Appendix 2

East Sussex County Council's Climate Emergency Plan

February 2020

Contents

Executive summary

In 2018 the UN's Intergovernmental Panel on Climate Change concluded that "rapid, far-reaching, and unprecedented changes in all aspects of society" are required to limit the average global temperature rise to 1.5^{o}C above pre-industrial levels. In June 2019 Parliament legislated for a commitment to net zero greenhouse gas emissions by 2050.

To keep below the 1.5^{o}C increase requires a limit to the total quantity of greenhouse gases released to the atmosphere. This is the global carbon budget, which can be divided into national and sub-national budgets. All emissions above this budget will contribute to exceeding the 1.5^{o}C threshold. Following the methodology used by the UK's Tyndall Centre for Climate Change Research, the total remaining carbon dioxide (CO_2) budget for East Sussex is about 14 million tonnes. At current emission levels this budget will be exceeded in 7 years. To stay within this budget requires cutting emissions from East Sussex by an average of about 13% per year.

There are three separate levels at which the County Council can act to reduce carbon emissions, as illustrated in figure 1 and described below:

1) the County Council has direct control over emissions that are generated as a result of corporate activities, such as the use of gas and electricity in council buildings and business mileage.

2) the County Council has influence over a range of local emissions as a result of its activities and its functions. For example, its role as Highways Authority enables it to influence some emissions from local transport.

3) the County Council has the opportunity to try to influence national policy, for instance by working with partners to lobby for greater ambition at a national level and for more resources to be allocated to a local level to help reduce emissions.

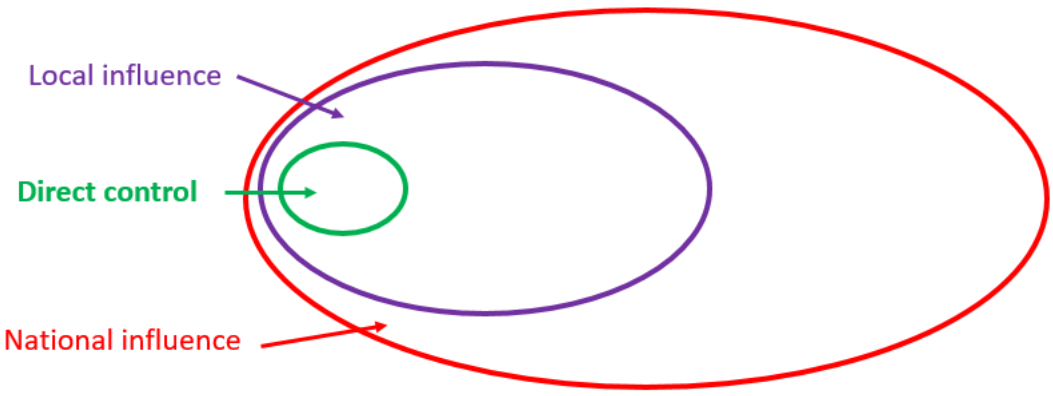


Figure 1. The County Council's spheres of control and influence

In recognition of these different levels of control and influence, the County Council:

1) declared a climate emergency in October 2019 and committed to becoming carbon neutral from its own activities as soon as possible, and by 2050 at the latest.

2) Has been working with partners to develop a county-wide Environment Strategy which includes a commitment to remain within a science-based carbon budget.

This plan covers the County Council's corporate carbon emissions. It sets out the scale of the carbon footprint, describes the carbon budget that the Council will aim to keep within, and proposes an initial 2 year delivery plan for 2020-22.

Using the international Greenhouse Gas Protocol, the Council estimates that it is total emissions in 2018-19 were approximately 73,940 tonnes of CO2e, which is about 3% of total emissions from East Sussex. Significant reductions have been achieved over the last 10 years from the use of gas and electricity, through the national decarbonisation of the electricity grid, a reduction in the size of the corporate estate, and investment of more than £3m in energy efficiency measures that have generated annual savings of £770,000. However, procurement and schools are by far the largest part of the council's CO2e emissions, over which the council has only limited control and influence.

The County Council, in order to play its part in keeping within the remaining carbon budget for East Sussex, will aim to cut its corporate emissions by 13% per year. The previous corporate target was 3% per year, however a 15% reduction was achieved in 2017-18 and 19% in 2018-19.

Simple modelling of the actions that the council can take to reduce its emissions highlights that all possible measures need to be implemented, rapidly and at scale. It is likely that the 13% per year target will become increasingly difficult to achieve over time, once the simpler and more cost-effective measures have been implemented. In addition, in order to become carbon neutral, the Council will need to consider investing in off-setting emissions that it is not able to cut, for instance by investing in a mix of large-scale off-site renewables, land use sequestration and/or carbon removal technologies.

An initial five year carbon reduction target is proposed, with annual milestones, which will enable progress towards net zero to be tracked closely. This is supported by an initial two year action and communications plan with clear outputs and lead officers. The action plan will be reviewed after the first year and adjusted in light of changing legislation, technology and levels of resources available. Progress against the plan will be overseen by a cross departmental senior officer board and reported to Cabinet and County Council every year.

Introduction

The 2018 report by the UN's Intergovernmental Panel on Climate Change (IPCC) states that we are already seeing the consequences of a 1^{o}C of global warming through more extreme weather, rising sea levels and diminishing Artic sea ice, among other changes. It concluded that "rapid, far-reaching, and unprecedented changes in all aspects of society" will be required in order to limit a global temperature rise to 1.5^{o}C above the pre-industrial level. Even half a degree above that will significantly worsen the risks of drought, floods, mass extinctions of animal species, and extreme heat and poverty for hundreds of millions of people.

The predicted impacts of climate change in East Sussex include more frequent and intense flooding, drought and episodes of extreme heat, as well as impacts from the effects of climate change overseas, such as on food supply. This will lead to an increase in heat-related deaths, particularly amongst the elderly, damage to essential infrastructure, increased cost of food, disruption to supply chains and service provision, greater coastal erosion and impact on coastal habitats and wetlands.

In response, many organisations have declared a climate emergency and in June 2019 Parliament legislated for a commitment to net zero greenhouse gas emissions by 2050, with five-yearly carbon budgets to set actions and review progress. Currently, there is no legal requirement for the County Council either to mitigate or adapt to climate change. This is partly because the large scale interventions required to achieve rapid and far-reaching change are mostly driven by international and national financial and regulatory frameworks. Nevertheless, in October 2019 the County Council approved a motion to declare a climate emergency and committed to becoming carbon neutral from its activities as soon as possible and in any event by 2050. This plan sets out an evidence-based road map to identify the key actions and intervention measures required to set the Council on the path to becoming carbon neutral.

Structure of the report

This report follows the steps that are recognised as being needed to deliver a robust and credible carbon management framework. It:

- Explains the terminology used in the report.
- Sets out a science-based rate of carbon reduction that the County Council needs to achieve if it is to contribute to East Sussex remaining within its carbon budget.
- Defines the scope of the County Council's carbon emissions.
- Measures the County Council's current carbon emissions.
- Describes the actions taken to date by the County Council to reduce its emissions.
- Assesses the options to reduce carbon emissions.
- Sets out an action plan for the next 2 years, to work towards the first 5 year carbon reduction target.

- Explains what governance structure, and the monitoring, evaluation and reporting processes, that will be put in place to ensure delivery of the action plan.

Terminology

There are six main greenhouse gases (GHGs) that contribute to global warming. Most of these gases arise from combustion of fossil fuels, and some originate from refrigeration, agriculture, chemical production and electrical applications. Each gas has its own global warming potential over a 100 year period (GWP). Carbon dioxide (CO_2) has the lowest GWP of all the gases, but is by far the most abundant GHG gas, hence the focus on CO_2 when discussing climate change. By comparing each gas's GWP to that of CO2 we are able to derive a CO_2 equivalent value (expressed as 'CO_2e'). For example, CO_2 has a GWP of 1, methane has a GWP of 24, therefore we can say that 1 tonne of methane emissions is equal to 24 tonnes of CO_2 (expressed as '24 tCO_2e'). This enables the total global warming potential of a range of greenhouse gases to be presented as a single figure, which simplifies analysis and reporting. In this report 'carbon' is used interchangeably with 'CO_2e'.

