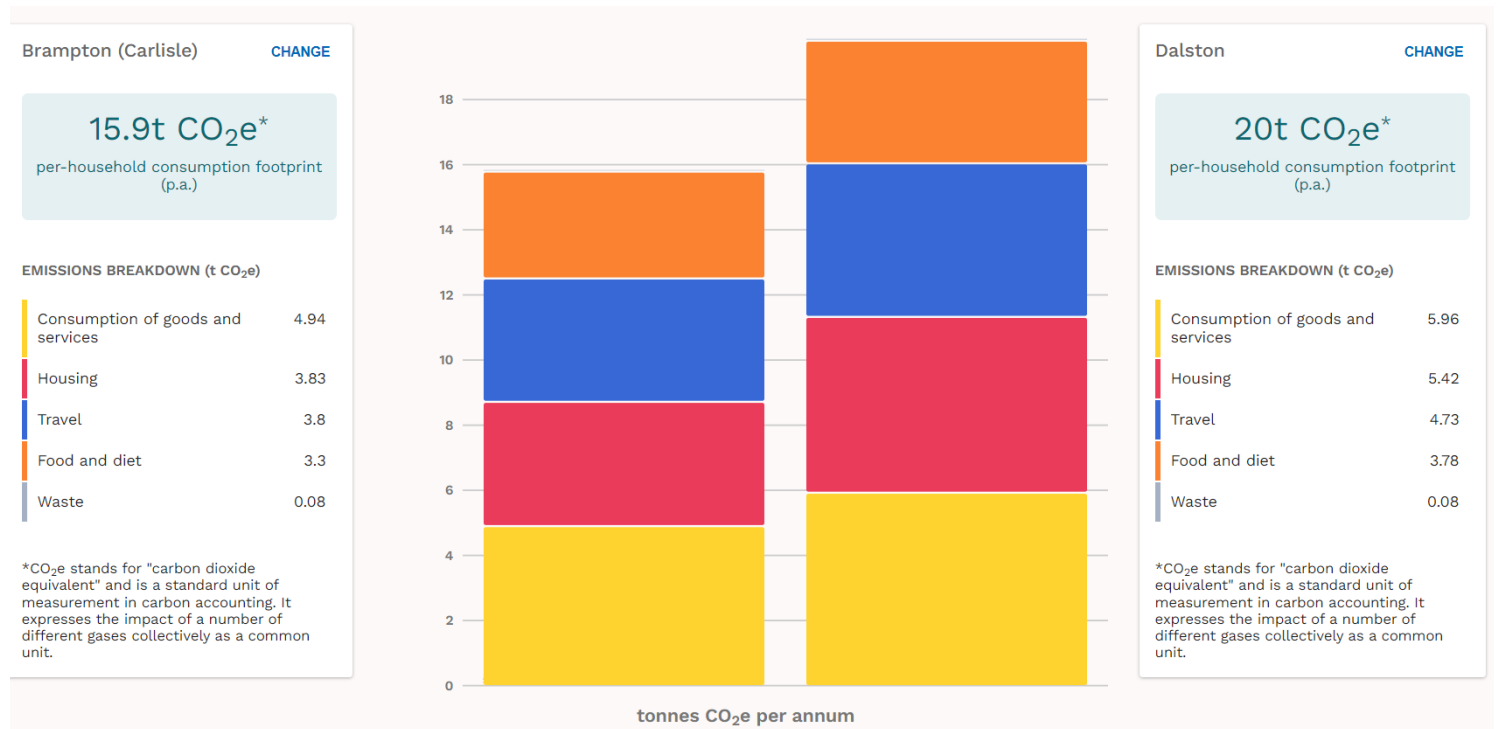
A small part of Brampton's housing stock still uses oil central heating which is a less efficient and dirtier fuel than gas (English Housing Conditions Survey). Furthermore, older houses with solid walls can be harder to insulate which means more energy is put into heating the house (Energy Performance Certificate (EPC) data). Working with homeowners, housing associations, and the council to improve insulation and move away from oil central heating would significantly reduce the impact of the housing sector on climate change.

