North Somerset Council Climate Emergency

Report on Area Baseline Evidence

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Executive Summary

North Somerset Council declared a Climate Emergency in February 2019 and since then enormous changes have been taking place both within the council and indeed around the world. The emergency declaration came as part of a global movement of increased awareness and demand for action over the causes and effects of climate breakdown.

This report contains a comprehensive assessment of greenhouse gas (GHG) emissions from activities within the North Somerset area – a greenhouse gas inventory. The scope of emissions which this inventory, and therefore the Climate Emergency target covers is defined within this report. This baseline is the first step in road-mapping a transition to Net Zero[1]. It will help us to prioritise actions and inform interim targets for climate action. Using science-based targets is a widely recognised mechanism with which to ensure appropriate pathways to reduce emissions.

This baseline assessment has been built from publicly available data sources on energy consumption, waste disposal and agricultural statistics. It builds a picture of emissions resulting directly from activity within our district, as well as those associated with grid supplied electricity and extraction and distribution of fuels – which happen outside the area.

As a summary of this inventory, by far the largest sector for North Somerset is Road Transport, with approximately 42% of our emissions – half of which are due to vehicles on the M5. Road transport emissions have also remained relatively static since Local Authority records began in 2005, while emissions in domestic and non-domestic buildings have steadily decreased due to increased energy efficiency and reduced carbon intensity of grid electricity.

[1] Net zero means that total greenhouse gas (GHG) emissions would be equal to or less than the emissions removed from the environment. This can be achieved by a combination of emission reduction and emission removal.

Figure 1 Emissions breakdown for 2018 for North Somerset

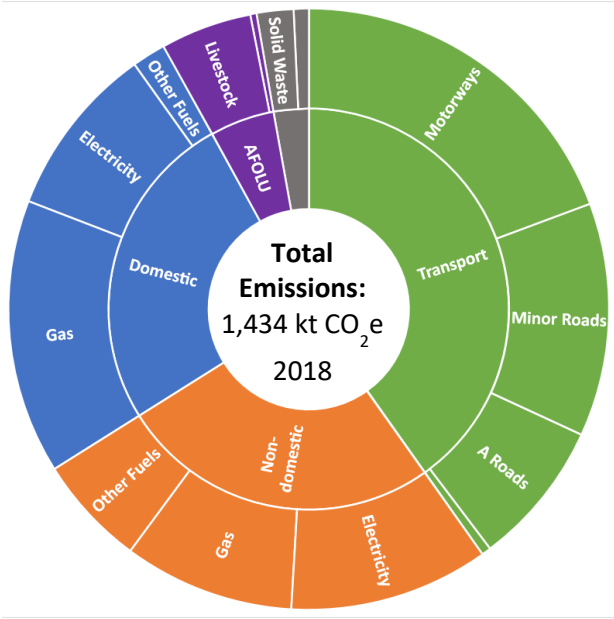


Table 1 Emissions breakdown for 2018 for North Somerset

Emissions Category	Emissions (kt CO2e)	Percentage of Total Emissions
Transport	**607**	**42%**
Motorways	298	21%
A Roads	113	8%
Minor Roads	189	13%
Railways	7	0%
Domestic	**352**	**25%**
Gas	219	15%
Electricity	107	7%
Other Fuels	27	2%
Non-domestic	**357**	**25%**
Gas	146	10%
Electricity	127	9%
Other Fuels	84	6%
AFOLU	**78**	**5%**
Livestock	73	5%
Land use	5	0%
Waste	**40**	**3%**
Solid Waste	28	2%
Wastewater	12	1%
Total	**1,434**	

Introduction

North Somerset Council declared a Climate Emergency in February 2019 and since then enormous changes have been taking place both within the council and indeed around the world. The emergency declaration came as part of a global movement of increased awareness and demand for action over the causes and effects of climate breakdown. At the time of writing, 274 out of 408 District, County, Unitary and Metropolitan Councils in the UK have declared a Climate Emergency.

In May 2019, local elections were held and many new councillors were elected. Four political groups – Independents, Liberal Democrats, Labour and Greens have formed a new partnership administration. This means working together across party boundaries for the benefit of our residents.

The North Somerset Climate Emergency Strategy and Action Plan were published in November 2019. They laid out the seven key principles of our strategy:

- Become a net zero carbon council
- Reduce emissions from transport
- An energy efficient built environment
- Renewable energy generation
- Repair, reuse, reduce and recycle
- Replenish our carbon stores
- Adapting to climate change

These documents are working documents and will grow and adapt as our knowledge of our own impacts on the world improve and as local and national policy enables greater change. An online data dashboard is in development, to be published later in the year.

In February 2020, the Climate Emergency Project Manager was appointed to oversee the strategy and action plan, and a new corporate plan for 2020-2024 was published. The plan lays out a vision of an open, fairer, greener North Somerset and puts acting on the climate emergency declaration at the heart of everything we do.

Since then, the Covid-19 crisis has struck and has drastically changed our daily lives. While we can't call something like this an opportunity, with so many people dying or losing livelihoods; we can listen to the voices across the world asking for a green recovery and we can't ignore this chance to redefine what is seen as normal. We will also need to be mindful of adverse effects on the climate, with potentially fewer people taking public transport or more people spending time at home. For this reason the strategy and action plan – as with many plans which define how we work – will have to adapt on the back of this crisis and hopefully this will give us an opportunity to avert further, more serious crises in the future.

