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Wealden District Council Climate Emergency Plan

Wealden District Council

20th December 2019

Quality information

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Executive Summary

Background and context

On July 24th 2019, Wealden District Council (WDC) unanimously approved a motion to declare a Climate Emergency and committed to becoming carbon neutral by 2050.

As part of this commitment, the Council resolved to develop an evidence-based Climate Emergency Plan that would identify the key actions and intervention measures required to meet the net zero target, describing the scale of impact along with a discussion of practicalities and resource implications.

This work is intended to provide the Council with an understanding of their own carbon emissions baseline, as well as that of the District as a whole, and identify the steps that need to be taken to achieve the decarbonisation target.

Establishing a baseline

In accordance with the Greenhouse Gas (GHG) Protocol[1] and the Department of Business, Energy and Industrial Strategy (BEIS) '*Emissions Reduction Pledge 2020*' guidance,[2] for the purpose of greenhouse gas reporting, emissions are divided into three categories, referred to as Scope 1, 2 and 3.

The table below provides a definition of these terms used for both the Wealden District and the Council's own emissions, and summarises the data used in establishing the carbon emissions baselines.

Category	Description	Data used in analysis of the Council's own emissions	Data used in analysis of the District-wide emissions
Scope 1	Direct emissions from the combustion of fuels such as gas, oil, petrol, diesel, coal, or wood. This primarily includes fuel used in homes and other buildings to provide heating and hot water, and petrol or diesel used in vehicles.	Metered gas data (for buildings where the Council pays the gas bills) Mileage for the Council-owned vehicle fleet and pool cars, along with vehicle make and model	The carbon emissions baseline for the Wealden District is based on figures provided by BEIS. The dataset, which covers Scope 1 and 2 CO_2 emissions for the District, is published annually; 2017 is the most recent year for which data is available.
Scope 2	Indirect emissions from the generation of purchased electricity	Metered electricity data (for buildings where the Council pays the electricity bills)	
Scope 3	Other indirect emissions that result from activities taking place within Wealden (in the case of the District-wide emissions), or activities of the Council (for the	Records of business mileage by Council employees Records of leisure centre gas and electricity consumption	Scope 3 emissions at a Local Authority level are not included in the District-wide baseline because published data (disaggregated at a Local Authority level) is not available

[1] The GHG Protocol is the most widely used global standardised framework for measuring and reporting GHG emissions. It is managed through a partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). For further details, see https://ghgprotocol.org/

[2] BEIS, *'Emissions Reduction Pledge 2020: Guidance for emissions reporting in the public and higher education sectors in England 2018-2020'* (April 2018). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/745003/Guidance_note_for_voluntary_reporting-final.pdf

Council's own emissions), at any point in the value chain. This includes emissions from water treatment, waste management, commuting, and the fuels required to manufacture and transport goods. Scope 3 emissions are not included in the baselines.	*Not reported due to lack of information or incomplete data:* *Emissions from WDC employee use of public transport – no records available for this activity* *Water consumption– incomplete metered data* *Emissions from waste collection service and Council waste disposal – insufficient information* *Street cleaning – insufficient information*

Wealden District Emissions

The 2017 Scope 1 and 2 emissions reported by BEIS are summarised in Figure 1, the total emissions were 636 ktCO_2e. The majority of the CO_2e emissions (47.2%) in the District are related to the transport sector, followed by domestic buildings (34.7%). Fuel use in non-domestic buildings accounts for the 15.2% of the total, and fuels used for agriculture account for 3%. Land Use, Land Use Change and Forestry (LULUCF) activities result in a significant net *removal* of atmospheric CO_2e, and in 2017 this had the effect of reducing total emissions by around 17.5%. This reflects the relatively rural character of the District, which includes large areas of woodland.