### 3.3. Comparing an average Brampton household to a Penrith household



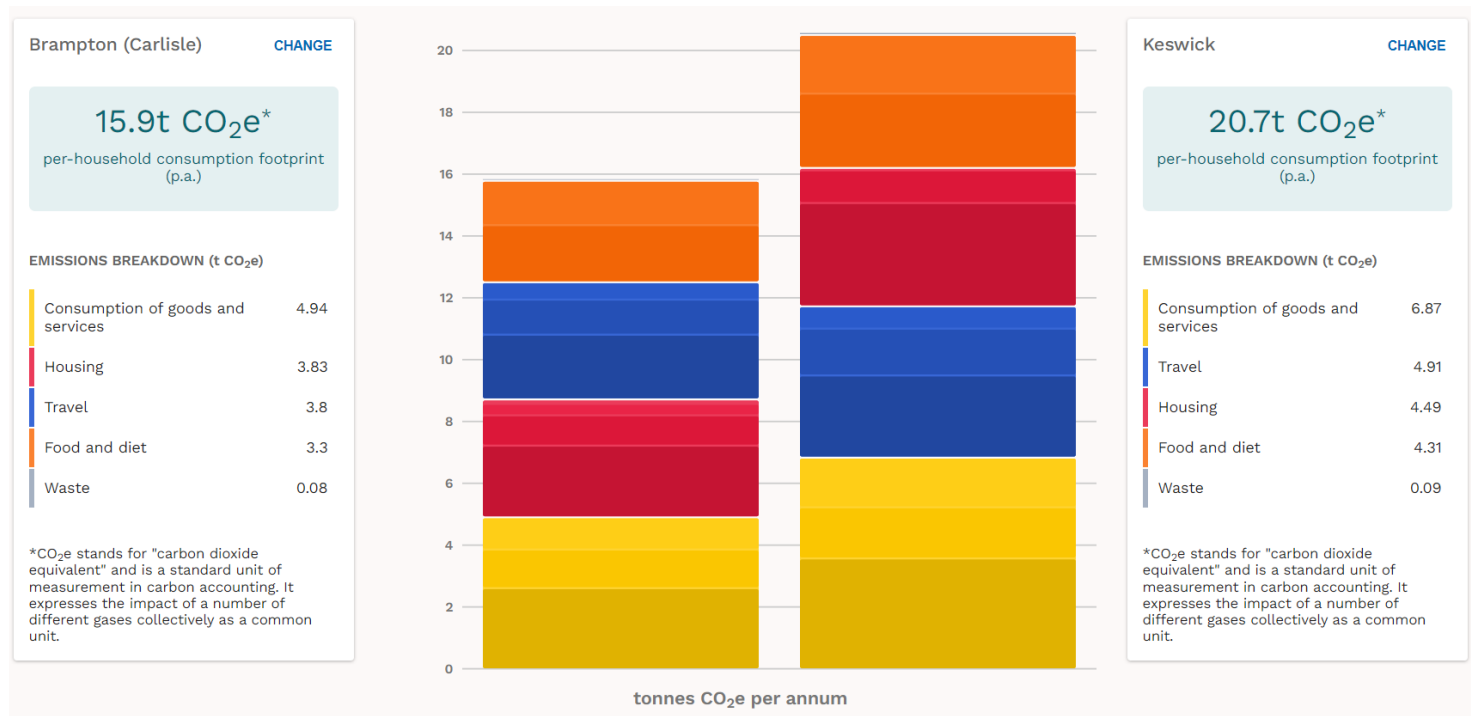
Shows the breakdown of Brampton's household footprint compared to Penrith's. Penrith overall has a lower footprint than Brampton. Penrith is further from Carlisle, or any city, yet the emissions per household for travel is 29% less than Brampton. This could be because the train station is more central in Penrith. **This shows that travel is a sector that has a lot of potential to be improved upon for Brampton.** Source – Impact online tool.

### 3.4. Comparing an average Brampton household to a Dalston household



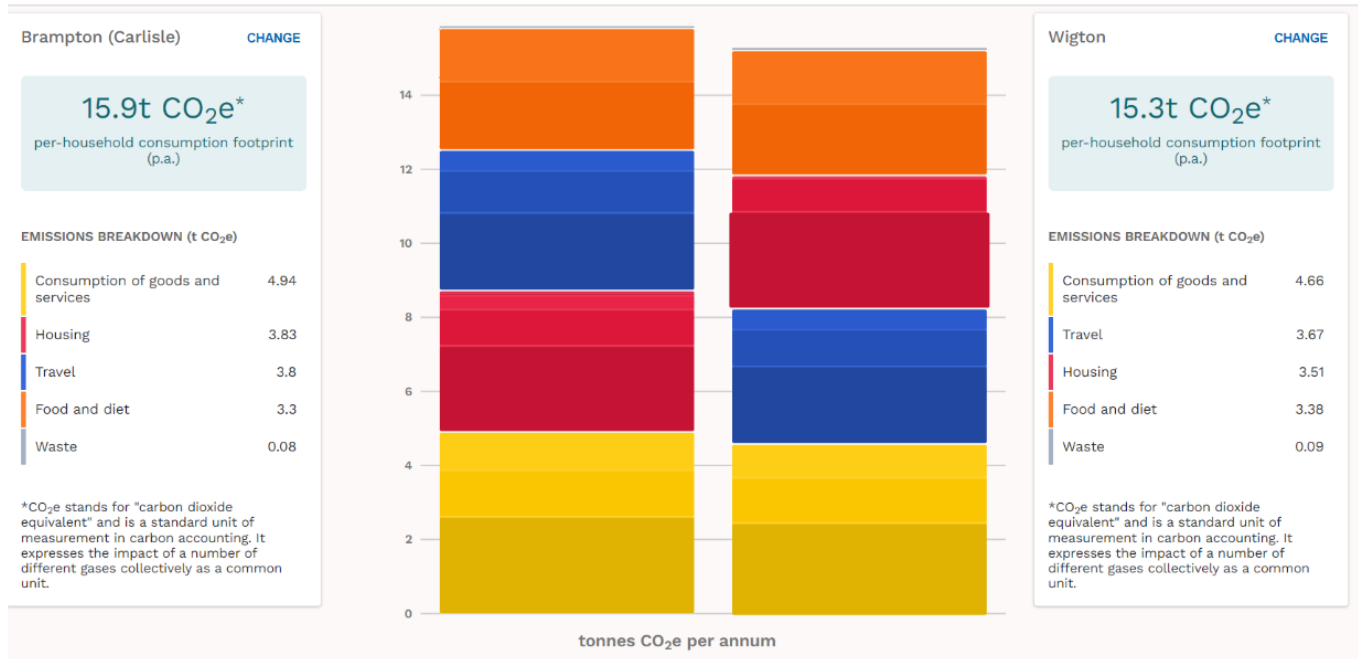
Compared to Dalston, Brampton's emissions look good. They have a similar order of the weight of different categories, but all of which are magnified. Particularly housing and travel. A large portion of Dalston's housing stock use oil boilers for central heating which is causing the disproportionate emissions from this sector (EPC data). **This shows the importance of decarbonising or using cleaner central heating systems.** Consumption is higher in Dalston suggesting it is a more affluent place (Pattison, 2017). This feeds into the size and type of house, wealthier people tend to have bigger and detached houses which require more energy to heat. Despite the good rail connection to Carlisle people in Dalston are choosing to travel by car with more people travelling by car than using public transport, often a result of affluence. **Highlights the impact of affluence on carbon footprints.** Source – Impact online tool.