Context

Inventory boundary and area context

The inventory boundary within this report is the local authority of North Somerset. North Somerset is a unitary council in the West of England, bounded by the River Avon in the north, and the Mendip Hills to the south. It covers an area of approximately 145 square miles and has a population of around 215,000 people[2].

North Somerset is strategically placed, close to the major cities of Bristol and Cardiff and with excellent transport links, including Bristol Airport, the M5 motorway, five railway stations on the main line to the south west and the Royal Portbury Dock, which has the largest entrance lock of any UK port. It is also a beautiful area with lovely countryside and 25 miles of coast attracting over 8m visitors a year. A large part of North Somerset is classified as either green belt or an Area of Outstanding Natural Beauty.

North Somerset is classified as 'urban with significant rural' with almost 40% of residents living in rural communities or 'rural hub towns.' The largest settlement is Weston-super-Mare, which with a population of 76,000 is already the third largest settlement in the West of England and with significant expansion planned, is likely to overtake Bath during the next decade. There are three other towns: Portishead, Clevedon and Nailsea and many villages of varied size and character.

Inventory scope

The inventory reports on a calendar year basis from 2005 to 2018 and it includes emission estimates for the three main greenhouse gases – Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O). International reporting also requires estimates of Fluorinated Gases (FGases) which are used mainly for refrigeration, air conditioning, electronics and firefighting. However, at present there is no methodology in the UK for estimating these by area.

All emissions in this document are presented in kt CO_2e. CO_2e is a universal unit of measurement that accounts for the global warming potential (GWP) when measuring and comparing greenhouse gases[3]. For reference, in the UK, on this basis, total emissions are made up of 81% CO_2, 11% CH_4, 5% N_2O and 3% FGases.

Each year, the Department for Business, Energy and Industrial Strategy (BEIS) publishes Local and Regional Carbon Dioxide Emissions Estimates[4] to be used by Local Authorities for tracking progress in reducing emissions. However, it was felt that using only CO_2 in our baseline, we might be missing an important proportion of our emissions – primarily CH_4 from agriculture. So this additional baselining exercise

[2] https://www.nomisweb.co.uk/reports/lmp/la/1946157351/report.aspx
[3] https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities
[4] https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics

was completed to assess how important emissions of CH_4 and N_2O are in North Somerset.

Inventory Methodology

The Global Protocol for Community Scale Greenhouse Gas Emissions Inventories[5] has been used to compile this inventory. Using this protocol ensures that local governments use a standard methodology, enabling measurable emissions reduction goals. In simplest terms, emissions are calculated by multiplying activity data (for example the amount of fuel used) by an emission factors (the amount of carbon in that fuel).

This inventory is based on some core inventory principles:

- Continuous improvement – this is the first time making these estimates for this purpose. If something cannot be included now or cannot be done to a high enough standard due to coronavirus, lack of data etc. then it can be updated in the future. Ideally a baseline will need to be updated to incorporate that improvement in order to be able to observe real change.
- Reporting must be relevant, complete, consistent, transparent and accurate: International (IPCC) guidance states: inventories should contain neither over- nor underestimates so far as can be judged, and in which uncertainties are reduced as far as is practicable. [i.e. things should be as accurate as possible but put most effort into the larger sectors if time and data are limiting factors].

Table 2 gives details of what is included in each inventory sector, the datasets used in calculations and additional information where relevant.

[5] https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

Table 2 Sources included, and datasets used in North Somerset Emissions Inventory

	Sources included	Datasets used	Comments
Stationary energy			
Domestic	Combustion of natural gas, solid and liquid fuels in domestic dwellings. Emissions associated with electricity consumption in domestic dwellings. Combustion of fuels in domestic machinery (lawnmowers).	Activity data: BEIS sub-national energy data [6] Emission factors: BEIS conversion factors[7]	Includes emissions associated with production of fuels
Non-domestic	Combustion of natural gas, solid and liquid fuels in non-domestic buildings. Emissions associated with electricity consumption in non-domestic buildings. Combustion of fuels in off-road machinery: construction vehicles, aircraft support vehicles etc.		Includes emissions associated with production of fuels
Agricultural combustion	Combustion of fuels in agricultural machinery		Includes emissions associated with production of fuels
Transport			
Road transport	Combustion of fuels in road transport vehicles	Activity data: BEIS sub-national energy data Emission factors: BEIS conversion factors	Emissions associated with electric vehicles cannot currently be reported separately - will be included where they are charged.

[6] https://www.gov.uk/government/publications/regional-energy-data-guidance-note
[7] https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting

			Includes emissions associated with production of fuels
Rail transport	Off-road combustion of diesel in rail sector		Includes emissions associated with production of fuels
Waste			
Solid waste disposal	Emissions associated with local authority collected waste sent to landfill	Activity data: Local authority collected waste [8] Emission factors: BEIS conversion factors	Does not include emissions associated with recycled waste, which would be included with industrial emissions where treated - or waste sent for incineration - which is included within the national electricity factor.
Wastewater	Emissions associated with wastewater treatment	Emissions scaled from national data based on population for domestic water and GVA for industrial water.	
Industrial Processes and Product Use (IPPU)	Not included		IPPU refers to emissions from the industrial processes (chemical reactions) rather than the combustion of fuels in industry - which are included in non-domestic above.
Agriculture, Forestry and Land Use (AFOLU)			