A tonne of CO_2e is calculated by multiplying the amount of energy used, for instance in units of kWhs for gas or electricity or litres of fuel used in a vehicle, by the amount of carbon produced per unit, which is a standardised unit set by government to ensure consistency in reporting over time.

The terms 'carbon neutral' and 'net zero carbon' are sometimes used inter-changeably and sometimes defined in different ways. For the purposes of this report they are considered to be inter-changeable.

Setting a science-based carbon budget for ESCC

The UN Paris Agreement on climate change commits the global community to take action to 'hold the increase in global average temperature to well below 2^{o}C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5^{o}C'. Staying within a given temperature requires that only a certain total quantity of GHGs is released to the atmosphere. This is the global carbon budget, which can be divided into national and sub-national budgets. All emissions above this budget will contribute to exceeding the 1.5^{o}C threshold. Therefore, the objective is for each area to reduce its emissions to net zero before its respective carbon budget is used up.

The global budget can be divided down to national and sub-national levels in a number of different ways, each of which has different strengths and weaknesses. The UK's Tyndall Centre for Climate Change Research has developed a recognised methodology for calculating the carbon budget by local authority area, which helps to ensure that carbon budgets at different administrative levels (e.g. district/borough and county) are comparable and that all areas are contributing to a common UK carbon budget. The methodology makes a number of simplifying assumptions and only covers CO_2 rather than all GHGs.

The Tyndall model indicates the following key points for East Sussex:

1) The total remaining CO_2 budget (i.e. the total amount of CO_2 emissions that can be emitted from East Sussex) is about 14 million tonnes;
2) To stay within this budget requires cutting emissions by an average of about 13% per year.

These figures, based on current scientific understanding, help to specify by how much and how quickly an area needs to reduce CO_2 emissions. The earlier and greater the reduction in emissions the more likely we are to contribute to remaining within the global carbon budget and, conversely, the later and slower the reduction in GHGs the more likely we are to contribute to exceeding the global carbon budget.

The approach adopted by the County Council is that, in order to make its fair contribution to reducing county-wide emissions, it will aim to cut its own emissions by 13% per year. This science-based approach to setting a carbon reduction target has been widely adopted, for instance by companies with a collective market valuation of over $13 trillion.

The scope of greenhouse gas emissions covered

A climate change strategy requires a detailed understanding of an organisation's GHG emissions, as it provides both the evidence to develop targeted interventions and the evidence of progress towards becoming carbon neutral.

The Greenhouse Gas Protocol is the most widely used and accepted global standard for measuring and reporting on an organisation's GHG emissions, and is used by more than 9 out of 10 Fortune 500 companies. The Protocol divides GHG emissions into three categories, referred to as Scope 1, 2 and 3. Together, these represent the total GHG emissions related to an organisation and its activities. Each scope covers the following emissions:

Scope 1 – emissions from the combustion of gas, oil, petrol, diesel, coal, or wood. For the Council this covers buildings and vehicles where the Council is responsible for paying for the fuel.

Scope 2 – emissions from the electricity purchased by the Council.

Scope 3 – emissions that result from all other activities of the Council. There are 15 different scope 3 categories defined in the Protocol, some of which do not apply to a local authority (e.g. emissions from manufactured goods). The categories that do apply include emissions from business travel, water usage, waste, procurement and staff commuting. In other words, the County Council's scope 3 emissions mostly comprise the scope 1 and 2 emissions of other organisations (e.g. contractors).

The corporate standard of the Protocol allows organisations flexibility in choosing which, if any, scope 3 activities to include in the GHG inventory, as long as exclusions are disclosed and justified. This is because it is recognised that organisations only have influence but not control over scope 3 emissions, and emissions from suppliers can be complex to apportion to a particular contract. In addition, the time and cost to collate data that may be of unknown quality would not be warranted.

Measures taken by the Council so far

In 2009-10 ESCC set a target to reduce its carbon emissions by 3% per year, which was in line with the previous national target of an 80% reduction between 1990 and 2050. The Council developed a carbon management plan in 2009, which was updated in 2016. This plan is the next update of the carbon management plan.

ESCC's CO_2e emissions have been reduced by 56% between 2008-9 and 2018-19, as shown in figure 1. This is due to a combination of factors, including national decarbonisation of the electricity grid as coal has been largely replaced by gas and renewables, by investment in a number of measures that have reduced emissions, and by a reduction in the size of the corporate estate (e.g. through the conversion of a number of schools to Academy status).

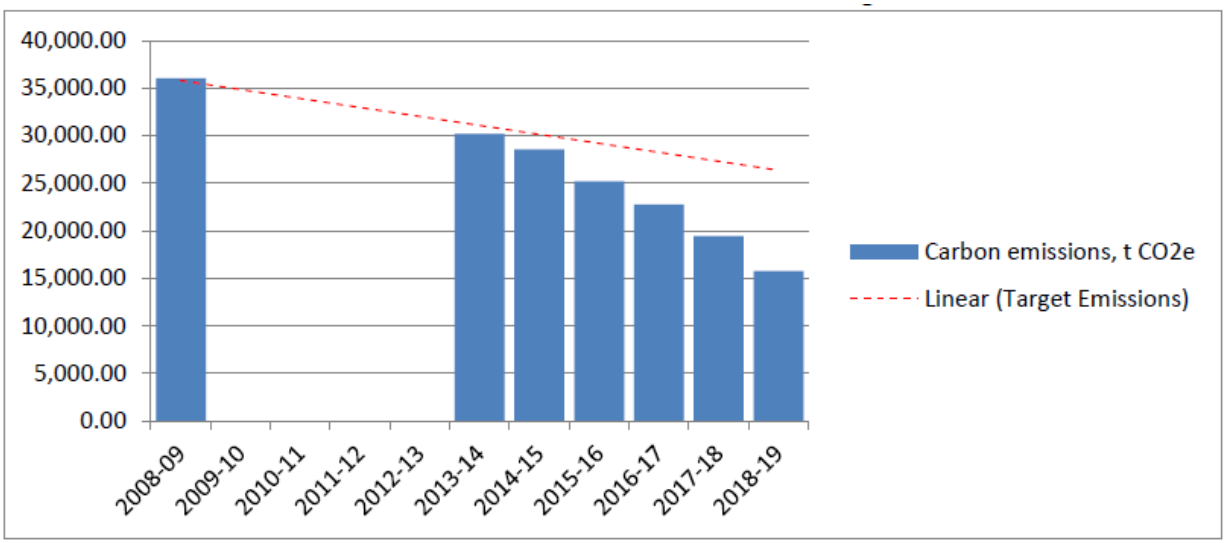


Figure 1. ESCC's CO_2e emissions from 2008-9 to 2018-19.

The main measures that the Council has invested in that have reduced emission are:

1. Changes to the way we work, for example through the Agile and SPACES programmes, which enable a reduction in travel through staff being able to be connected whilst working remotely and enable a more efficient use of the organisation's buildings.

2. Improved and more energy efficient connectivity, for instance through server virtualisation.

3. Encouraging behaviour change, for example by providing the ICT equipment, tools and support to enable Members and staff to work digitally and providing discounted bus travel and season-ticket loans to encourage the use of public transport.

4. Installing a number of energy efficiency measures in ESCC buildings and street lighting through the £1.025m Salix invest-to-save fund. To date, Salix has funded nearly 200 projects worth £3m, generating annual savings of £770,000. Figure 2 summaries the schemes that have been delivered.

5. Installing 1.5MW of renewable energy generation on buildings. This is an underestimate because a number of schools have entered agreements with 3rd parties and so the Council does not have access to the data.

6. Requiring energy efficiency improvements in key contracts, for example including performance indicators for street lighting and business mileage within the current highways contract.

7. Changing our approach to procurement to enable more goods and services to be delivered by local businesses, which reduces the transport impact of our supply chain.