### 3.5 Comparing an average Brampton household to a Keswick household



Shows the breakdown of Brampton's footprint compared to Keswick's. Keswick is a hotspot of the Lake District and receives a lot of tourism. The centre of Keswick is much bigger than Brampton with more shops, which is a product of the tourism. Keswick is a sort after place to live with much more expensive house prices. A lot of the homes are owned by second-home owners that spend the summer in Keswick, and likely indulge themselves (Cumbria Tourism Visitor Survey 2018). The emissions from consumption of goods and services are much higher in Keswick than Brampton which shows the affluence. Furthermore, there is no train station in Keswick which means driving a car is almost essential for residents. Keswick residents are taking more flights as they release 33% more carbon from flights than an average Brampton household, which also highlights the affluence of the people. **This shows the affects that tourism can bring to a town.** If Brampton was to become a more popular tourist destination, measures would need to be made to ensure it is bringing "eco-tourism". Source – Impact online tool.

### 3.6 Comparing an average Brampton household to a Wigton household

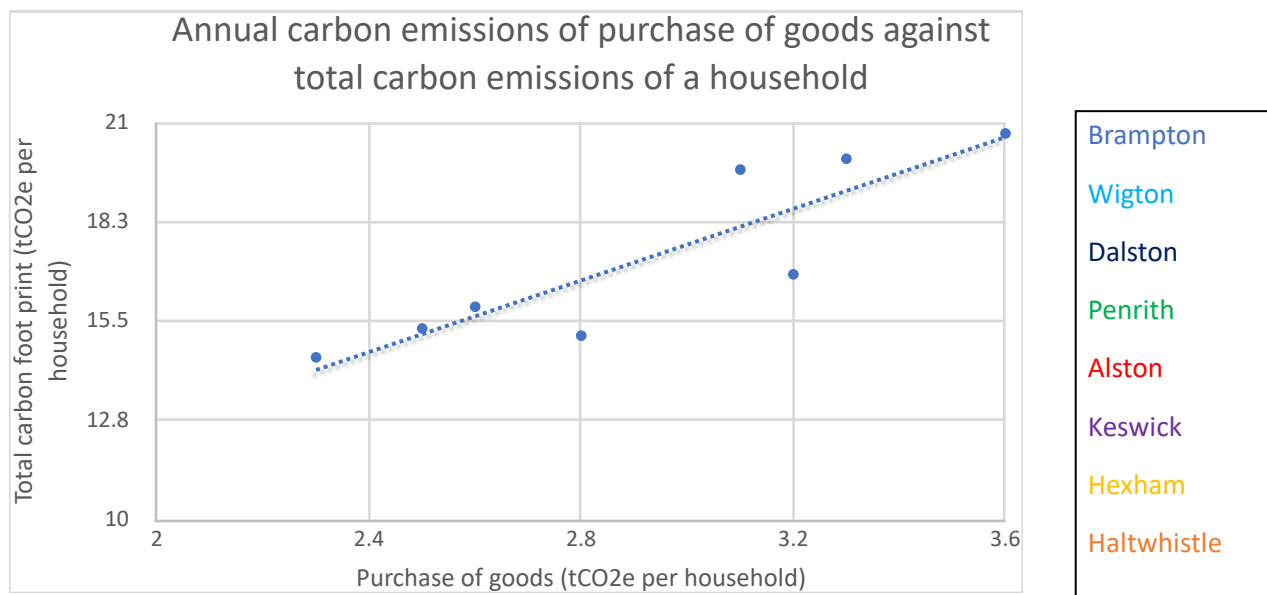


Shows the breakdown of an average Brampton household compared to a Wigton household. The average emissions from a house in Wigton is 9% lower than in Brampton. This could be because there are more new builds in Wigton where they are insulated better. **Brampton houses need to be assessed and more done to improve the current housing stock.** Source – Impact online tool.