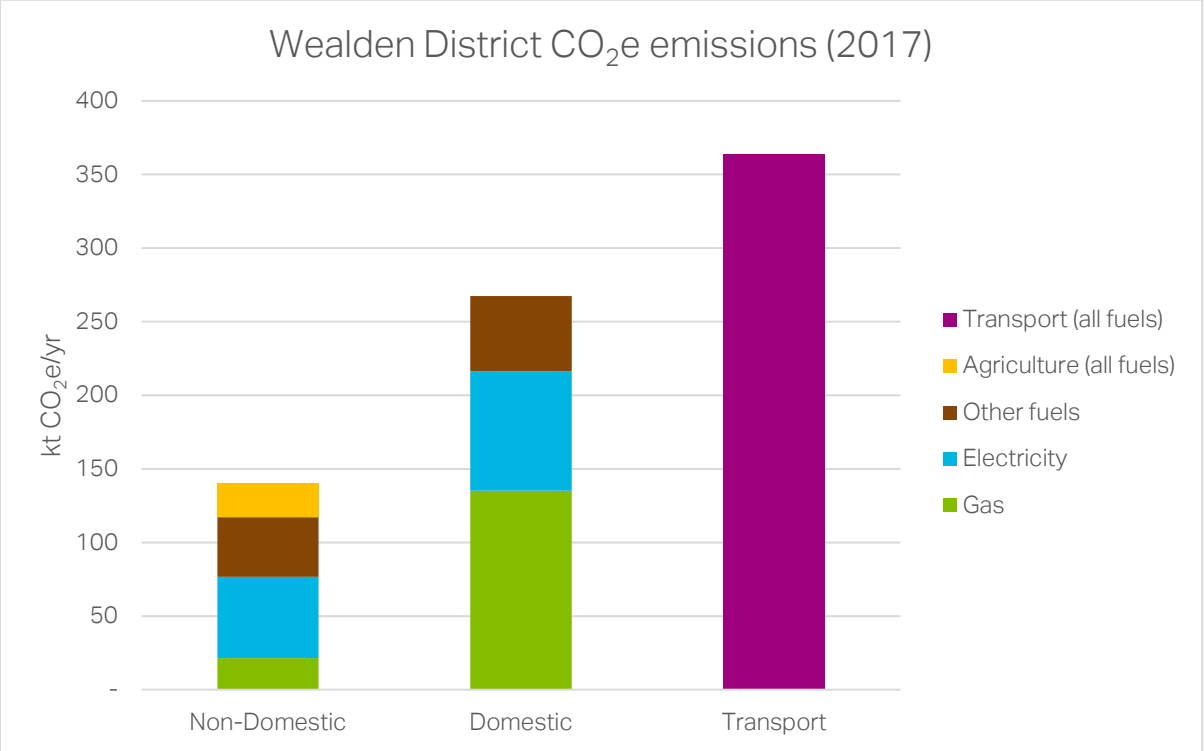


Figure 1: Wealden District CO_2e emissions by sector and fuel type in 2017

Note that the BEIS dataset does not cover all potential sources of non-CO_2 greenhouse gas emissions within the Local Authority. For example, in the agricultural sector, it includes the CO_2e emissions from

fuels used in agricultural processes and vehicles but does *not* include methane emissions from livestock. At the time of writing, this information is not published by BEIS at a Local Authority level.

Wealden District Council Emissions

Based on the Council's direct consumption of gas, electricity, and vehicle fuel in the year from April 2018-March 2019, we estimate that the Council's current annual Scope 1 and 2 emissions are approximately 1,424 tCO_2e per annum (p.a.). This figure is included within the District-wide emissions estimates shown above and indicates that the Council's Scope 1 and 2 emissions account for a very small proportion (approximately 0.2%) of the overall total for the District.

Figure 2 and Figure 3 below illustrate the relative contribution from different fuels, building use categories and vehicles.

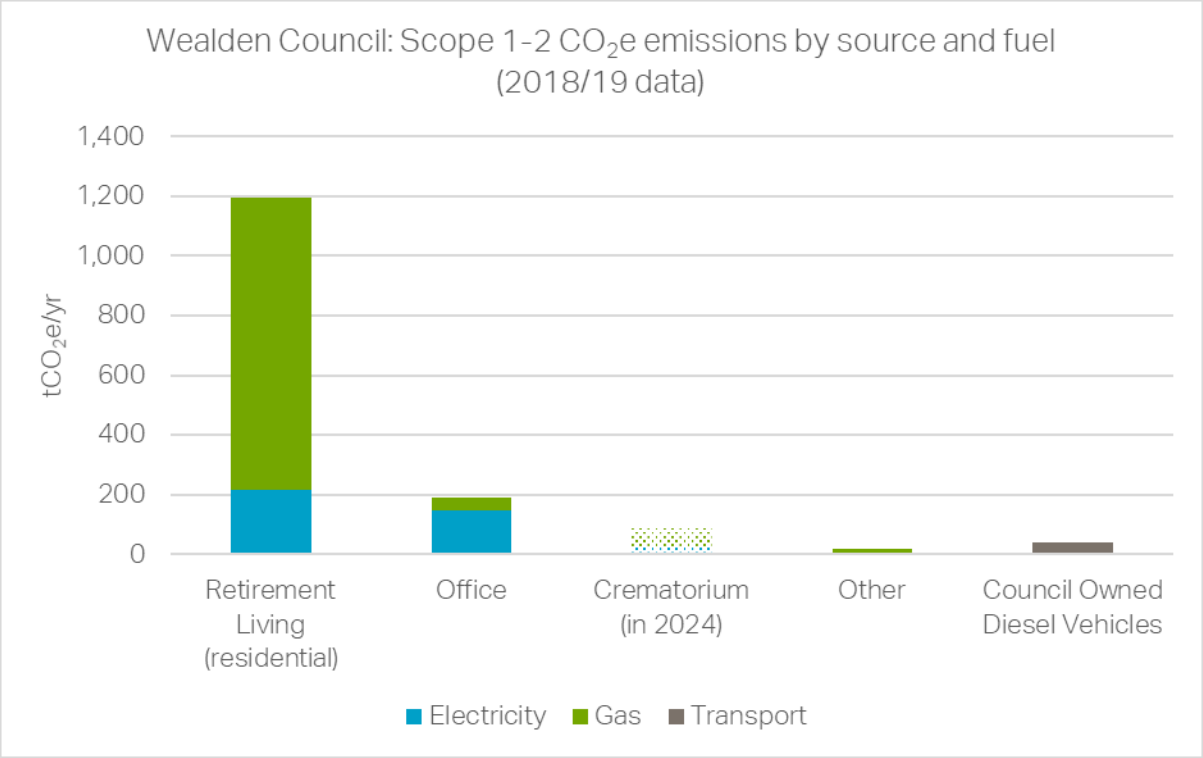


Figure 2: Wealden District Council Scope 1 and 2 CO_2e emissions (2018/19 data)