[8] https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables

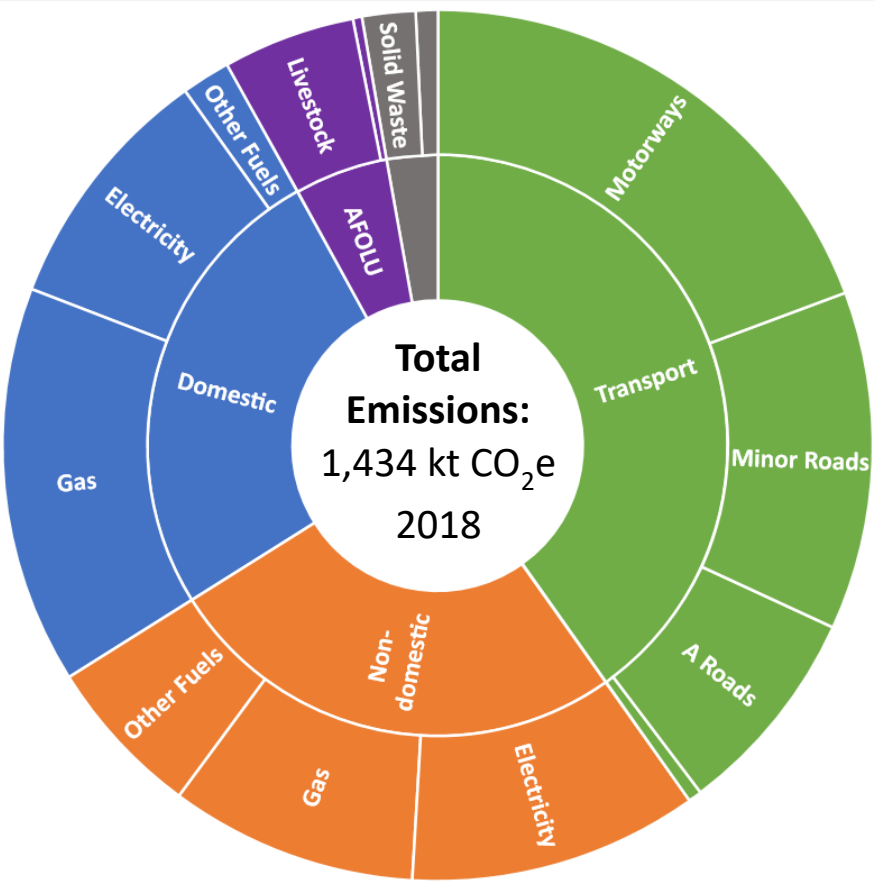
Agriculture	Emissions associated with livestock farming.	National emissions scaled using Local Authority data[9] obtained via SCATTER[10]	
Land Use, Land Use Change and Forestry (LULUCF)	Emissions and removals associated with different types of land use.	Emissions directly used from BEIS	

[9] https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june.
[10] https://scattercities.com/

Emissions in North Somerset

The total area-wide emissions for North Somerset in 2018 were 1,434 kt CO_2e and this figure has decreased by 16% since 2005. The largest single sector is Transport with 607 kt CO_2e (42%) of the emissions, road transport makes up almost the entirely of the Transport sector. The domestic and non-domestic sectors emitted 352 kt CO_2e (25%) and 357 kt CO_2e (25%) respectively. Waste makes up 3% of total emissions and AFOLU 5%.

Figure 2 Total emissions for North Somerset



Not only is transport the largest sector, it also is the sector (other than waste) which has seen no downward trend in emissions. North Somerset's total emissions have on average decreased by 19 kt CO_2e each year, however for transport, on average it has remained static.

Since 2005, emissions from the consumption of electricity have declined by 210 kt CO_2e (47%), this is partly due to the use of more efficient light bulbs and appliance, but overwhelmingly due to the ongoing decarbonisation of the grid. Use of

renewables has increased and our reliance on fossil fuels has decreased – Great Britain has recently gone 2 months without any coal use for electricity production, the first time since industrialisation.

Emissions in the domestic sector have decreased by 162 kt CO_2e (32%) and in the non-domestic sector by 137 kt CO_2e (28%). Emissions from the waste sector have increased over this period although this is partly due to inconsistency in reported data nationally, giving rise to variable emission factors – in future years we hope to produce a more locally specific model for North Somerset's waste emissions. For the AFOLU sector, a decrease in emissions has been a combination of our grassland and forestland becoming a larger carbon sink and a decrease in emissions from cropland and settlements. These emissions are modelled by the Centre for Ecology and Hydrology on behalf of BEIS, so more investigation will be required to understand these fully.

These trends can be observed in Figure 3 below and Table 3 on the following page.