### 3.7. Correlation between purchase of goods and total footprint

Assuming “purchase of goods” as a measure of how much spare money a household has, then plotting it against the total footprint of a household shows the affect money has on a carbon footprint. However, affluence is more complex than this. For example, bigger families will have a higher purchase of goods but are not necessarily wealthy (Pattison, 2017).

Furthermore, the data used by Impact for the purchase of goods is based on the Living Costs and Food Survey. This survey collects information on spending habits and the cost of living of a representative set of households. Using social-demographic data from Experian this data is applied to every house based on the type of house, tenure, and who lives there. So assumptions have been made and there will be inaccuracies.



Plotted are the results for towns near Brampton based of Impact’s online tool, table below shows the data. The graph shows a clear correlation between purchase of goods, or spare money, and the total carbon footprint of a household. Brampton is on the trend line which means for its relative affluence Brampton’s footprint is average. Source – Impact online tool.

Civil Parish	Purchase of goods (tCO <sub>2</sub> e)	Total carbon footprint (tCO <sub>2</sub> e)
Brampton	2.6	15.9
Wigton	2.5	15.3
Dalston	3.3	20
Penrith	2.8	15.1
Alston	3.1	19.7
Keswick	3.6	20.7
Hexham	3.2	16.8
Haltwhistle	2.3	14.5



#### **4. Comparing Impact's results to a Carbon Baseline for Cumbria**

In order to confidently use Impact's online tool it is important to compare their estimates to other sources.

A Carbon Baseline for Cumbria provides consumption-based and production-based estimates for local authorities in Cumbria. Brampton falls into Carlisle's district. Small World Consulting Ltd produced this report and it is co-written by Jessica Moss, Mike Berners-Lee, Charlie Freitag and Sarah Donaldson. I am comparing Impact's results for Carlisle to a Baseline's results.

They have chosen slightly different categories which makes the comparison a little trickier. For example, a Baseline for Cumbria uses the subcategory "Food and Drink from shops" and has a category "accommodation and eating out". Whereas Impact breaks "Food and Drink" into "Meat and Fish" and "Other food and drink", and eating out would come under "other consumption related emissions". Using the methodologies for both reports I have made decisions on which categories are comparable.

Furthermore, Impact reports on the total and the per household carbon footprint. A Baseline reports on the per person footprint. Further calculations are required to calculate Impact's per person values. I take the population of Carlisle to be 107,500 (2011 Census data)

##### **4.1. An overview of a Carbon Baseline for Cumbria**

The aim of the report is to help the county's policy makers address the climate emergency and outlines some targets and recommendations. The report looks at the footprint of Cumbria 3 ways: extraction, production, and consumption.

Extraction-based footprint accounts for the emissions produced from a fossil fuel mining or extraction that take place in Cumbria. There are currently no active sites in Cumbria however there is a proposed coal mine near Whitehaven that would produce 8.4Mt CO<sub>2</sub>e per year.

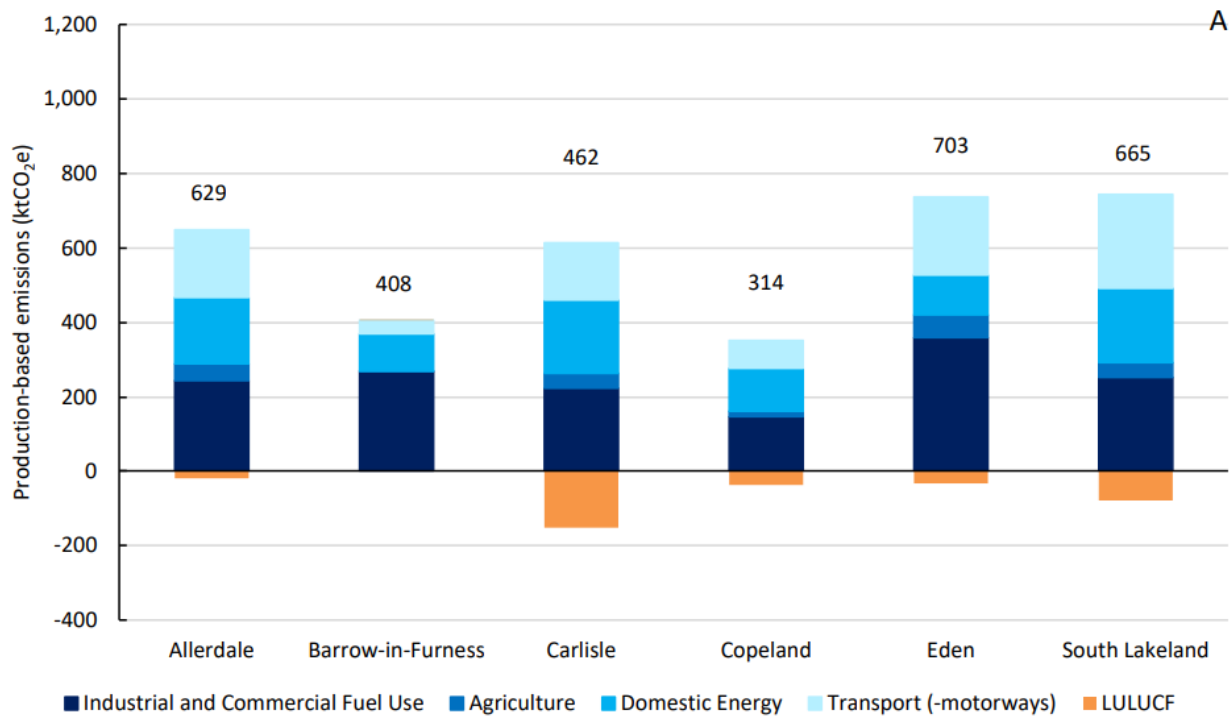
Production-based is the same as Impact's "territorial-based" footprint. It accounts for all carbon emissions produced within a boundary but does not include indirect emissions from the supply chains.