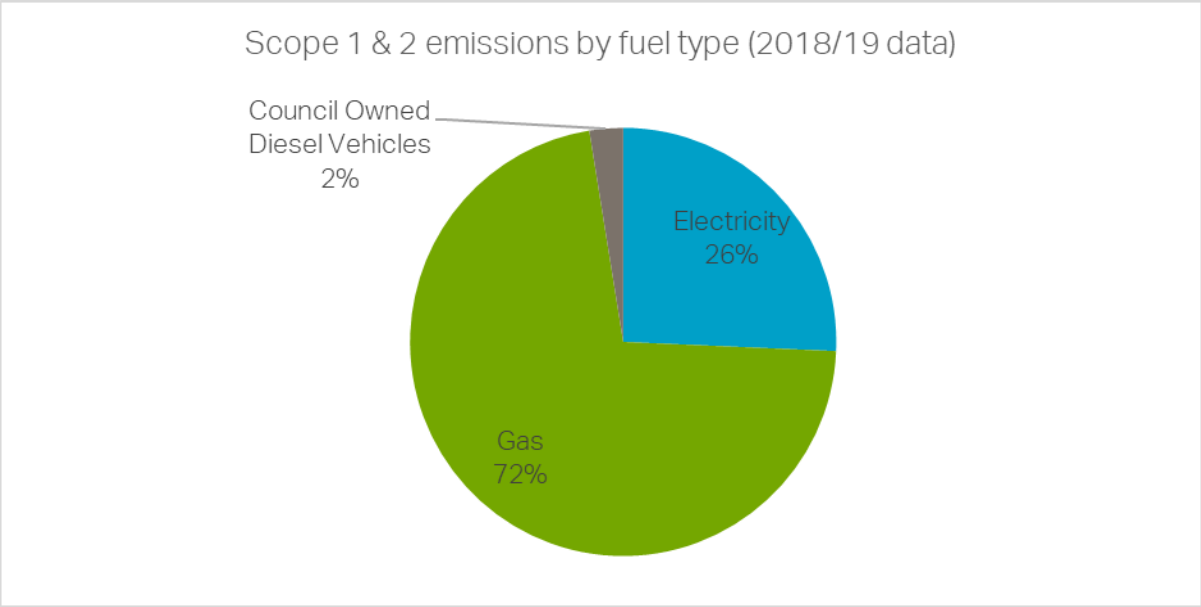


Figure 3: Wealden District Council Scope 1 and 2 CO_2e emissions by fuel type (2018/19 data)

The results show that gas and electricity use in buildings accounts for most of the Scope 1 and 2 emissions (72% and 26%, respectively). The emissions from the Council's own vehicles is relatively small at 2% but this is as expected, given that the fleet includes just 9 vehicles. The crematorium will also represent a major source of CO_2e emissions, primarily due to the gas used by the cremator when operated at its intended capacity of approximately 1,200 cremations per year by 2024.

In practice, annual Scope 1 and 2 emissions vary over time, due to a variety of factors not assessed in detail in this report. These include factors such as weather and user behaviour, but a key sensitivity is linked to changes in the Council's ownership or operation of buildings or provision of services. The defined baseline in this report only considers properties both owned and operated by the Council for which the Council is responsible for paying the energy bill.

Scope 3 emissions from the District's leisure centres, operated by Freedom Leisure on behalf of the Council, amount to approximately 824 tCO_2e p.a. Note that there are additional Scope 3 emissions, such as those arising from business travel on public transport, waste collection, waste processing, water usage and procurement, that have not been quantified in this report due to insufficient data. In the future, Wealden District Council could consider a variety of additional data collection methods that could provide further visibility of these Scope 3 emissions. Select Scope 3 emissions, where data is available, are reported but not projected to 2050.

Routes to 2050

Carbon projection modelling has been carried out to assess the potential impact of a range of future trends that are expected to affect the District's and Council's specific emissions.

The modelling includes possible future changes such as:

- Decarbonisation of the National Grid (electricity)
- Reducing demand for fuel in buildings and transport (e.g. insulating existing buildings and reducing the number of journeys travelled)
- Switching from fossil fuel heating to electric forms such as heat pumps
- Switching to zero emission vehicles
- Emission offsetting investments such as solar Photovoltaic (PV) farms or sequestration through planting new woodland

It is important to note that these scenarios are *not* intended to predict actual fuel consumption or CO_2e emissions. Instead, they are used to highlight key issues and support the identification of carbon reduction interventions to inform the actions and recommendations laid out in subsequent chapters of this Climate Emergency Plan.

Wealden District Projections

The historic emissions for the District and the projected cumulative impacts of the listed intervention measures are summarised in Figure 4.