Figure 3 North Somerset Emissions over time

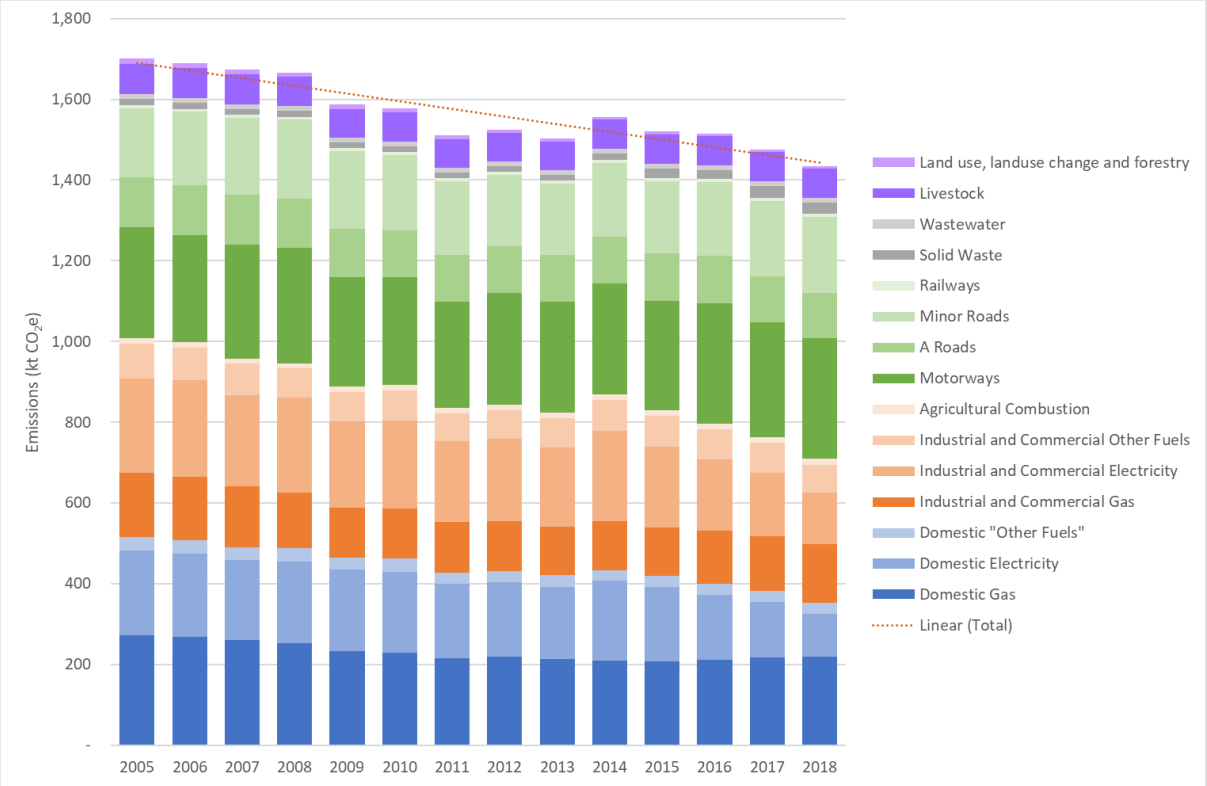


Table 3 Emissions for all years for North Somerset

Emissions: kt CO_2e	2005	2006	2007	2008	2009	2010	2011	2012
Domestic	**515**	**507**	**490**	**487**	**464**	**462**	**427**	**432**
Domestic Gas	272	268	261	253	232	230	215	218
Domestic Electricity	210	207	199	202	202	199	184	185
Domestic "Other Fuels"	32	32	30	32	30	33	28	28
Non-domestic	**494**	**493**	**468**	**459**	**423**	**430**	**408**	**413**
Non-domestic Gas	160	157	151	139	123	124	125	122
Non-domestic Electricity	234	241	226	235	215	218	202	206
Non-domestic Other Fuels	86	80	78	72	72	75	68	71
Agricultural Combustion	15	14	13	13	13	13	13	14
Transport	**576**	**577**	**603**	**610**	**591**	**578**	**569**	**576**
Motorways	274	264	282	286	272	268	263	276
A Roads	124	123	124	122	120	116	116	116
Minor Roads	171	182	190	195	192	187	182	177
Railways	7	7	7	7	7	7	7	8
Waste	**27**	**27**	**27**	**27**	**26**	**26**	**26**	**26**
Solid Waste	15	15	15	15	15	15	15	15
Wastewater	12	12	12	12	11	11	11	11
AFOLU	**89**	**87**	**86**	**83**	**82**	**82**	**80**	**79**
Livestock	76	74	74	72	71	72	71	71
Land use, land use change and forestry	14	13	12	11	11	10	9	8
Total	**1,702**	**1,690**	**1,674**	**1,666**	**1,587**	**1,577**	**1,510**	**1,525**

Continued on the next page

Table 3 continued.