Consumption-based footprint accounts for everything a resident does and buys, and all the indirect carbon emissions associated with these things. For example, driving a car would include emissions from the manufacture of the car as well as the fuel burned when driving it.

##### **4.2. A Carbon Baseline for Cumbria consumption-based results by local authorities**

##### **4.3. A Carbon Baseline for Cumbria territorial-based results by local authorities**

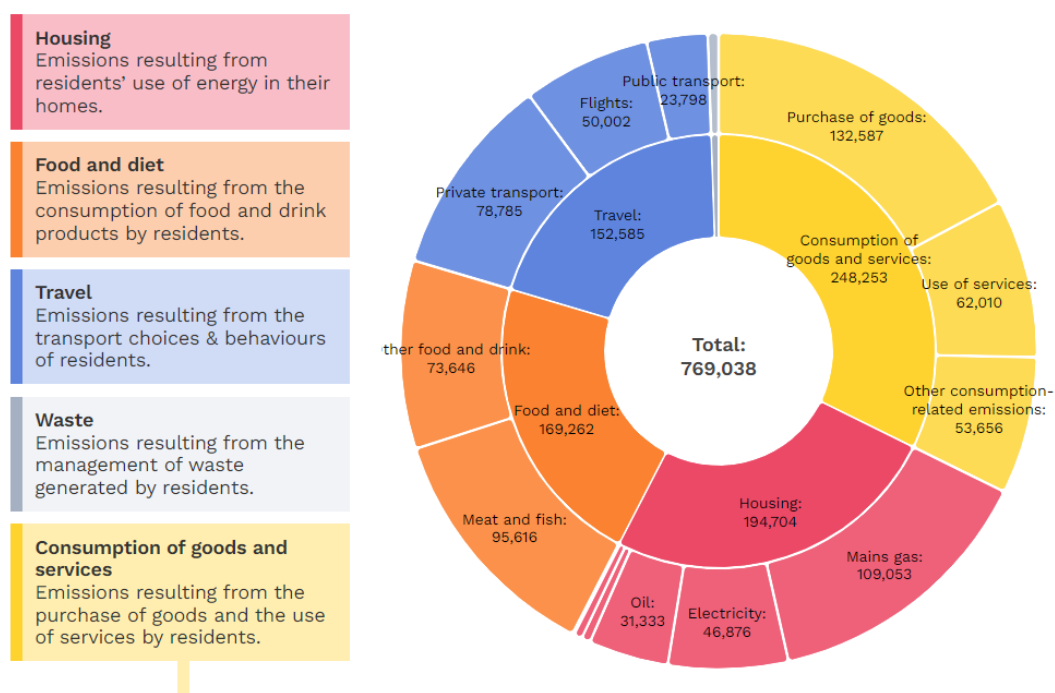
Shows per capita resident emissions broken down by category and local authority. Shows Carlisle's areas of highest CO <sub>2</sub> emissions per person as household fuel (1.45t), vehicle fuel (1.47t), food and drink from shops (1.7t), other non-food shopping (0.9t), and public services/administration (2.2t). Source – a Carbon baseline for Cumbria.
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Shows the total emissions for local authorities in Cumbria on a production basis, broken down by sector. For Carlisle, Industrial and commercial fuel use and domestic housing are the biggest sectors, followed by transport and then Agriculture. Source – a carbon baseline for Cumbria.