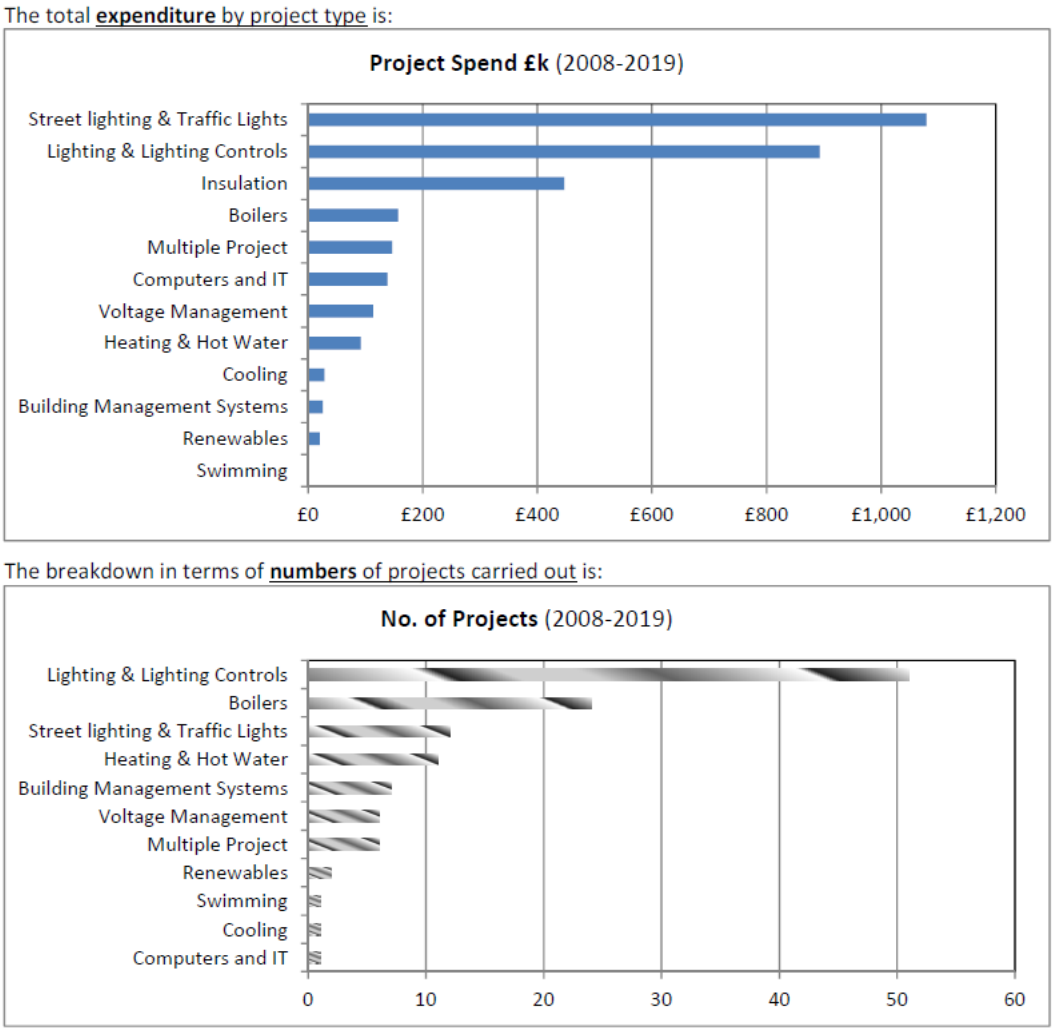


Figure 2. Salix projects, by type and spend, between 2008-19.

The Council has recently procured a new framework for the provision of electricity for corporate buildings, schools and street lighting. This allows electricity to be supplied from renewable sources, independently certified through the Renewable Energy

Guarantees of Origin scheme (REGOs). This will start from 1 April 2020 for an initial period of at least 12 months and is likely to continue indefinitely, subject to availability and price.

Government guidance offers two different ways for public sector bodies to report the emissions from the electricity they procure, using either a 'location based' or 'market based' approach.

The location-based approach uses the average carbon emission intensity of the national grid. Using this method means that buying green electricity is not 'counted' towards meeting a carbon reduction target.

The market-based approach involves using an emissions factor that is specific to the electricity supply that is purchased. Using this approach means that, when green electricity is procured in line with the REGO scheme, it can be counted towards meeting a carbon reduction target. If this approach is used then, to avoid double counting, it reduces the amount of green electricity that is available to others through the national grid. In other words, the council's electricity supply may be green but the supply to all other customers will be a little less green.

The Council has decided to adopt a location-based approach, on the basis that it is good practice to work to reduce energy usage first, followed by improving energy efficiency, then investing in renewable energy, and finally to procure green electricity.

The County Council's current GHG emissions

The objective is to achieve sufficiently accurate data to enable decision-makers to be confident in the integrity of the information. The County Council has measured scope 1, 2 and some scope 3 emissions since 2008-9, initially to comply with the requirement to report against government indicator NI 185, then to comply with the statutory Carbon Reduction Commitment, and more recently in order to be able to report on progress against the previous corporate commitment to reduce GHG emissions by 3% per year. Annual progress reports have been published on the County Council's website here:
(https://www.eastsussex.gov.uk/environment/priorities/whatawearedoing)

The Council's GHG footprint set out in this report represents a thorough but practical effort to obtain as complete a picture as possible. It is compiled from a number of data sources, which are summarised in table 1. Some of the data are of high quality, notably for scope 1 and 2 emissions, as over 90% of sites have automatic meter readers installed which provide accurate data on gas and electricity usage in buildings. Other data, notably some of the scope 3 categories, are of varying detail and quality. A more detailed explanation of the scope 3 figures shown in table 1 that the Council has not reported on previously is provided in appendix A.

Emissions vary over time due to a variety of factors, such as changes in the weather (which can affect the amount of heating used), changes to the County Council's buildings portfolio (e.g. Academy conversions have seen our school portfolio reduce), the number of staff travelling for business and user behaviour. Therefore, the GHG footprint should be understood as being a reasonable estimate rather than a precise picture, and some parts of the footprint, notably the supply chain, may increase or decrease significantly as data quality improves over time. There are also emissions related to the Council's operations that are not possible to estimate with any reasonable degree of accuracy and so have not been included, for instance domestic heating and lighting used by staff and Members when working from home.

In order to allow meaningful year-on-year comparisons, our policy is to recalculate base year emissions and previous year emissions where structural changes lead to an increase or decrease in corporate emissions of 5% or more, for instance due to Academy conversions. The last time the baseline was re-calculated was in 2014-15.

Figure 3, below, illustrates the split in Council emissions by scope. This highlights, in particular, the importance of needing to address emissions from the supply chain, which is estimated to be about three quarters of the Council's total emissions.