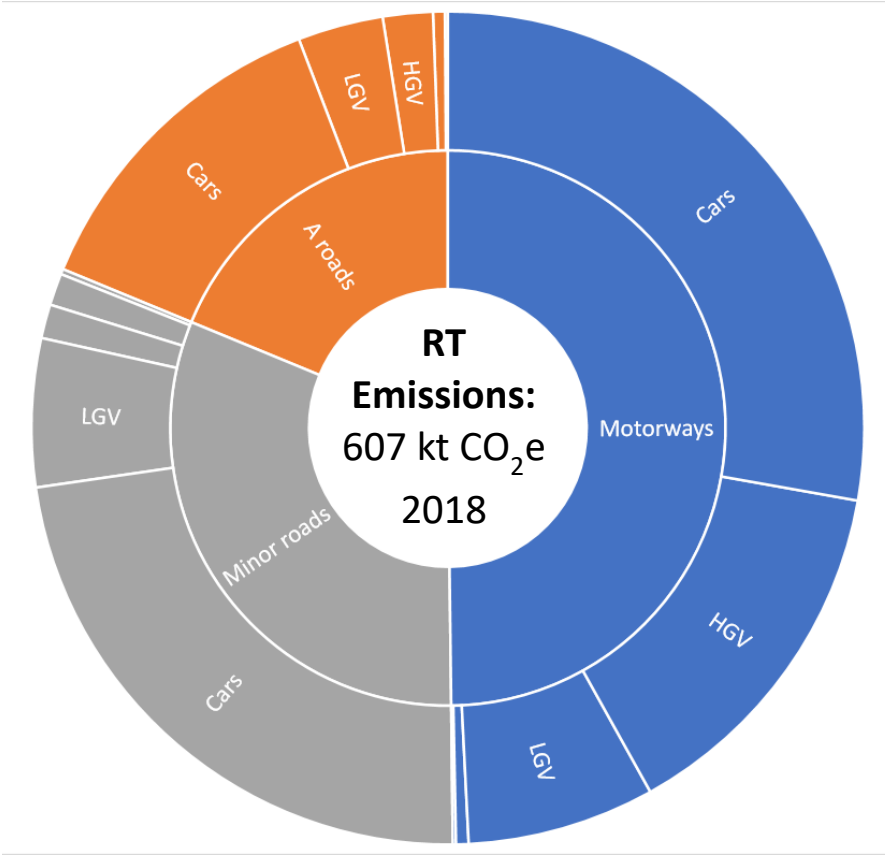
Emissions: kt CO_2e	2013	2014	2015	2016	2017	2018	Change since 2005	
Domestic	**421**	**434**	**419**	**400**	**381**	**352**	**-162**	**-32%**
Domestic Gas	214	208	207	210	218	219	-54	-20%
Domestic Electricity	178	199	185	162	137	107	-103	-49%
Domestic "Other Fuels"	29	27	27	27	27	27	-5	-17%
Non-domestic	**402**	**435**	**411**	**397**	**382**	**357**	**-137**	**-28%**
Non-domestic Gas	119	122	119	130	135	146	-13	-8%
Non-domestic Electricity	197	222	202	178	159	127	-107	-46%
Non-domestic Other Fuels	71	77	75	74	73	69	-16	-19%
Agricultural Combustion	14	14	14	14	14	14	-0	-2%
Transport	**576**	**582**	**576**	**605**	**592**	**607**	**30**	**5%**
Motorways	276	275	271	298	284	298	24	9%
A Roads	115	115	117	118	115	113	-11	-9%
Minor Roads	177	184	180	182	186	189	18	10%
Railways	8	8	8	8	7	7	-0	-6%
Waste	**26**	**27**	**35**	**34**	**41**	**40**	**13**	**48%**
Solid Waste	15	15	23	22	29	28	13	86%
Wastewater	11	12	12	12	12	12	0	1%
AFOLU	**78**	**80**	**80**	**79**	**79**	**78**	**-12**	**-13%**
Livestock	71	73	73	73	73	73	-3	-4%
Land use, land use change and forestry	7	7	6	6	5	5	-9	-65%
Total	**1,503**	**1,557**	**1,520**	**1,516**	**1,475**	**1,434**	**-268**	**-16%**

Transport Emissions

Transport is the most significant single sector in North Somerset, with 42% of emissions, it becomes increasingly important as other sectors have decreased over time due to improved efficiencies and decreasing carbon intensity of the grid. Electric vehicles cannot currently be considered in this sector as emissions are included where charging occurs. In 2018, just 1,100 out of 135,000 registered cars and vans were electric or plug in hybrids[11]. The transport sector also includes 7 kt CO_2e emissions from diesel railways (excluded from chart below).

Figure 4 below shows the split of emissions by road and vehicle type for 2018. It can be seen that almost half of all emissions are due to cars on the M5 – this is a combination of drivers passing through, trips between North Somerset towns and villages and commuting into and out of the area. More difficult to see in this chart is that 64% of emissions are from cars. Since 2009, car ownership in North Somerset has increased by 12%

Figure 4 Split of road transport emissions by road type and vehicle type.