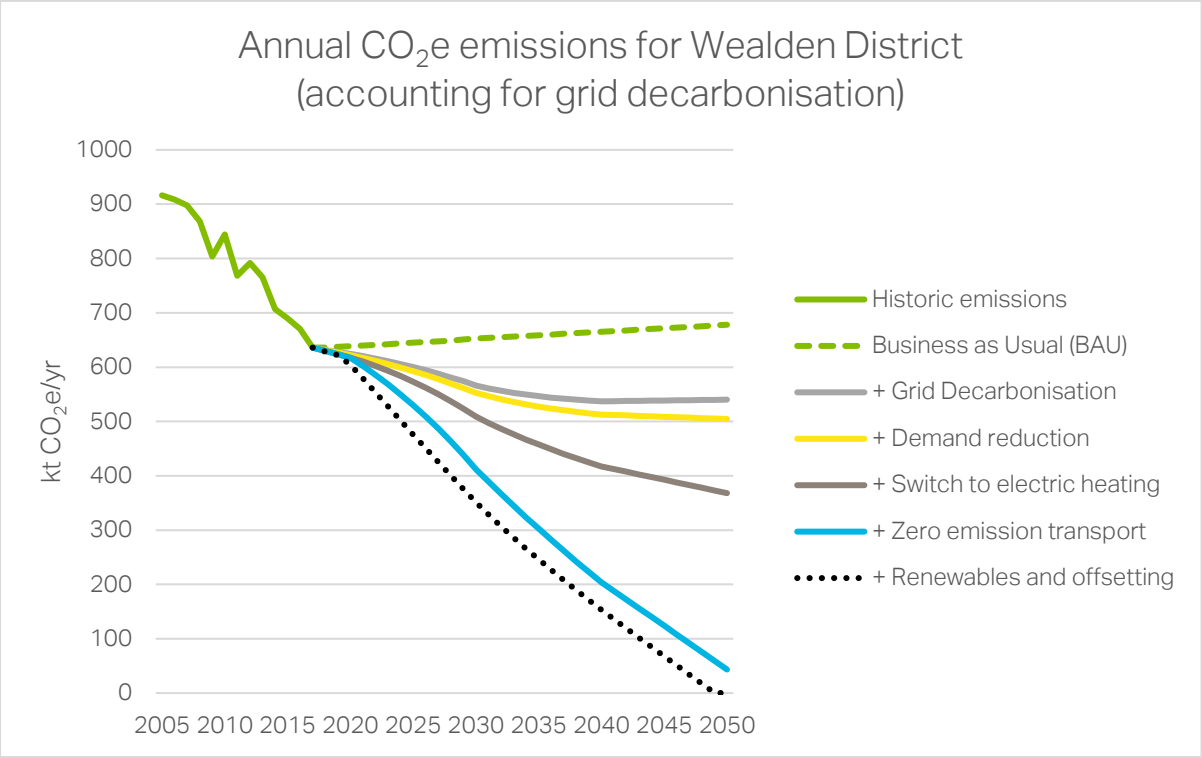


Figure 4: Wealden District CO_2e emissions –Accounting for grid decarbonisation (2011-2050)

This analysis indicates that the most significant carbon reductions will result from switching towards the use of electric heating systems and electric vehicles – *provided that the national electricity grid undergoes significant decarbonisation*.

Demand reduction measures (energy efficiency and behavioural change in buildings, and reduced use of transportation) have less impact when considered on their own but are crucial prerequisites for successfully switching towards the use of electric heating and vehicles.

For instance, energy efficiency improvements in buildings enable systems such as heat pumps to work at a higher level of efficiency. Similarly, a large-scale shift to the use of electric vehicles must also be accompanied by a significant modal shift towards walking, cycling, ridesharing, and an increase in the use of public transport to deliver the decarbonisation targets.

As buildings and vehicles switch away from the use of fossil fuels and towards electricity, it becomes increasingly important to ensure that electricity is supplied from renewable sources. This is important for several reasons, including reducing pressure on grid infrastructure, ensuring security of supply, and protecting consumers from rising electricity prices.

On the other hand, the shift towards the use of electricity means that the route towards becoming zero carbon is increasingly dependent on national grid decarbonisation. This leads to significant uncertainty when projecting carbon emissions but serves to reinforce the message that demand reduction and renewable energy generation should be high priorities for the Wealden District.

The scenario testing demonstrated that, even with the most optimistic assessment of grid and transport decarbonisation and highest levels of uptake for energy efficiency measures, there will be significant residual CO_2e emissions that would require offsetting. Further work and consultation would be required to identify the most appropriate and cost-effective opportunities, but these could include:

- Investing in off-site renewable electricity generation such as solar PV farms
- Carbon sequestration through land management, woodland creation, and tree planting

Wealden District Council Projections

Emissions form the Council's own operations for the year 2018/19 and the projected cumulative impacts of the listed intervention measures are summarised in Figure 5.