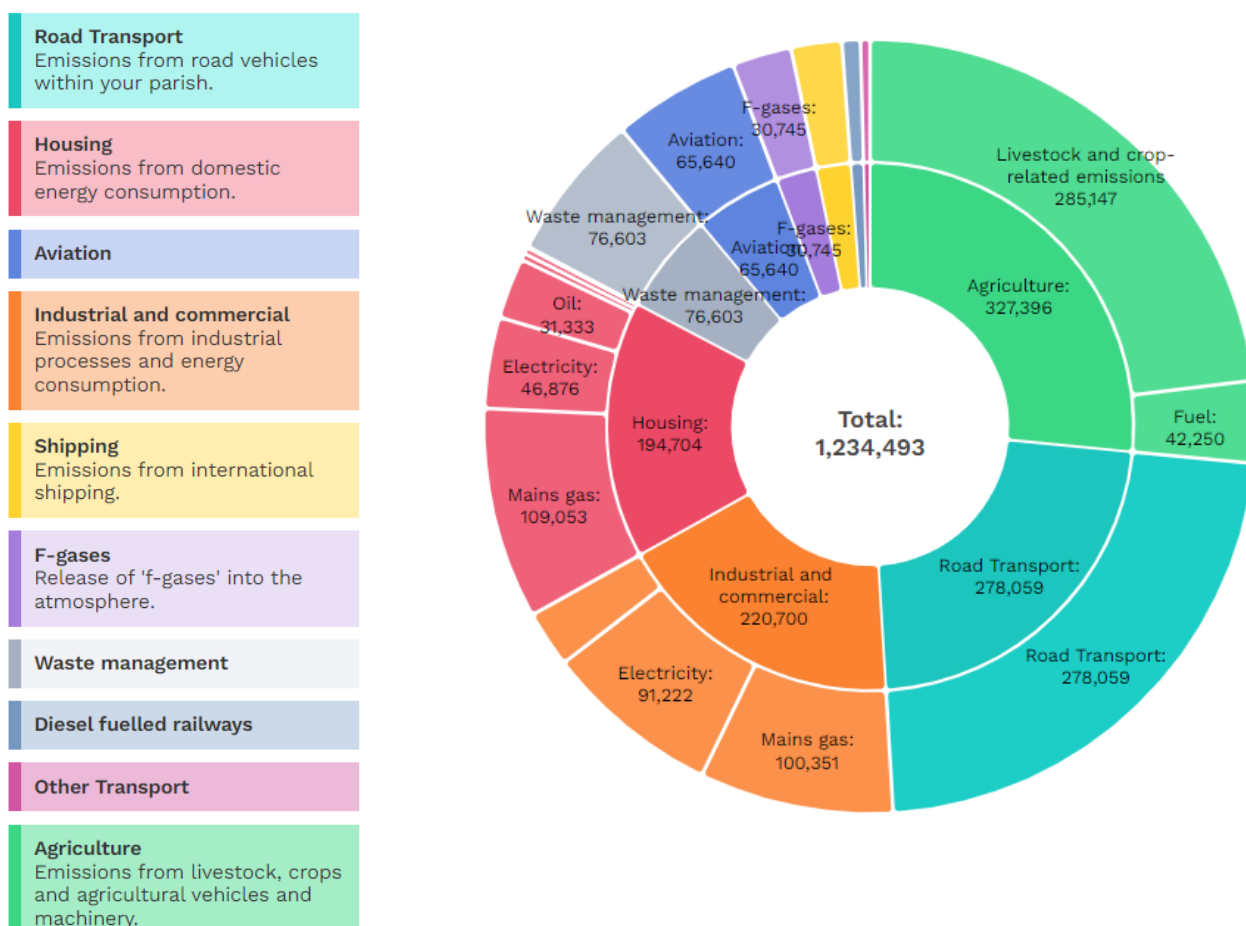
■ Allerdale ■ Barrow-in-Furness ■ Carlisle ■ Copeland ■ Eden ■ South Lakeland

#### 4.4. Impact's consumption-based results for Carlisle



Shows Impact's estimate for total emissions for the **Carlisle district**, broken down by category. Carlisle's largest contributors as purchase of goods, private transport, meat and fish, other food and drink, and mains gas. Source – Impact online tool.

#### 4.5. Impact's territorial-based results for Carlisle



#### 4.6. Comparison of consumption-based data

##### 4.6.1. Food and Diet

From my understanding the Impact category “Food and Diet” is most comparable to the Baseline category “Food and drink from shops”.

A Baseline for Cumbria estimate **1.7t CO<sub>2</sub>e** per person.

I calculated what Impact's per person value would be by dividing the total (**169,262t CO<sub>2</sub>e**) by the population of the Carlisle local authority, **107,500 (2011 Census data)**.

$$169,262 / 107,500 = 1.5t \text{ CO}_2\text{e per person}$$

The value of **1.5t CO<sub>2</sub>e** per person is in line with a Baseline's report figure of **1.7t CO<sub>2</sub>e** per person.

##### 4.6.2. Household Fuel

A Baseline uses the category “household fuel” to include all fuel types that are used to heat a house and heat water. Impact splits household fuel into “main gas”, “oil”, “LPG”, and “coal”.

A Baseline for Cumbria estimate household fuel to be **1.45t CO<sub>2</sub>e** per person

Shows territorial-based emissions for the **Carlisle local authority**. Estimates Carlisle's largest emission sectors as Agriculture, road transport, industrial and commercial fuel use, and housing. Source Impact online tool.

To calculate the Impact household fuel person, deduct the carbon emissions from “electricity” from the total for “housing”, and then divide by the population of Carlisle (**107,500**)

$$194,704 - 46,876 = 147,828$$

$$147,828/107500 = 1.37t \text{ CO}_2e \text{ per person}$$

**1.37t CO<sub>2</sub>e** per person is very close to a Baseline report of **1.45t CO<sub>2</sub>e** per person for household fuel.