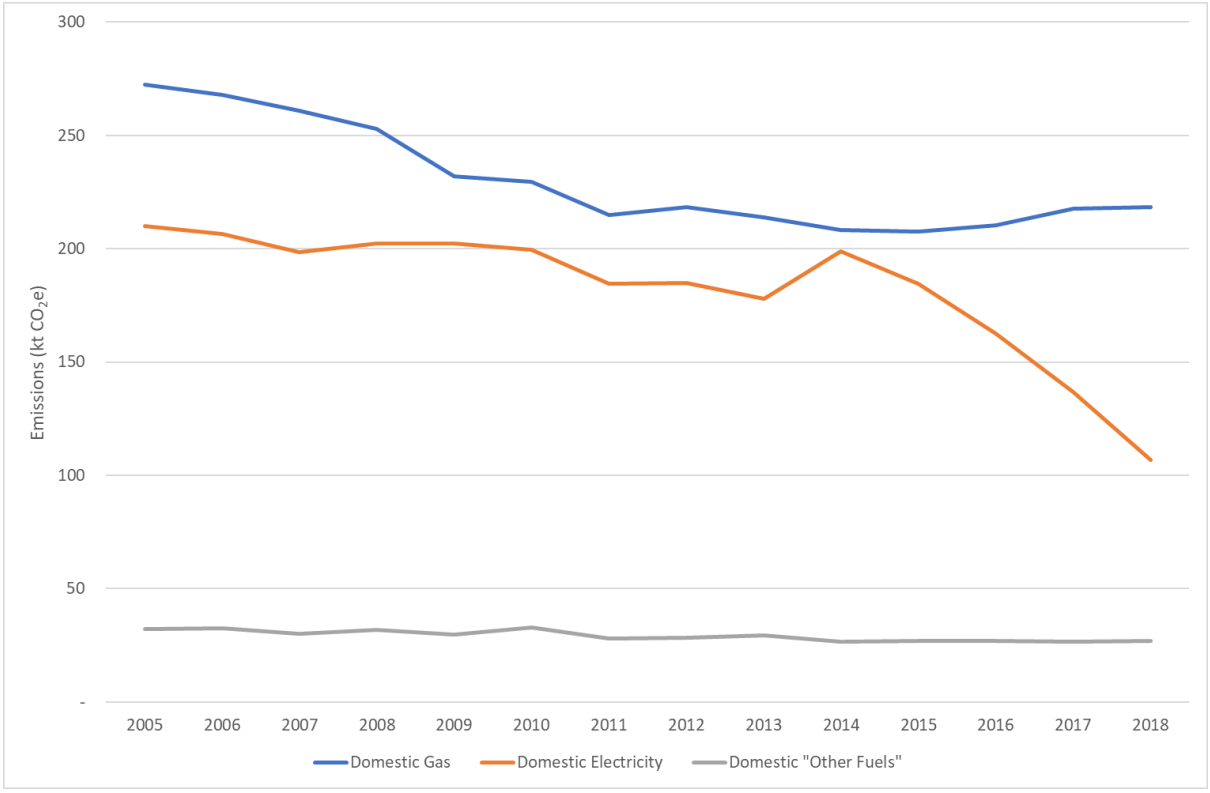
[11] Department for Transport Vehicle Licensing Statistics (2018) https://www.gov.uk/government/statisticaldata-sets/all-vehicles-veh01

Domestic emissions

The domestic sector make up 25% of emissions in North Somerset and have decreased by 32% since 2005, due mainly to lower emissions from consumption of electricity. Figure 5 below shows that emissions from electricity consumption have fallen dramatically in recent years whereas emissions from natural gas use have remained relatively stable since 2011.

There are approximately 96,000 dwellings, 55% of which have an energy performance certificate (EPC) graded as D or lower. The average energy consumption per household is similar to regional and national average (see below), but there is significant variation across the area. Approximately 13% of homes are not connected to the gas grid and there are 7,300 (7.6%) fuel poor households.

Figure 5 Domestic emissions in North Somerset



Non-domestic emissions

The non-domestic sector is made up of combustion and electricity consumption in industrial and commercial buildings and off-road mobile machinery such as construction vehicles, aircraft support vehicles and tractors.

To note, emissions from industrial processes are not currently estimated for North Somerset. These would consist of emissions produced during chemical reactions in industrial processes. If these emissions are occurring, it would be from only a small number of businesses and we aim to work directly with those companies to better understand emissions and potential mitigation methods.