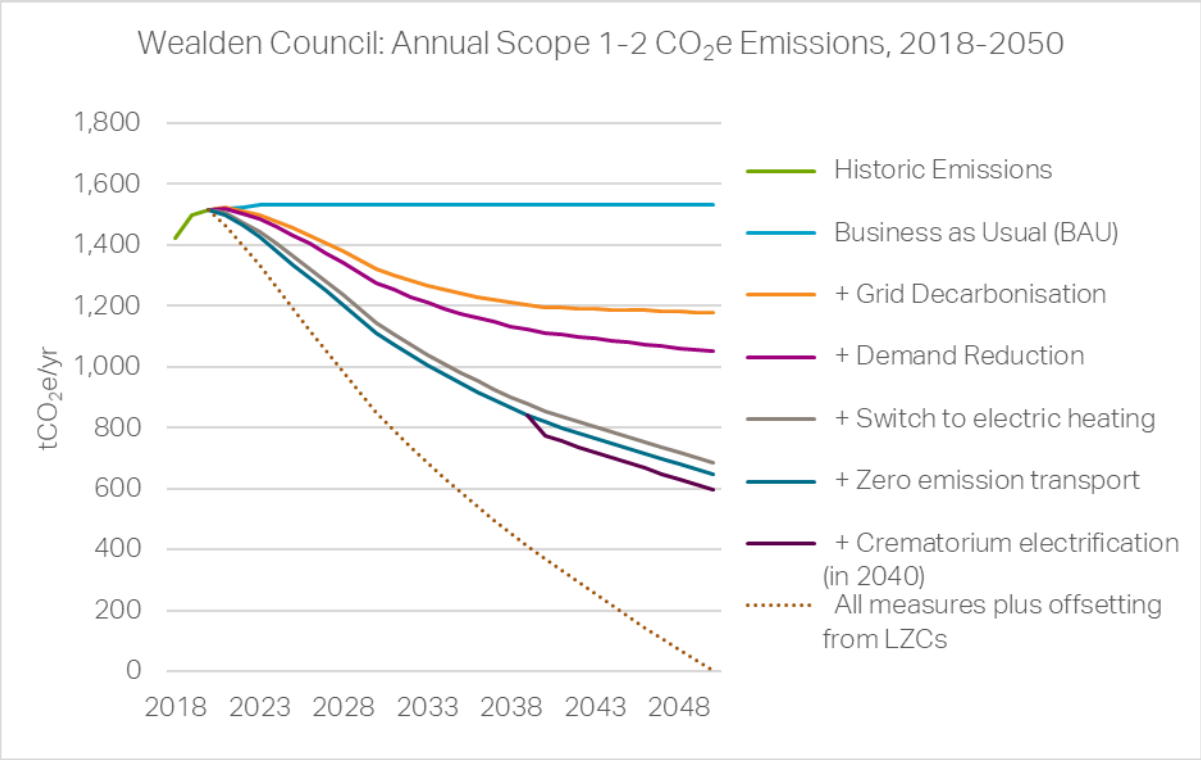


Figure 5: Wealden District Council annual Scope 1 and 2 'Future Trend' emissions (2018-2050)

The Council's own emissions will, like the District emissions, be increasingly dependent on grid decarbonisation. Many of the same reduction measures are applied but most notably the switch to zero emission vehicles has less of an impact given that the baseline transport emissions are a relatively small proportion.

Even with all reduction measures applied there will be significant residual CO_2e emissions that would require offsetting to achieve net zero carbon. Further work and consultation would be required to identify the most appropriate and cost-effective opportunities, but these could include:

- Investing in off-site renewable electricity generation such as solar PV farms
- Carbon sequestration through land management, woodland creation, and tree planting. For context, as a rough estimate, offsetting the Council's remaining 2018/19 CO_2e emissions (after all other measures are applied) would require conversion of around 170 hectares (1.7 square kilometres) of low-grade agricultural land to sustainably managed woodland.[3]

[3] Estimate based on an average of 3.56 tCO_2e / hectare of new woodland per year, based on nation-wide reporting by the UK Woodland Carbon Registry. See https://www.woodlandcarboncode.org.uk/uk-woodland-carbon-registry for more information.

Building energy audits

In order to identify specific opportunities for demand reduction measures in the Council's own buildings, AECOM carried out building energy audits on a range of properties owned and operated by Wealden Council, including:

- Cherry Tree Court (retirement living)
- Wealden Crematorium
- Crowborough Leisure Centre
- Helen Court (retirement living
- Wealden DC Offices and Civic Hall

Full details and recommendations have been provided to the Council in a separate report.

Priority areas and Action Plan

This work highlights that there is considerable uncertainty in the trajectory to 2050, and that there will be significant challenges in reducing energy demands and offsetting any remaining CO_2e emissions. The Council will need to actively work towards enabling the following in order to address both the Council's own emissions and emissions in the wider District:



In buildings, it will be necessary to reduce heat and power demands through fabric efficiency improvements and behavioural change. In addition to investing in the existing building stock, this means ensuring that any future development achieves a high standard of energy efficiency in order to minimise any increase in fuel consumption. Long term, all buildings (both new and existing) will need to switch from gas / fossil fuels to low and zero carbon heat sources such as heat pumps.



Uptake of LZC technologies and battery storage within the Council's own stock will reduce reliance on fossil fuels, reduce pressure on existing utility infrastructure, improve security of supply, and mitigate against price fluctuations.



A transformation in the transport sector must take place, reducing vehicle use / mileage through behavioural change and modal shift will be necessary along with the replacement of all existing petrol and diesel engine vehicles with low and zero emission vehicles.



Private road vehicles will continue to be a dominant energy user in the District and although outside of the sphere of direct influence from the Council a focus on increasing the switch to zero emission vehicles will be key. The Council can both set an example and reduce its own emissions by switching all its vehicles to electric models when replaced and install electric vehicle charging points on its own estate.



In order to offset any remaining CO_2e emissions, the Council will need to explore additional measures, such as promoting carbon sequestration through sustainable woodland management or investing in large-scale renewable energy generation. It is important to note, however, that carbon offsetting is not enough to achieve the net zero target on its own – success relies on maximising demand reduction and renewable electricity generation as a high priority.

The detailed recommendations from the study are set out in an Action Plan which aims to support the Council in delivering the intervention measures required to realise their net zero carbon ambition.

Conclusion

The results of this study show that the route towards net zero carbon will require ambition and commitment, backed up by significant interventions and investment across Wealden District Council's operations. Although the study shows that meeting the decarbonisation target will rely upon factors outside of the Council's control, the fundamental actions required to deliver the net zero target are clear and can be set into action now.

1. Introduction and context

1.1 Wealden District Council's Climate Emergency Declaration

On July 24th 2019, Wealden District Council unanimously agreed to declare a Climate Emergency and committed to becoming carbon neutral by 2050.

As part of this commitment, the Council resolved to develop an initial evidence-based Climate Emergency Plan that would identify the key actions and intervention measures required to meet the net zero target, describing the scale of impact along with a discussion of the practicalities and resource implications.

1.2 Purpose of this study

AECOM has been commissioned to support Wealden District Council in producing their Climate Emergency Plan. This work is intended to provide the Council with an understanding of their own carbon emissions baseline, as well as that of the District as a whole, and identify the steps that need to be taken to achieve the decarbonisation target.

The recommendations in this Climate Emergency Plan have been informed by carbon emissions modelling that accounts for key technological trends and policy changes that are expected to take place at national, regional and local levels over the coming decades.