#### 4.6.3. Private Transport

**Impact** estimates total emissions of **78,785t CO<sub>2</sub>e** for private transport. This includes the emissions released during the manufacture of a car and when the car is being driven. That makes the Per-person footprint:

$$78,785/107,500 = 0.73t \text{ CO}_2e \text{ per person}$$

**A Baseline** separates private transport into “vehicle fuel” and “cars”, making the total for private transport:

$$1.47 + 0.48 = 1.95t \text{ CO}_2e \text{ per person}$$

**0.73t CO<sub>2</sub>e** per person is a significantly lower figure than **1.95t CO<sub>2</sub>e** per person. I believe this is due to the inclusion of tourism in the Baseline figure.

Both reports use publicly available data from the office of national statistics - Road transport energy consumption at regional and local authority level (2017). A Baseline for Cumbria also use the STEAM report (Cumbria, 2018). Impact use Experian data and the National Travel Survey (2002 -2019).

A Baseline reckons the average Cambrian resident drives around 20% more than the UK average.

#### 4.6.4. Purchase of Goods

Impact estimates across the Carlisle district that the purchase of goods contributes to a total of **132,587t CO<sub>2</sub>e**. To calculate the footprint per-person:

$$132,587/107,500 = 1.23t \text{ CO}_2e \text{ per person}$$

A Carbon Baseline’s most comparable category is “other non-food shopping”. Calculations give an estimate of the footprint of goods to be **0.9t CO<sub>2</sub>e** per-person.

Impact’s estimate of **1.23t CO<sub>2</sub>e** per person is relatively similar to **0.9t CO<sub>2</sub>e** per-person. Perhaps Impact’s results are slightly higher because of what they included in this category?

#### 4.7. Table of results

	A Carbon Baseline for Cumbria (tonnes CO <sub>2</sub> e)	Impact (tonnes CO <sub>2</sub> e)
Food and Diet	1.7	1.5
Household Fuel	1.45	1.37
Private Transport	1.95	0.73
Purchase of Goods	0.9	1.23

Table shows a summary of the per person consumption-based footprints a Carbon Baseline for Cumbria and Impact reports for the **Carlisle**. Generally, Impact seems to be under estimating, particularly in private transport. A Baseline includes visitors consumption and this explains why most of the values are higher, especially private travel as visitors tend to drive more. Purchase of goods higher in Impact perhaps because they use a different dataset for emissions factors.

## **5. Sustainable Brampton's 2011 household survey**

### **5.1. Overview of Sustainable Brampton's survey**

The survey was based around the online carbon calculator developed by the University of Chester for the Ashton Heyes community. It asked questions about household size, type of housing, energy in the home, transport, waste recycling and where they source food. This excludes the carbon emissions from buying goods and using public services and how much and what type of food people eat.

Volunteers administered the survey by interviewing a household member. 166 households completed the survey, representing 2.79% of the total 5958 households in Brampton.

A sample of every 20<sup>th</sup> house was selected. 111 households didn't take part for various reasons.

### **5.2. Things of note**

- 34% of houses with lofts have less than eight inches of loft insulation
- 58% of houses do not have full wall insulation
- 18% of houses have incomplete double-glazing
- 84% of households depend primarily on fossil fuels for their heating
- 65% never use a bus
- 47% of households have more than one vehicle
- 30% of vehicles travel more than 10,000 miles annually
- 79% of commuters travel to work by car
- 38% of household made at least 1 short haul flight in the past year
- Roughly 90% of households recycle all their glass, tins, paper and hard plastic
- 89% of households source at least some of their food from Brampton shops, but only 25% much or most of it

### **5.3. Sustainable Brampton Results**

The results from the survey found that the per person footprint of a Brampton resident in **2011** was 3.66t CO<sub>2</sub>e for an urban resident and 4.22t CO<sub>2</sub>e for a rural resident. The average for Brampton was **4t CO<sub>2</sub>e** per person per year.

### **5.4. What this tells us about the housing stock of Brampton**

There is more understanding of carbon auditing now and so estimations of goods and services are becoming more accurate. In 2011 the per person carbon footprint was higher than it is today as people are becoming more environmentally aware, according to UK carbon footprint statistics UK's emissions have fallen by 30% since 2004. Due to leaving out greenhouse gas emissions from consumption the estimation of 4t CO<sub>2</sub>e per person is likely an underestimate. It is therefore hard to compare Impact's result of **7.4t CO<sub>2</sub>e per person per year** to Sustainable Brampton's result of **4t CO<sub>2</sub>e per person per year**.

The Sustainable Brampton survey gives a good indicator of the problems in housing in Brampton. Around 30% of heat is lost through the fabric of a house that isn't properly insulated. 54% of houses have less than the recommended wall insulation and 34% have less than the recommended amount of loft insulation. These homes will therefore have to use more energy to get the level of warmth needed to be comfortable. The housing stock of Brampton has a bigger proportion of pre 1920's housing than most cities. The solid walls and different design of these houses does make them harder to insulate. There are ways around this such as external insulation, draught excluders, double glazing and floor insulation but this can be expensive. More government schemes and bursaries would solve this issue. Reducing energy bills not only mitigates the climate crisis but also alleviates some fuel poverty.