Figure 6 Emissions from the non-domestic sector in North Somerset

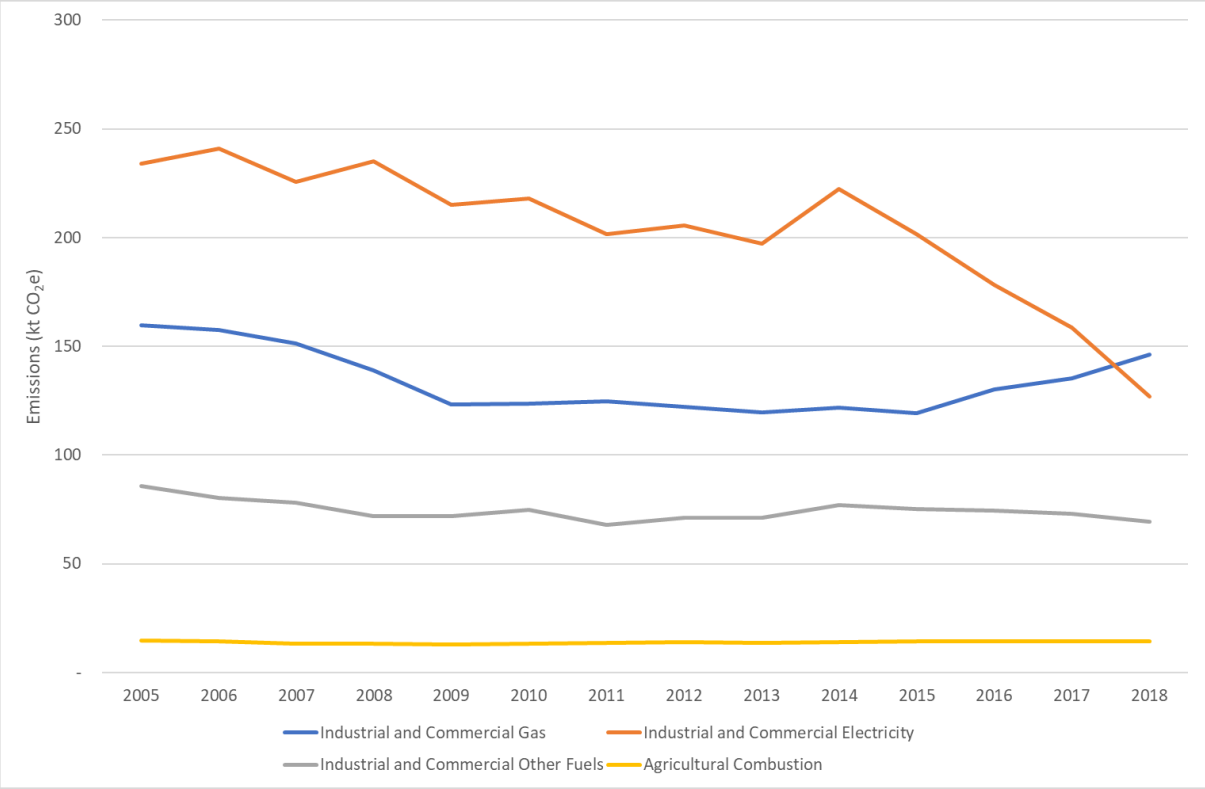


Figure 6 shows that emissions associated with electricity consumption have decreased in line with the decreasing carbon intensity of the grid. Emissions from non-domestic electricity consumption fell by 107 kt CO_2e (46%). The carbon factor for electricity reduced from 523 gCO_2e/kWh in 2005 to 307 g CO_2e/kWh in 2018, accounting for 41% of the emissions' reduction[12]. The remaining reduction comes from falling electricity demand, from 448 GWh in 2005 to 413 GWh in 2018 (-8%).

There are approximately 6,400 non-domestic properties in North Somerset

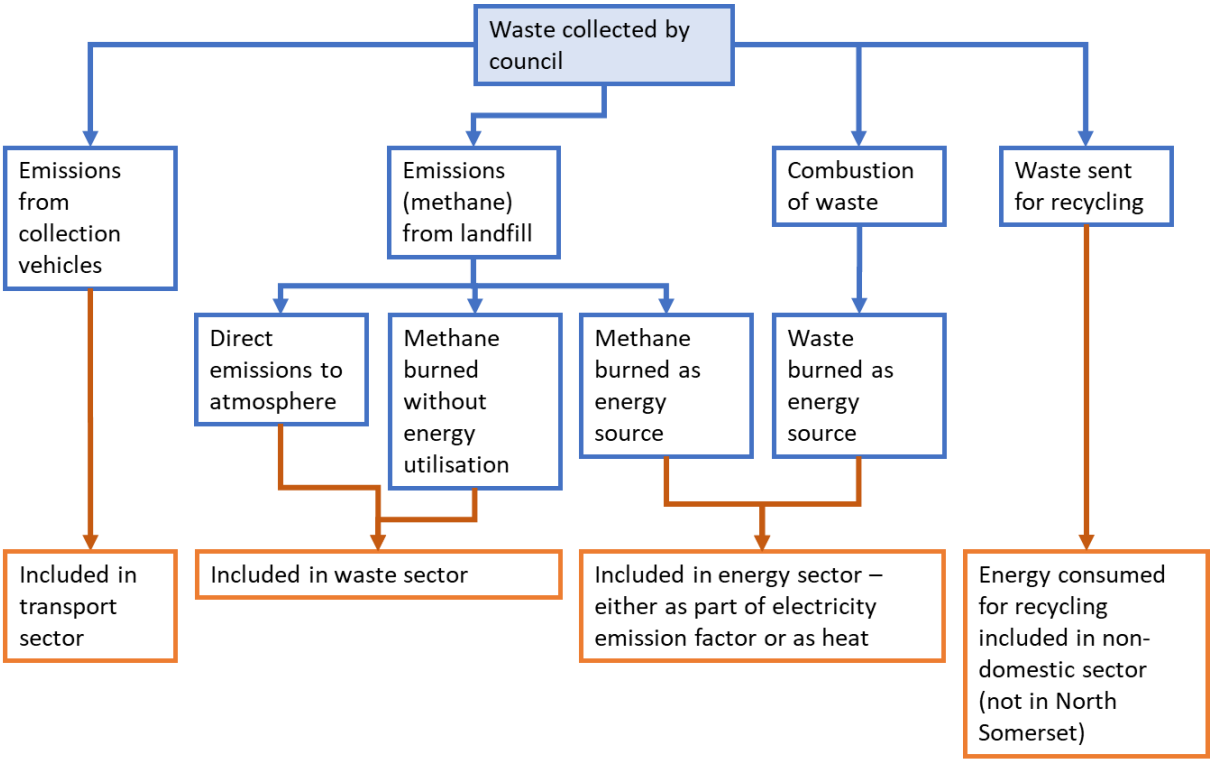
[12] Including emissions from energy generated and transmission and distribution

Waste Emissions

Emissions included in the waste sector are those from council collected waste sent to landfill and wastewater treatment. Both of these are currently based on nationally calculated emissions, rather than locally specific waste treatment. Figure 7 below gives some explanation of how waste emissions are included within an inventory – for example where emissions are produced from combustion of waste and electricity is generated and exported to the grid, those emissions will not be included as waste emissions but within the national electricity carbon intensity factor.

For North Somerset, emissions from waste are relatively small – 40 kt CO_2e (3%) in 2018, the council does have direct control over how much of the waste in the area is disposed of.

Figure 7 Simplified diagram of how waste emissions are included in North Somerset's emissions inventory



Agriculture, Forestry and Other Land Use (AFOLU) Emissions

The AFOLU sector includes emissions from the farming of animals within North Somerset and the emissions – and removals – associated with various types of land use. While emissions in this sector are relatively low and static – 78 kt CO_2e (5%) in 2018, this sector does present us with a small potential opportunity for removals of CO_2 from the atmosphere.