The proposed action plan has been developed through engagement with the Council, to ensure that it reflects the unique circumstances and priorities of Wealden as it looks towards the future.

> **Units for greenhouse gas emissions reporting: CO_2e**
>
> Results are reported in terms of 'carbon dioxide equivalent' emissions, or CO_2e. This unit of measurement is intended to reflect the total global warming potential of a range of greenhouse gases, including carbon dioxide, methane, and nitrous oxide.

1.3 Drivers for achieving Net Zero Emissions

Nation-wide

Various targets and regulatory drivers have been created at a national and international level to incentivise action to avoid the potentially devastating impacts of climate change, including:

- The UK Climate Change Act 2008 (2050 Target Amendment) Order 2019 – This policy legally commits the UK Government to deliver net-zero emissions by the year 2050, compared with a 1990 baseline.[4] As described by the UK Committee on Climate Change (CCC), *'The Act provides the UK with a legal framework including a 2050 target for emissions reductions, five-yearly 'carbon budgets' (limits on emissions over a set time period which act as stepping stones towards the 2050 target), and the development of a climate change adaptation plan.'*[5] The CCC is an independent statutory body which sets the magnitude of carbon budgets; the Government must prepare policies accordingly.
- The Paris Climate Agreement –The UK ratified the Paris Climate Agreement in November 2016. The Agreement's central aim *'is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2º Celsius above pre-*

[4] The original (2008) target of 80% was amended through subsequent legislation in 2019. *See 'The Climate Change Act 2008 (2050 Target Amendment) Order 2019'*: http://www.legislation.gov.uk/uksi/2019/1056/contents/made
[5] https://www.theccc.org.uk/tackling-climate-change/the-legal-landscape/

industrial levels and to pursue efforts to limit the temperature increase even further to 1.5º Celsius."[6]

Some of the key documents are outlined below, particularly those related to decarbonising heat, energy and transportation within the UK. These do not fully capture the wide range of environmental, social, and economic drivers for taking action, but have been used to inform the analysis and assumptions that underpin this Climate Emergency Plan.

Building Regulations (Part L)

Part L of Building Regulations is the key mechanism that prescribes standards for the conservation of fuel and power in buildings in the UK, based on metrics such as the estimated level of energy demand and CO_2e emissions. At the time of writing, the Ministry of Housing, Communities and Local Government (MHCLG) had released a consultation on proposed future standards, that would significantly reduce emissions from new domestic buildings in the UK. The consultation also states that Government intend to consult on making improvements to Building Regulations requirements for existing domestic buildings as well as new and existing non-domestic buildings. [7]

The Road to Zero (2018)

The Road to Zero report,[8] published in July 2018, sets out the Government's core mission to '*put the UK at the forefront of the design and manufacturing of zero emissions vehicles and for all new cars and vans to effectively be zero emission by 2040.*' The strategy furthers the ambitions of the NO_2 (nitrogen dioxide) plan[9] and Clean Growth Strategy (see following section) in defining key policies with primary focus upon introduction of low and zero emission vehicles, with the aim that *'at least 50%, and as many as 70%, of new car sales and up to 40% new van sales being ultra low emission by 2030. By 2050 we want almost every car and van to be zero emission.'*

In supporting these longer-term ambitions, the strategy outlines supporting policy action toward fulfilment of these broader goals, including:

- Reducing emissions from existing vehicles on the road;
- Extension of the Clean Vehicle Retrofit Accreditation Scheme (CVRAS) beyond its current scope to include both vans and black cabs; and
- Developing a strategy to tackle HGV and freight-related emissions through Highways England research.

The Government has stated that local action will be supported through new policies, including provision of funding to extend ultra low emission bus schemes and taxi charging infrastructure. Ongoing goals to encourage uptake of clean new vehicles will be backed by developing electric vehicle infrastructure and offering funds and grants for provision of electric charge points. The Government also intends to support further research into zero emission vehicle design and manufacturing techniques and next generation battery technologies which would help to improve performance and promote uptake.

[6] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[7] BEIS, *'The Future Homes Standard Consultation'* (2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/843757/Future_Homes_Standard_Consultation_Oct_2019.pdf

[8] HM Government, *'The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy'* (2018) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739460/road-to-zero.pdf

[9] Air quality plan for nitrogen dioxide (NO_2) in UK (2017) https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017

Clean Growth Strategy (2017)

The UK Clean Growth Strategy[10] was published in October 2017 and sets out the Government's vision for decoupling economic growth from carbon emissions. It includes objectives for increasing generation of energy from renewable sources, increasing the delivery of clean, smart and flexible power and accelerating the shift to low carbon transport, smart grids and energy storage. The delivery of low carbon heating is identified as a priority, indicating that heat pumps, district heating networks and a hydrogen gas grid could all support the scale of change required, while acknowledging the significant technical and financial obstacles.