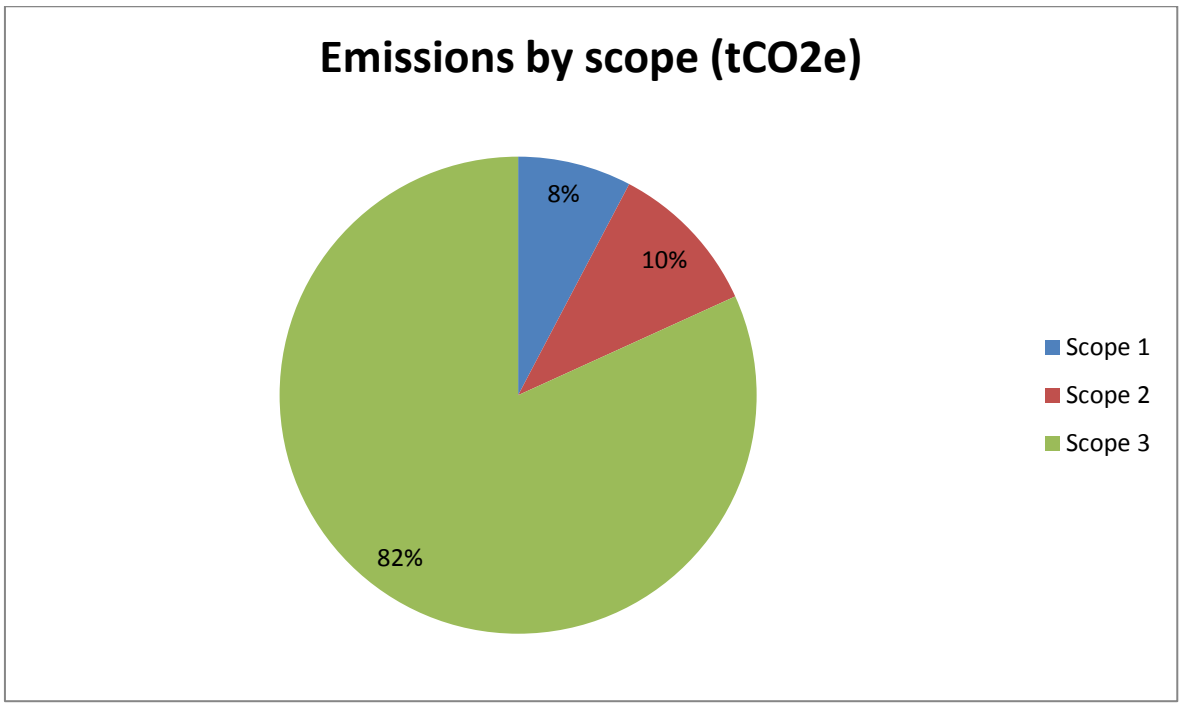


Figure 4, below, illustrates the split in the total scope 1 and 2 emissions by service area. Scope 3 emissions are not included because it is too complex to split all emissions by service area. This figure highlights the importance of engaging with schools, which have devolved budgets for most measures that can reduce emissions.

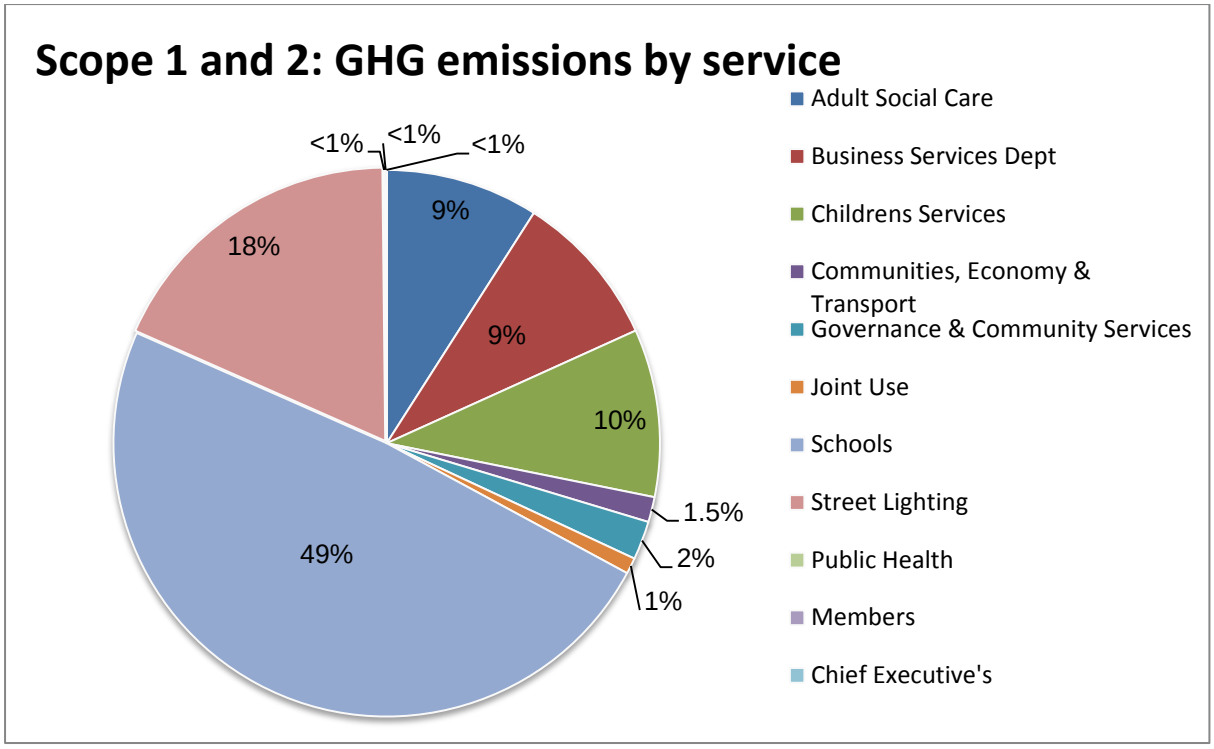


Figure 5, below, illustrates the split between emissions from gas, electricity and transport in scope 1 and 2, which highlights that the Council's own buildings should be the priority area to focus on. However, table 1 indicates that, when scope 3 emissions are included, business mileage and staff commuting generate a similar scale of emissions as gas used in buildings, so transport also needs to be an area of focus.

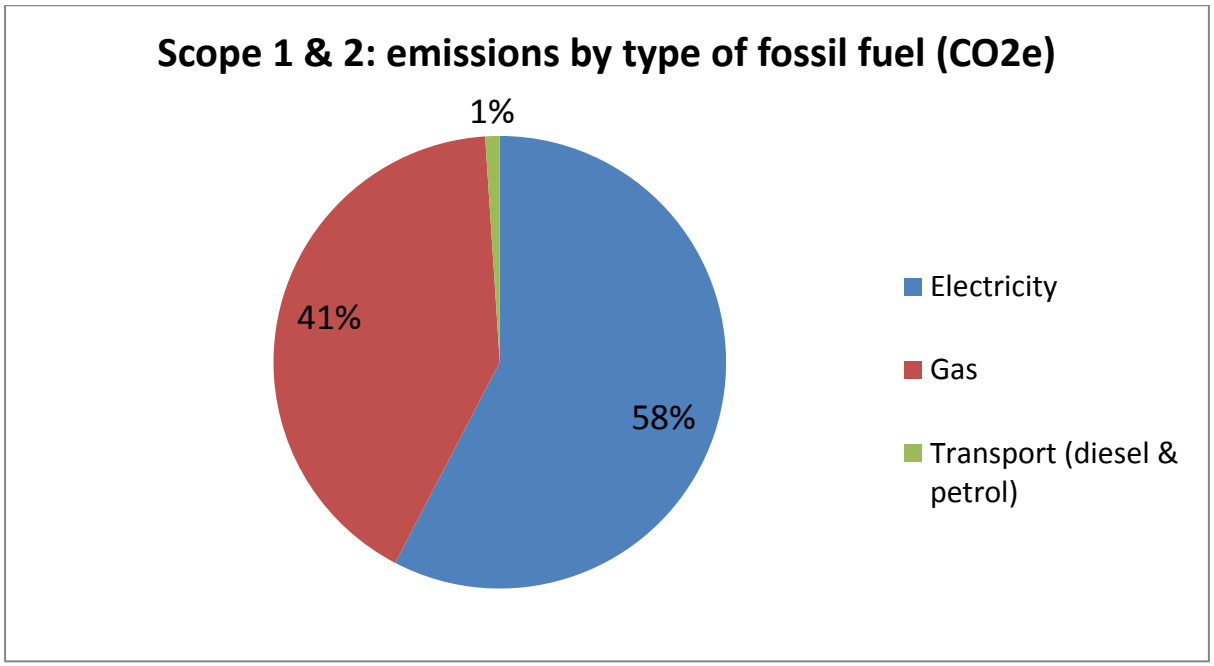


Table 1. Summary of Council emissions

Scope	What's covered	Emissions (tCO2e)	Source of the data	Key exclusions & uncertainty
Scope 1	Gas consumption for heating and hot water in buildings	4,664	Based on metered gas bills that ESCC pays, including schools	Excludes schools that does not buy in to the energy supply service.
	Oil & propane for heating & hot water in buildings	897	Based on oil and propane that ESCC pays, including schools	Excludes schools that does not buy in to the energy supply service.
	ESCC owned transport	139	Based on fuel usage and vehicle type	
Scope 2	Electricity usage in buildings	5,115	Based on metered electricity bills that ESCC pays, including schools	Excludes schools that does not buy in to the energy supply service.
	Electricity usage in street lighting	2,645	Unmetered supply so usage is estimated by inventory and usage pattern	
Scope 3	Transmission & distribution	661	Losses associated with electricity purchased under scope 2	Excludes schools that does not buy in to the energy supply service.
	Business travel	1,628	Based on the fuel type, distance travelled and engine size of private cars used for business travel	Excludes public transport, flights, cycling, taxis, rental cars and overnight accommodation.
	Employee commuting	3,120	Based on distance from home to work, days worked per year, and ONS data on commuting by car in East Sussex	Excludes the use of public transport and school staff, simplifies days worked & uses average emission factor.
	Waste disposal	115	Based on waste, recycling and composting tonnage figures	Excludes emissions from waste transport and sites that have not joined the contract
	Water usage	68	Based on metered water usage	Excludes unmetered sites (12.5% of the 136 corporate sites)
	Supply chain	54,888	List of current contracts and use of spend as a proxy value for carbon (tCO_2/m£)	Financial value is a weak proxy for emissions. Excludes procurement by schools & from framework contracts.
	Total emissions:	**73,940**		

Figure 6, below, provides a breakdown of the building-specific emissions shown in figure 5, by service area. This again highlights the importance of needing to engage with, and persuade, schools to invest in energy reduction and efficiency measures, and renewables.