Impact show that the housing stock and travel both contributes 24% of emissions, so nearly half of the total. A significant amount which marries up with sustainable Brampton. And shows us the areas we need to focus on.

## **6. What this means for Brampton**

### **6.1. Areas to improve**

#### **6.1.1. Travel**

Travel is often a high contributor for rural communities as there is more reliance on private travel (13% of a Brampton's resident's footprint). There are good bus links from Brampton to Carlisle but the links from Brampton to the surrounding villages are not so frequent if they even exist. In order to reduce the carbon emissions of those making these short journeys there are a couple of options. Promoting cycling as a valid means of transport with many benefits to the person, and working with drivers to make it safe. For those unable to cycle establishing a similar village bus service to the Fellrunner for Penrith would serve them.

To reduce the number of cars per household a shared fleet of electric cars could serve Brampton and reduce the footprint. The manufacture of a car creates as much carbon pollution as driving it so decreasing the number of cars could have a big impact. Furthermore, electric cars use less fossil fuels than petrol or diesel cars, and so the emissions caused by the journey would be lower too. The Scottish social enterprise consultants Scene are collaborating with Brampton 2 Zero to undertake a feasibility study for Brampton.

Private flights make up 7% of a Brampton's resident's emissions. Unfortunately, flights are the quickest and cheapest option for holidays. Resident's should consider how many flights they take a year. There needs to be more incentives from the government to make trains the cheaper and more viable option to internal flights. B2Z have ideas to offer a service to offset the emissions of personal flights.

#### **6.1.2. Housing**

According to Impact the average emissions from a house in Wigton is 9% lower than in Brampton, and in Alston 56% higher. The condition of housing can clearly have a big effect.

New builds should be held to high energy certificate standards and idealistically model the German Passive house, i.e. fitted with solar panels and heat pumps.

B2Z have goals to put in place a retrofit scheme for the current housing stock of Brampton. Retrofit means to firstly improve the insulation of homes and secondarily implement renewable energy sources. This would rely on grants and fundraising, and private funding for those that can afford it. The aim would be work with local contractors and trainees to retrofit the first 10 for free and use these homes as show homes. In the long term B2Z would work with homeowners and housing associations to make retrofitting more accessible and easier. Not only would this bring Brampton closer to net zero but also reduce gas and electricity bills, relieving some homes from fuel poverty.

Another option for reducing bills and the carbon footprint of Brampton is a community energy project. Scene are working on the feasibility of a solar cooperative in Brampton and have found a

number of buildings such as Brampton Primary School, WCF headquarters, and William Howard School amongst others all have high potential for solar generation and sufficient demand. The idea would be that instead of feeding electricity into the grid it would be sold directly to the businesses. There are a number of domestic houses with south facing roofs that would also be suitable for pv solar panels.

### 6.1.3. Agriculture

Farming is a necessity of life and part of the heritage of an area. The land around Brampton is tough and predominately dairy, cattle, and sheep are farmed. Moving away from conventional practices will be hard. Having spoken to some of the farmers they are largely driven by financial motives. For example, moving away from dairy as feeding the cows becomes too expensive, or using organic fertilizer instead of chemical as prices rise. Improving the biodiversity of the land improves the soil health. Looking after soil is crucial for it to be arable in the future and preserving the carbon sink. Many of the farmers are in the government's stewardship scheme and awaiting the announcement of future plans. Stewardship schemes allow farmers and land owners to collect subsidies for using their land to improve the environment.

To learn more about what farmers are currently doing and what practices they are willing to adopt and what issues worry them, B2Z have created a survey. B2Z want to have good relations with the local farm network and create an open and positive space for discussions around the impact agriculture has on the environment, potentially creating a farming cluster. The conclusions to this survey will be reported in the near future.

## 6.2. Conclusion for the carbon footprint of Brampton

Brampton's footprint is average for the UK, and for a rural town it is in a positive position, but this does not mean it is on target for the United Nations Paris agreement of limiting global warming to 1.5 degrees Celsius.

Carbon auditing is a world of estimates and the science is constantly being updated. A figure of **15.9t CO<sub>2</sub>e per household per year (7.4t CO<sub>2</sub>e per person per year)** on a consumption basis is perhaps a slight underestimate but using Impact is simple and easy to check. Impact is dedicated to updating the tool annually and developing the tool as technology improves.

The goal of net zero is a big one but not impossible. The footprint suggests Brampton is ready for change but there must be community engagement with projects to reach the wider community and therefore be successful. Having close ties with schools gives B2Z a strong position within the community. So far B2Z have been involved in school outreach projects and started a forest school. There are also plans for a community orchard where residents can forage foods. B2Z seems to have a good network of volunteers and people that are interested in, but more work needs to be done to reach those that maybe aren't as privileged or don't have the time to make the climate emergency their priority.

Lucy Ingham, Research Officer for B2Z July- September 2022 funded by Cumbria County Council

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