The Clean Growth Strategy also discusses the need to improve energy efficiency in buildings, particularly the existing stock. This includes a strategy of progressively increasing the minimum Energy Performance Certificate (EPC) ratings that will be considered permissible in order to allow the sale or rental of buildings, as required by the Minimum Energy Efficiency Standards (MEES) regulations. [11]

UK Industrial Strategy (2017)

The UK Industrial Strategy[12], published in November 2017, echoes some of the priorities laid out in the Clean Growth Strategy and further emphasises how clean growth can boost economic prosperity within the UK. It indicates the Government's intention to support electric vehicle uptake, through £400m investment in charging infrastructure and by extending the plug-in car grant. The Industrial Strategy also indicates that, in future, Building Regulations will be updated *'to mandate that all new residential developments must contain the enabling cabling for charge-points in the homes.'*

Regional

Environment Strategy for East Sussex (2011)

The Environment Strategy for East Sussex[13] outlines a commitment to protect the environment, reduce carbon emissions and adapt to climate change. Published in 2011, the Strategy considers a 15-year timeframe (i.e. up to 2026). As described by the East Sussex County Council (ESCC), *'key aims of the strategy include:*

- *minimising the amount of waste created and getting more waste re-used and recycled*
- *reducing carbon emissions and the use of fossil fuels*
- *improving habitats to reverse and prevent the loss of plant and animal species*
- *creating healthy seas and sustainable fisheries*
- *promoting the use of open and green spaces for healthy and active lifestyles*
- *promoting the economic value of the environment and its opportunities for growth in jobs and prosperity.'*

Draft East Sussex Environment Strategy (2019)

The draft Environmental Strategy for East Sussex[14] seeks to *'contribute to the emerging urgent global and local environmental challenges and to maximise the available opportunities.'* The strategy identifies

[10] HM Government *'Clean Growth Strategy'* (2017). Available at: https://www.gov.uk/government/publications/clean-growth-strategy

[11] The *'Energy Efficiency (Private Rented Property) (England and Wales)'* Regulations 2015 introduced the Minimum Energy Efficiency Standard (MEES) for buildings across the UK. For further information, see https://www.gov.uk/government/publications/the-private-rented-property-minimum-standard-landlord-guidance-documents

[12] HM Government, *'Industrial Strategy: Building a Britain Fit for the Future'* (2017). Available at: https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

[13] East Sussex Strategic Partnership, *'Environment Strategy for East Sussex'* (2011). Available at: https://www.eastsussex.gov.uk/media/1988/environment_strategy_for_east_sussex.pdf

[14] East Sussex Environment Board, 'East Sussex Environment Strategy' (2019 draft). Available at: https://www.eastsussex.gov.uk/media/14251/east-sussex-environment-strategy-2019-draft.pdf

local specific challenges and opportunities. The following five priority environmental themes have been identified within the strategy: climate change, natural capital, air quality, water and resource efficiency. The draft Environment Strategy includes:

- Long term aims for each of the environmental themes;
- Actions that the Environment Board will lead on in the short-term;
- Examples of programmes and projects already being delivered nationally and locally; and
- Indicators to monitor progress in implementing the Environment Strategy.

East Sussex Local Transport Plan (2011)

The Local Transport Plan[15] (LTP3) covers the years 2011-2026. It includes a broad-ranging strategy for improving transport within East Sussex, and specifically identifies South Wealden as an area which could particularly benefit from sustainable transportation infrastructure. This includes, but is not limited to:

> *'... promotion and infrastructure for public transport e.g. accessible bus stops, shelters [...] implementation of infrastructure to support integrated sustainable travel – walking, cycling, public transport, car sharing etc. For example – bus priority measures, cycle lanes and facilities, improvements to pedestrian routes to key trip attractors, better rail / bus / cycle interchanges [and] charging points for electric vehicles and smart ticketing initiatives...'*

LTP3 also acknowledges the need to *'look at non-transport measures which reduce the need to travel to access services.'* As evidenced in Section 2 of this report, the transportation sector accounts for nearly half of CO_2e emissions in Wealden District, and is therefore considered a priority area for intervention measures.

South2East Local Energy Strategy (2018)

The South2East Energy Strategy[16] was developed by three Local Enterprise Partnerships (LEPs), which are joint private / public organisations intended to drive economic growth in a broad geographic area encompassing Wealden District. The Strategy outlines a vision for achieving clean growth through the year 2050, with a focus on the power, heat and transportation sectors.

It highlights several key opportunities for the region, including:

- Significant renewable energy potential, especially solar, wind, energy from waste and landfill gas;
- Rich natural assets (including a high proportion of woodland); and
- Large amounts of planned new development within the region, offering opportunities for deployment of smart, integrated, sustainable energy system models.

Wealden is specifically identified as having the potential for district heating systems[17] and this is reflected in the actions listed in Section 4.1.

Local

Local Plans (2019)

Wealden District Council (WDC) is responsible for preparing strategic development plans in the part of Wealden District that is not within the South Downs National Park. WDC is required to adopt a Local

[15] East Sussex County Council, *'Local Transport Plan'* (2011). Available at: https://www.eastsussex.gov.uk/media/2336/ltp3_main_doc_2011-2026.pdf
[16] Energy South2East, *'South2East Local Energy Strategy'* (2018). Available at: https://www.southeastlep.com/app/uploads/2019/03/Local-Energy-Strategy-FINAL.pdf
[17] Energy South2East, *'Action Plan and Project Models'* (2018). Available at: https://www.southeastlep.com/app/uploads/2019/03/Action-plan-and-project-models_FINAL.pdf

Development Scheme, which sets out the Development Plan Documents that will be produced. There are several documents that constitute the Development Plan for the area:

Wealden Local Plan (1998) – Saved Policies

The Wealden Local Plan[18] was prepared by Wealden District Council to guide development across the whole administrative District. The adopted Wealden District Local Plan contains several saved policies relevant to sustainable development within Wealden District, including policy EN1 Sustainable Development which requires consideration of incorporating renewable energy and reducing the need to travel.

Core Strategy (2013)

The Core Strategy[19] was adopted in 2013 and sets out how the places and communities within Wealden will change up until 2027. The Core Strategy Local Plan comprises a long-term spatial vision and strategic objectives for the Wealden District area for the period 2013 to 2027, including the area within Wealden which is in the South Downs National Park.