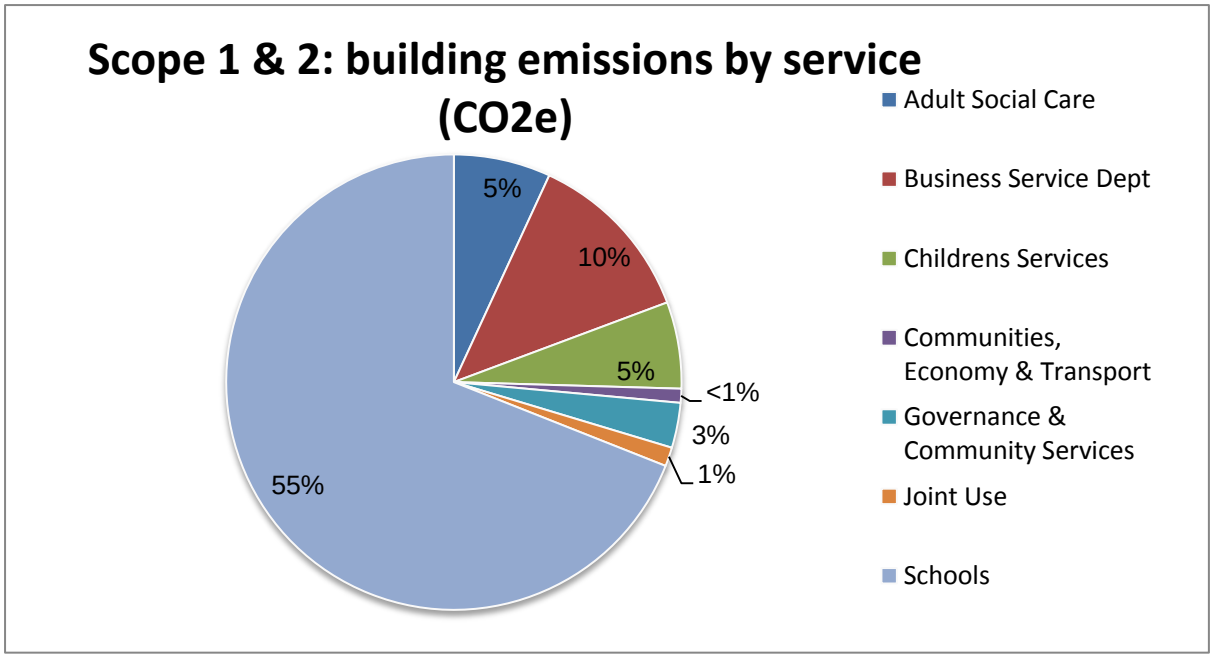
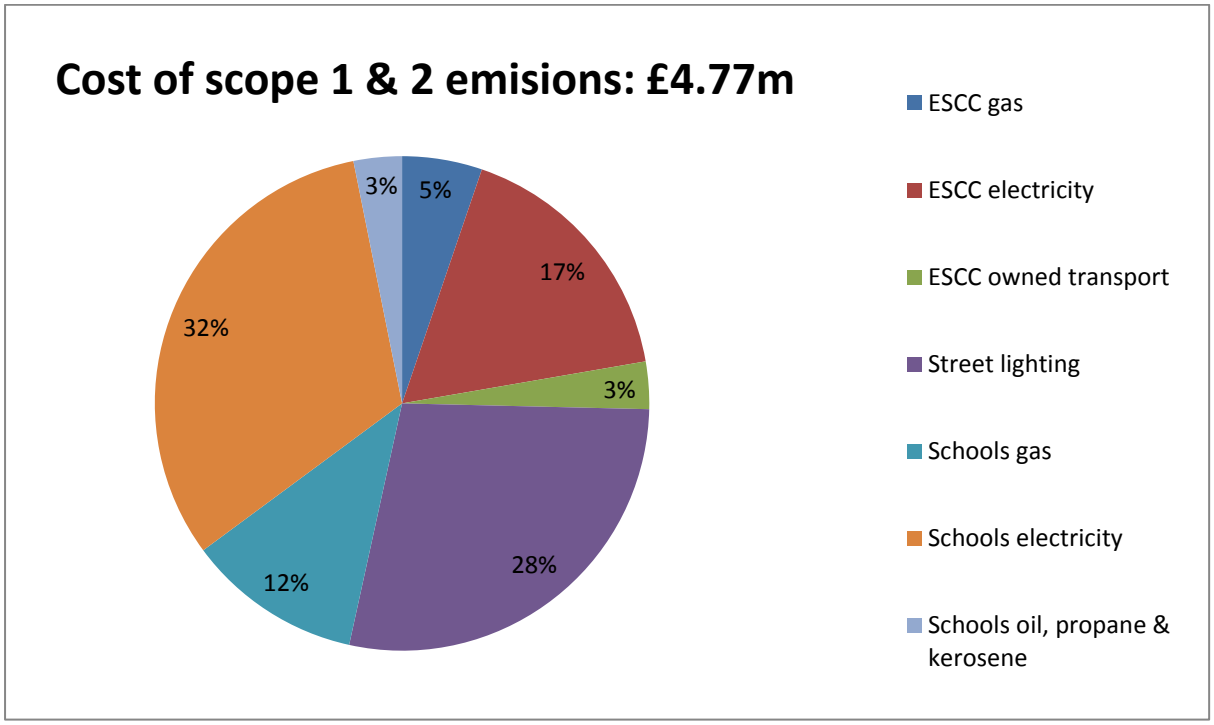


Figure 7, below, provides a summary of the financial costs associated with all scope 1 and 2 emissions in 2018-19. This indicates that electricity is about three quarters of the total cost.



The key points to draw from table 1 and figures 3-7 are that:

1) The total estimated emissions from the Council's scope 1-3 are about 3% of the total GHG emissions from East Sussex.
2) Scope 3 emissions are by far the largest part of the Council's carbon footprint, notably through the supply chain, but the Council only has influence rather than direct control over these emissions.
3) The largest part of scope 1 and 2 emissions is from schools, again over which the Council has influence, but limited direct control.
4) Further work is required to quantify some key scope 3 emissions before they can be integrated reliably into the Council's carbon footprint and modelled for future emission reductions, notably from procurement.

Decarbonisation pathways

The carbon budget set out above indicates that the County Council needs to cut its emissions by about 13% per year. The following section sets out how this might begin to be achieved. It assumes that in the 'business as usual (BAU)' scenario there are no further change in emissions from the baseline. In practice this is unlikely, for instance due to changes in service provision or building assets. It also uses the same simplifying assumptions about the effect of government policy and wider technological trends that have been made in other local authority climate emergency plans, for example on the rate of decarbonisation of the electricity grid, to ensure consistency between plans. These assumptions may prove to be very inaccurate over time, for instance as new technologies are developed at scale, which may fundamentally alter the scenarios outlined below. Finally, it is assumed that the measures are all delivered gradually over the next 30 years, whereas in practice some measures could be delivered in a shorter time frame, for instance improving the energy efficiency of street lighting.