Targets

Action plan

The Climate Emergency Strategy and Action Plan were published in November 2018 and are working documents – to be improved and updated as knowledge increases. Understanding our baseline starting point was a key first step in this action plan. Further work is still to be done to establish interim targets and performance indicators.

Understanding emissions trajectories and carbon budgets

The Tyndall Centre for Climate Change has produced a tool to set carbon budgets for each local authority across the UK[13]. The advisory targets have been set to enable each local authority to make its fair contribution to meeting the objectives of the UN Paris Agreement.

The budgets have been allocated using a “grandfathering” sub-national approach. Which means that emissions are allocated to North Somerset, based on its previous share of UK emissions.

The outline recommendations are:

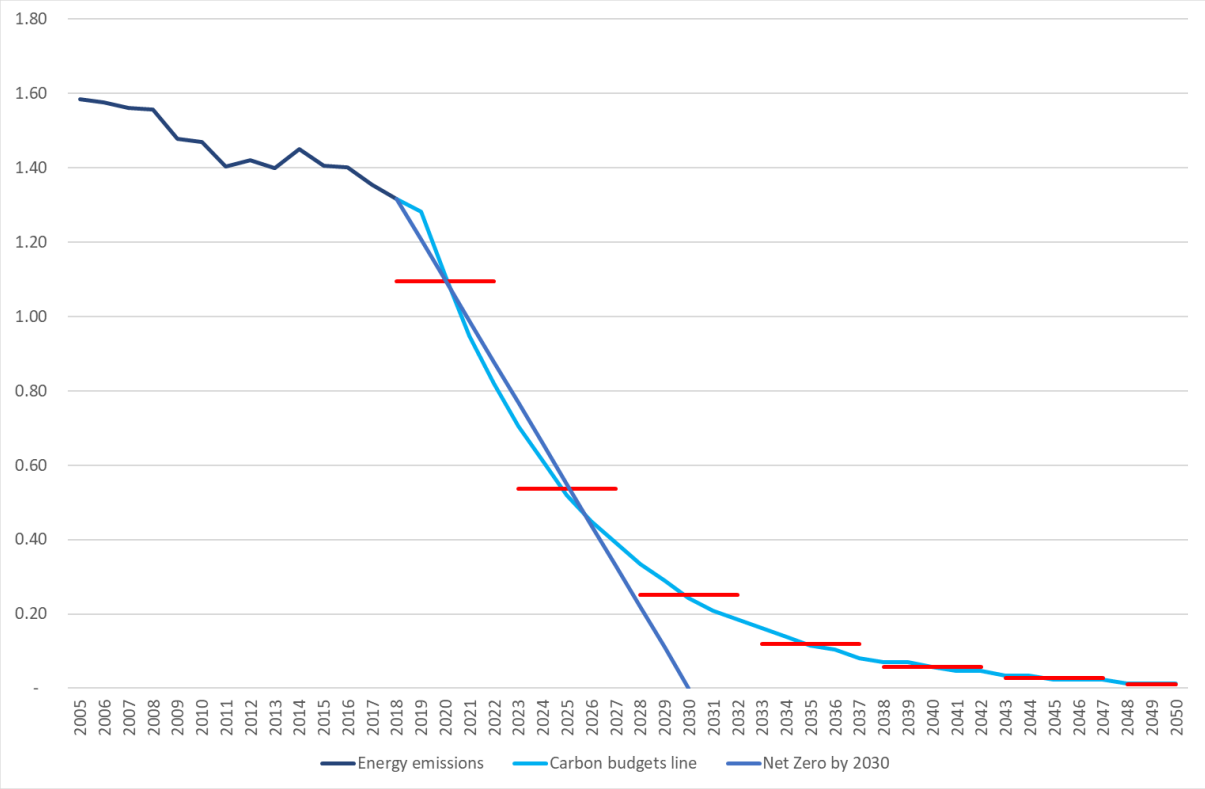
1. Stay within a carbon budget of 6.9 $MtCO_2$ between 2020 to 2100;
2. Initiate an immediate carbon mitigation programme to deliver carbon emissions reductions of -13.9% per year;
3. Reach zero or near zero carbon no later than 2040.

The report also states that at 2017 CO_2 emissions levels, North Somerset would use its entire budget within 6 years from 2020.

This method has been applied to this baseline datasets and compared with a simple and “straight line” reduction in emissions to get to zero carbon by 2030. Reducing in this way would keep North Somerset within the cumulative carbon budget required to be aligned with the Paris Agreement.

[13] https://carbonbudget.manchester.ac.uk/reports/

Figure 8 North Somerset Carbon Budgets and Trajectory to Net Zero



Conclusion

Analysis of the area's greenhouse gas emissions presents a valuable baseline ahead of our journey to 2030. The key findings identify core priorities for mitigation and more detailed strategic evaluation will be undertaken to understand the best approach. Where high-level pathway projections have been estimated, further work is required to understand more detailed targets for our activities.

But we must not wait for results from detailed analysis to act. The action plan is in place and will be used as a working document. As more information becomes available it will aid our understanding enable us to build a more comprehensive plan.

Getting to Net Zero by 2030 will not be simple, it involves transformative change. Since 2005, emissions in North Somerset have decreased by an average of 19 kt CO_2e per year, this needs to increase to approximately 120 kt CO_2e, starting immediately.