This section focuses on the following areas:

1) Decarbonisation of the national electricity grid.
2) Emissions from buildings.
3) Emissions from street lighting.
4) Emissions from transport.
5) Scope 3 emissions.
6) Renewables.
7) The use of off-setting.

Figure 8 (on page 18) provides a visual summary of the combined effect of the measures outlined below on total scope 1 and 2 emissions. Ways to reduce scope 3 emissions are discussed below but are not included in figure 8 due to the current high degree of uncertainty associated with the data and, consequently, the lack of accuracy when modelling future reductions.

A useful means to consider which emission measures to prioritise is the energy hierarchy, with the most effective option being to use less energy in the first place, and working down the hierarchy shown in figure 9.

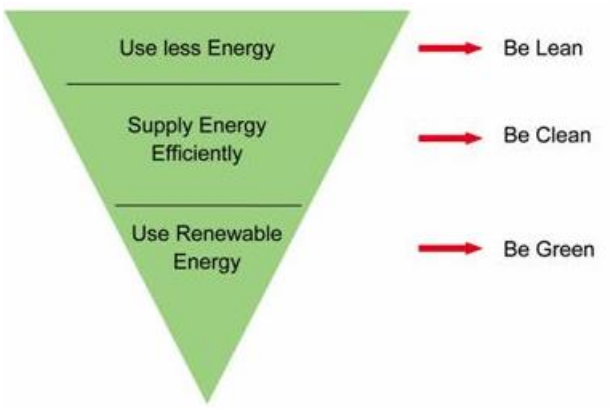


Figure 9. The energy hierarchy.

Decarbonisation of the grid

The greenhouse gas intensity of grid electricity has decreased significantly over the last decade or so as coal has increasingly been replaced by gas and renewables. Government predicts that its policies will continue to drive this down. The practical consequence is that much of the reduction in GHG emissions achieved by the County Council over the last 10 years has been due to the decarbonisation of the grid, and further grid decarbonisation may deliver another 38% reduction in the Council's total scope 1 and 2 carbon footprint between 2020-50 without any further action by the Council. However, if the rate of decarbonisation predicted by government does not occur then the Council will have to find a way to fill this shortfall by other means. This adds to the uncertainty in trying to forecast the Council's likely future GHG emissions.

The rate of decarbonisation of the grid also has significant and complex knock-on effects on other types of measures to reduce emissions, notably changing from gas to electric heating and moving to electric vehicles.

Emissions from buildings

For the sake of simplicity it is been assumed that the 'business as usual' scenario would mean that there will be no change in the Council's building portfolio and emissions from buildings would remain constant. In practice, this is likely to vary considerably, for instance as sites are either disposed of, acquired or modified. The emerging Property Strategy will be used to inform future updates to this action plan.

The main measures that can be implemented to reduce emissions from buildings are reducing energy demand, for instance through behavioural change programmes such as switch off campaigns, improving the fabric of buildings (e.g. insulation), improving the energy efficiency of equipment such as lighting and ICT, and reducing energy intensity by switching from gas to electricity (or hydrogen) as the grid decarbonises. A rough estimate as to the potential energy improvements that each option could bring as an average across the building stock are as follows:

1) Behaviour change and energy efficiency measures – a total 20% reduction in electricity usage and 10% reduction in gas usage, based on data from the non-domestic National Energy Efficiency Data Framework.

2) Switching from gas to electricity – a total 15% reduction compared with current gas usage, based on typical estimates of the efficiencies of gas boilers (80%) compared with switching, for instance, to heat pumps (250%). This assumes that some conversions will not be possible, for instance due to the type of building.
3) Carbon neutral new build – this will be necessary in order to avoid increasing the Council's carbon footprint. Ideally, new build would be carbon negative (i.e.. by generating more renewable energy than they consume).

These measures are shown in figure 8 as cumulative changes that take place in a consistent linear manner between now and 2050, as the latest date by which the Council will aim to become carbon neutral. In practice, there is a complex interaction between these measures, which means that there is considerable uncertainty as to what savings might be delivered and when. For instance, improving building fabric is an essential prerequisite to being able to switch from gas to heat pumps in some properties, and demand reduction helps to improve the business case for investing in low carbon heating systems, the effectiveness of which depends on the decarbonisation of the grid.

Emissions from street lighting

Emissions can be reduced by cutting the amount of lighting used, for instance by switching off or dimming more street lighting assets in the middle of the night, and by installing more energy efficient lighting. It is assumed that these measures could deliver a 40% reduction in electricity usage, based on being able to achieve about a 30% reduction from installing LEDs alone. The effect of this is illustrated in figure 8.

Emissions from transport

A reduction in emissions can be achieved by further roll-out of flexible work patterns such as the existing Agile programme, encouraging changes in travel modes to more walking, cycling and use of public transport, by driver training programmes, and by changing non-HGV vehicles from petrol and diesel to electric. It is assumed that these measures, in combination, could deliver a 75% reduction in emissions from current mileage, based mostly on replacing the majority of the fleet with electric vehicles (there are no HGVs), without impacting on service delivery.

The cumulative reduction in emissions that might be achieved by all the measures outlined above is shown in figure 8. This highlights that the measures appear to fall far short of meeting the 13% per year reduction target, which is designed to help keep within the county's carbon budget recommended by the Tyndall Centre. In addition, it is worth noting that figure 8 does not include the emissions from scope 3 emissions, which are significantly greater than the combined scope 1 and 2 emissions. However, in practice it is likely that greater carbon reductions can be achieved more quickly and more deeply in the next few years than shown by the modelling, as indicated by the actual reductions that have been achieved in recent years (10% in 2016-17, 15% in 2017-18 and 19% in 2018-19).

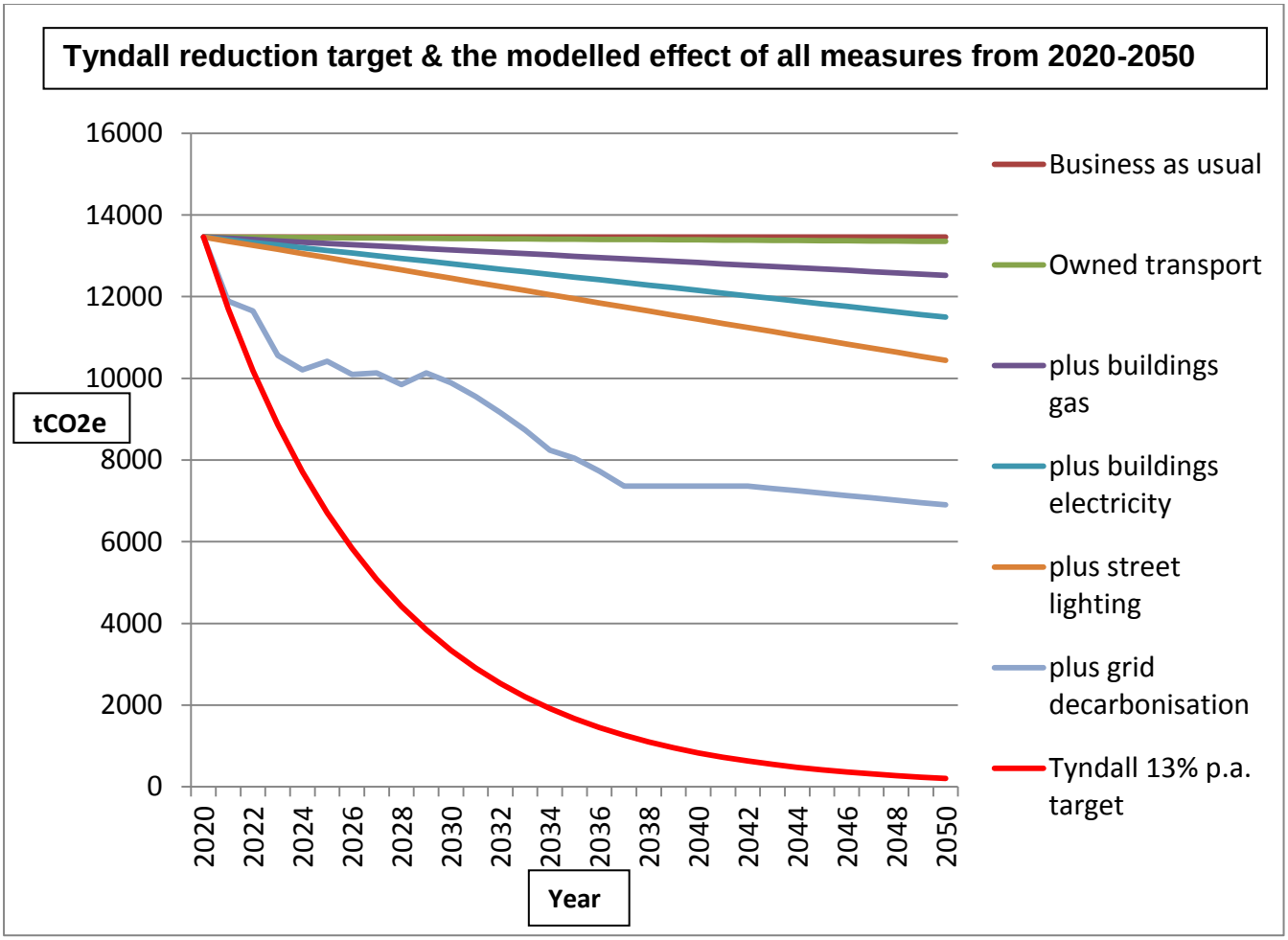


Figure 8. The potential cumulative effect of all measures.

Scope 3 emissions

The measures outlined for scope 3 emissions in the following section are not illustrated in figure 8 due to the high degree of uncertainty with the estimates used to calculate these emissions and how far they can be reduced, and the much lower level of control and influence that the Council has over these emissions. However, the measures below will be taken up in the climate emergency action plan (see pages 21-22).

Water: case study evidence suggests that installing a range of water efficiency measures, such as low flush toilets and flow restrictors in taps, can potentially reduce water use by about 20% (AECOM, 2019).

Waste: evidence from the national Waste and Resources Action Programme suggests that emission reductions of about 10% are possible as a result of interventions to reduce the amount of waste produced and to compost food waste.

Supply chain: table 1 clearly shows that the largest part of scope 3 emissions is likely to be as a result of what ESCC procures. This is typical for a local authority, as most of the Council's revenue and capital budgets are used to procure goods, services and works from 3rd parties. The council can influence contractual emissions by

requiring GHG reduction targets when renewing relevant contracts, where appropriate. This approach has been adopted, for instance, in the current highways contract. However, there will be a number of contractors and suppliers who will not have data on their emissions or will have relatively small-scale emissions. Consequently, the Council will focus on contractors and suppliers where the likely scale of their emissions and the ability of the Council to influence these emissions are greatest, for instance where the Council is a major client.

Renewables

Installing renewable energy supports the decarbonisation of the grid, which in turn supports the switch in buildings and vehicles away from fossil fuels to electricity, and contributes to ensuring security of supply and protecting consumers from rising electricity prices. The scale of possible generation opportunities on Council buildings and land is currently unknown, and so quantifying this is an important task set out in the action plan.

Off-setting

It is widely recognised that emissions should be reduced as much as possible before any residual emissions are compensated for by using off-setting. Due to the significant level of uncertainty as to the cumulative effect of the measures outlined above it is difficult to predict at this stage what scale of offsetting might be required. Nevertheless, it is clear from figure 8 that, even if all the measures to reduce emissions are implemented and are successful, it is highly likely that there will be a need to offset remaining emissions in order to reach carbon neutrality. This could be by investing in a mix of large-scale off-site renewables, land use sequestration and/or carbon removal technologies. Off-site renewables are the most straightforward and measurable method. Land use sequestration is being explored with the Sussex Local Nature Partnership, as there is the opportunity to invest in local natural capital which might bring economic benefits, whilst carbon removal technologies are at a very early stage of development and there is insufficient evidence to provide a realistic estimate of their potential contribution at this stage.

Action plan for 2020-22

Figure 8 shows that decarbonisation relies on adopting all possible CO_2e reduction measures, doing so rapidly and doing so at scale, and investing in carbon off-setting.

A CO_2e budget for the next 5 years is set out in table 2 below, with annual milestones, as the first step towards becoming carbon neutral. The table shows:

1. the annual reduction in CO_2e required to achieve a 13% reduction per year;

2. the annual change in the scope 1 and 2 footprint that this rate of reduction would deliver.

Table 2. ESCC carbon budget for 2020-25.

Year	13% p.a. reduction target (CO_2e)	Scope 1 & 2 footprint (CO_2e)
2020-21	1,750	11,710
2021-22	1,522	10,188
2022-23	1,324	8,863
2023-24	1,152	7,711
2024-25	1,002	6,709
Totals:	**6,750**	**n/a**

In recognition of the scale of the challenge, the County Council has created a new post of Climate Change Senior Technical Officer, which is currently being recruiting to. If it becomes clear that moving from the current annual carbon reduction target of 3% to 13% per year requires further new resources, then this will be addressed through the annual Reconciling Policy and Performance process.

Table 3, below, sets out an action plan for 2020-22, which will aim to meet the annual carbon budget targets set out in table 2 for the next 2 years by means of a structured programme with clear roles and responsibilities. The oversight of this programme is set out in the following sections on governance and monitoring, and the risks are assessed on page 24.

Governance

The Council is setting up a robust structure of roles, responsibilities and accountability for delivering the climate emergency plan. This includes:

1) Recruiting to a new post of Climate Change Senior Technical Officer.
2) Setting up a senior Officer climate emergency Board to oversee the delivery of the action plan.
3) Carrying out a Scrutiny review of the Council's programme of work to address the climate emergency.
4) Reporting annually to Cabinet and County Council on progress against the carbon budget and commitment to becoming carbon neutral.

Table 3. Action plan for 2020-22

Action	Description of action	GHG reduction	Lead & resources
Framework (governance, leadership, communications, data, policy & partnership working):			
Set up robust governance	Establish a senior Officer board to oversee delivery of this plan.	n/a	CET Director. £0.
Develop a communications plan	Set out clear messages and comms routes, Member and staff engagement, & integrate public engagement via the Environment Strategy	n/a	Corporate Comms team. £tbc.
Improve GHG baseline data	1) Update ESCC's GHG data management plan and improve transparency by explaining the methods, data, processes, assumptions, estimates, changes and quality checks used. 2) Obtain more accurate GHG data for staff commuting, priority suppliers and renewables already installed at schools (see below).	n/a	New Climate Officer. £0.
Review ESCC's policies, strategies, programmes, projects and practice to align with the climate emergency	Policy should provide clear and stable direction and a simple set of rules that supports corporate climate change mitigation and adaptation	Tbc	New Climate Officer. £0.
Work in partnership with other organisations to share resources & good practice	1) Continue to work with all Sussex local authorities on developing organisational and area-wide carbon plans. 2) Work with SE7 partners on the same.	n/a n/a	New Climate Officer. £0. New Climate Officer. £0.
Produce an annual progress report	Report to County Council on progress and identify additional resources that may be required	n/a	New Climate Officer. £0.
Emissions from buildings:			
Behaviour change programme – corporate	Develop an engagement plan to create an energy-aware culture amongst staff and Members & develop a network of climate emergency champions to accelerate change	Low	Energy Manager. £tbc.
Behaviour change programme - schools	Update & disseminate the energy saving guide for schools.	Low	Energy Manager. £tbc.
Planned Maintenance & Capital programmes	1) Establish a robust process for identifying, prioritising and delivering projects. 2) Prepare an annual programme of energy efficiency projects linked to the maintenance and capital programmes. 3) deliver a pipeline of whole-building energy efficiency projects.	High	1) Energy Manager. £0. 2) Energy Manager. £0. 3)Energy Manager. Salix invest to save fund.
Install low carbon heating in buildings to replace gas boilers	Review boiler replacement programme and assess options for replacing with heat pumps	Tbc	Energy Manager. £tbc.
New build	Ensure the 2008 ESCC sustainable buildings policy is being implemented and report on its effectiveness	Tbc	Lead? Funded within project budgets.

Action	Description of action	GHG reduction	Lead & resources
Emissions from street lighting:			
Improve energy efficiency –street lighting	1) Install energy efficient LED lights. 2) review dimming and switch-off policy.	High	Highways Service Delivery Manager. £5m from Salix SEELS.
Emissions from transport, including commuting:			
Grey fleet review	Commission review by the Energy Savings Trust.	Tbc	New Climate Officer. £0.
Develop and implement a staff travel plan	To cover both business mileage and commuting.	tbc	Corporate Property. £tbc.
Install EV charge points	Identify where to locate which types & number of chargers, and delivery mechanism, for staff & visitor use	Low	New Climate Officer. £tbc.
Emissions from water & waste:			
Reduce waste	1) Consider requiring all sites to sign up to the same waste contract. 2) Set up food waste collections from all kitchen areas.	Low	Senior Officer group.£0. Contract Manager. £tbc.
Reduce water usage	Install water efficient fittings in all appropriate toilets, urinals, taps & showers	Low	Energy Manager. £tbc.
Emissions from procurement:			
Engage priority suppliers	1) obtain scope 1 & 2 GHG footprints of transport & construction contracts above >£1m p.a. 2) embed low carbon outcomes into new contracts.	n/a Tbc	New Climate Officer. £0. New Climate Officer.
Offer practical support to all other suppliers	Provide energy audits and grants to local SMEs in the supply chain (e.g. via LoCASE) and eco-driver training for transport providers	Medium	Environment Manager. £0.
Renewables:			
Improve data on school installs	Obtain data on renewables installed at schools	n/a	Energy Manager. £tbc.
Identify opportunities to install PV and other renewables on buildings & land	Commission viability assessment of renewables on buildings & land	Tbc	Energy Manager. £tbc.
Off-setting:			
Explore carbon off-setting	Work with the Sussex Local Nature Partnership to explore options and costs for off-setting with natural capital benefits	tbc	Environment Manager. £0
Grid flexibility:			
Assist integration of low carbon technologies into the national grid	Review ESCC estate for opportunities to provide Grid Flexibility services such as Demand Side Response and Battery Storage	n/a	Energy Manager. £tbc.

Monitoring & reporting

The Council already has a system in place to collate and analyse data for scope 1 and 2 emissions and some scope 3 emissions. The action plan above includes an objective to ensure more robust data, notably for key scope 3 emissions, and to capture a more complete figure for generation from renewables. The key metric to measure progress will continue to be tonnes of CO2e by scope, though this data will be disaggregated to help identify key areas to focus on and to capture the anticipated reduction in emissions from individual projects. Monitoring and reporting will continue to be led by the Orbis Energy team.

Risk table

Area of Risk	Definition	Probability of occurrence Score	Degree of Impact Score	Risk Result Total Score (probability x impact)	Mitigation measures
Add to GHG footprint through business as usual	Fail to change key policy and practices	3	3	9	Begin policy & practice review asap
Off-setting opportunities aren't available at scale	Residual GHG emissions remain	3	3	9	Work collaboratively with partners (e.g. the Local Nature Partnership) to develop off-setting
Statutory change	Legal requirement to cut GHG emissions	2	3	6	Develop an action plan
Technology change	Invest in incorrect or costly technology	3	2	6	Carry out research & test scenarios prior to investment
Reduction in resources / increase in costs	Unable to deliver the action plan	2	3	6	Stress test the action plan
Grid decarbonisation does not occur	Higher rate of local decarbonisation needed	2	3	6	Track actual decarbonisation & national policy changes
Lack of skilled providers to deliver mitigation measures	Competition for skilled labour	2	2	4	Test the market & work with Skills East Sussex
Decarbonisation impacts on service delivery	Service users not supported	1	3	3	Senior officer board to review all actions for service impacts
A % of staff and schools are unwilling to play their part	Fail to win hearts & minds	1	2	2	Design engagement & behavioural work with a staff & school peer group
Adaptation measures become more urgent	Focus needs to change	1	2	2	Address adaptation in parallel with climate change mitigation measures

Glossary

Acronym	
ASC	Adult Social Care
BAU	Business-as-usual
BSD	Business Services Department
CS	Children's Services
CET	Communities, Economy & Transport
GHG	Greenhouse gas
G&CS	Community Services
GWP	Greenhouse warming potential
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
REGOs	Renewable Energy Guarantees Origin

Appendix A - How scope 3 emissions have been calculated

Supply chain

The Council currently has over 500 active contracts in place, which are listed here: https://www.eastsussex.gov.uk/search/search.aspx?q=active+contracts+list.

It is impractical to try to capture the carbon emissions from this number of contractors, therefore emissions from procurement have been calculated in 2 ways:

1) step 1: annual emission data is already required from our waste and highways contractors, which are the 2 largest Council contracts by financial value. Therefore, actual emission data has been used from these contracts (608 tonnes in 2018-19 from the highways contract and (tbc) tonnes from the waste contract). These contracts have then been removed from step 2.

2) Step 2: the total annual cost of all the remaining contracts of £50,000 or above has been estimated by dividing the total value of each contract by the contract duration, and this has been multiplied by a GHG intensity figure of 230 tonnes of CO2e/£ million spent, which has been obtained from the Office for National Statistics.
(see:
https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/greenhousegasintensityprovisionalestimatesuk/2018provisionalestimates).
GHG intensity for the UK has reduced by two-thirds between 1990 and 2018, largely due to grid decarbonisation and improved energy efficiency.

   Using this approach is simple and quick but has the disadvantage of making crude assumptions about the correlation between cost and carbon emissions. The consequence is that it can be difficult to then demonstrate the results of actions to reduce emissions.

Waste contract	=	tbc tCO2e
Highways contract	=	608 tCO2e
All remaining contracts above £50K = £236m x 230	=	54,280 tCO2e
Total	**=**	**54,888 tCO2e**

Waste

ESCC entered a new waste contract, which started in April 2019. Monthly data from the new contractor has been used to estimate the likely annual total tonnage, by disposal method, as summarised in table 4 below. The tonnage figures are multiplied by the appropriate emission factor, obtained from BEIS
(see:https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019).

This is an incomplete picture due to:
- not all Council properties are within the contract;
- the figures include waste from 3rd parties (e.g. some private schools);

- some waste streams are not included because they are managed by other contractors (e.g. confidential and sanitary waste).

Table 4

Waste treatment	Tonnes p.a.	Proportion (%)	Emission factor (kg CO_2e/tonne)	CO_2e
Landfill	33	1	99.7729	3
Incineration with energy recovery	4107	78	21.3842	88
Recycled	1116	21	21.3842	24
composted	0	0	10.2586	0
			Total:	**115 tCO_2e**

Commuting

A database has been compiled of the straight-line distance that 2,332 of 4,479 staff live from their main work base and the number of hours they work. Emissions from commuting by this cohort have been estimated by:

- grouping 'hours worked' by staff into those that need to travel 1, 2, 3, 4 or 5 days per week, and applying a pro rata of 221 working days per year to each group;
- applying an average uplift of 1.2 to the miles from home to work to account for the increase in distance above a straight line journey, based on measuring a sample of actual journeys;
- reducing the total distance travelled by 10% to try to account for the average effect of agile working and sickness.
- An average figure for distance travelled per member of staff for whom we have data has been applied to those staff for whom the data are not yet available (i.e. 2,147 of the total 4,479), to provide a more complete picture of the likely distance travelled by staff.
- The ONS figure for the average commuting patterns in East Sussex has then been used to calculate the percentage of commuting that is likely to be completed by car or van (76%).
- an emission factor for an 'average car' (0.28502 kg CO2e/mile) has been applied to the total mileage figure, obtained from BEIS
- (see:https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019).

Water

The Orbis property team manage water bills and collate data for all metered sites. A BEIS emission factor is then applied to water supply and wastewater, as show **in table 5** below. Of the 136 corporate water supplies that are billed, 17 are unmetered (12.5%) and are excluded from the figures below.

Input/output	Volume (m3)	Average emission factor (kg CO2e/m3)	tCO2e
Water supply	66,210	0.344	23
Water treatment (95% of supply)	62,900	0.708	45
		Total:	**68**