The Core Strategy includes spatial planning objectives to ensure development takes full account (by mitigation or adaptation) of the likely forecast impacts of climate change including: minimising the emissions of greenhouse gases; the use of non-renewable energy and natural resources; and by encouragement of construction using sustainable techniques.

In addition to the spatial planning objectives, the Core Strategy provides policies relevant to the Climate Emergency Plan, including policies on sustainable development, climate change and sustainable construction.

Submission Wealden Local Plan (January 2019)

At the time of writing, the Wealden Local Plan is currently at late stages of development. It has been submitted for independent examination, and subject to hearings regarding key strategic matters including climate change, but has not yet been adopted. The emerging Local Plan sets out the ambition and vision for development within the area, including a range of policies and measures to adapt to and mitigate against climate change.

The Local Plan sets out objectives to manage carbon and greenhouse gas emissions, in particular:

- Adoption of developed low carbon and renewable technologies. (policy NE7);
- Manage proximity and access to growth areas for employment, limiting spread of development to reduce reliance on private motor vehicle travel. (AF1, WLP 3,7&9, SWGA1);
- Implement a greener infrastructure network and provide support for low carbon options; prioritising cyclists, pedestrians and public transport amenity. Providing electric vehicle charging infrastructure as appropriate in new development as well as in towns, villages and other public spaces. (AF2, INF3 & INF4); and
- Through terms of design ensuring energy efficiency of new development; use of high-quality materials, utility of solar gains and passive cooling. (BED1)

[18] Wealden Local PLAN (1998)
http://www.wealden.gov.uk/Wealden/Residents/Planning_and_Building_Control/Planning_Policy/Former_Local_Plan/Planning_Adopted_Wealden_Local_Plan_1998.aspx
[19] Wealden Core Strategy(2013)
http://www.wealden.gov.uk/Wealden/Residents/Planning_and_Building_Control/Planning_Policy/CoreStrategy/Core_Strategy_Local_Plan.aspx

Steps taken so far by the Council

Examples of recent local actions include, but are not limited to:

- Implementation of a comprehensive energy efficient retrofit of the WDC offices at Vicarage Lane site in Hailsham. This included installation of air source heat pumps, solar photovoltaic (PV) energy generation, passive ventilation, cycle storage, and dedicated car-share bays.
- Exploring opportunities for investment in low carbon and renewable energy technologies, including heat networks. For example, there is an aspiration for the redevelopment of Vicarage Field Shopping Centre in Hailsham to become an 'exemplar project' in sustainability terms, with the potential to incorporate a low carbon heat network, solar PV, battery storage, and electric vehicle (EV) charging points.

2. Carbon emissions baseline

2.1 Scope of the analysis

In accordance with the Greenhouse Gas (GHG) Protocol[1] and the Department of Business, Energy and Industrial Strategy (BEIS) '*Emissions Reduction Pledge 2020*' guidance,[2] for the purpose of greenhouse gas reporting, emissions are divided into three categories:

- Scope 1 – This refers to direct emissions from the combustion of fuels such as gas, oil, petrol, diesel, coal, or wood. This primarily includes fuel used in homes and other buildings to provide heating and hot water, and petrol or diesel used in vehicles. For the District-wide emissions estimates, this is restricted to fuels used within the geographic boundaries of Wealden District. In the case of the Council's own emissions, this not defined on a geographic basis, but is instead limited to buildings and vehicles where the Council is responsible for paying the for the fuel. So, for example, this excludes leased buildings which form part of the Scope 3 emissions.
- Scope 2 – Indirect emissions associated with the generation of electricity. For the District-wide estimate, this includes emissions from any electricity purchased for use within the District. In the case of the Council, this includes emissions from any electricity purchased by the Council, without regard to a specific geographic area.
- Scope 3 – Other indirect emissions that result from activities taking place within Wealden (in the case of the District-wide emissions), or activities of the Council (for the Council's own emissions), at any point in the value chain. This includes emissions from water treatment, waste management, commuting, and the fuels required to manufacture and transport goods. For the Council's own emissions, this includes emissions associated with buildings and services linked to the Council but where it is not responsible for paying the fuel bills, for example leased properties, the leisure centres and the waste management system.

Wealden District emissions

The carbon emissions baseline for the Wealden District has been developed based on figures provided by the Department of Business, Energy and Industrial Strategy (BEIS). The dataset, which covers Scope 1 and 2 emissions for the District, is published annually; 2017 is the most recent year for which data is available. Historic emissions from 2005-2017 are presented for context, along with estimates of renewable energy capacity and uptake of electric vehicles.

Note that the BEIS dataset does not cover all potential sources of greenhouse gas emissions within the Local Authority. For example, in the agricultural sector, it includes the CO_2e emissions from fuels used in agricultural processes and vehicles but does *not* include methane emissions from livestock. At the time of writing it is understood that such information is not published by BEIS at a Local Authority level. For more information, see Appendix A.

Wealden District Council emissions

The baseline for the District Council's emissions include Scope 1, 2 and some Scope 3 emissions where recorded data is available. Scope 1 and 2 emissions are presented separately and are used to model the projected future emissions. The baseline for the emissions has been taken as financial year 2018/19 based on the most recent complete set of energy data available.

This study primarily focuses on Scope 1 and 2 emissions. These are the areas where the Council can have the most impact and, given the limitations on resources (time and money) where we believe the Council should initially direct its efforts. A fully comprehensive study of Scope 3 emissions would take a considerable amount of time and it would be difficult to generate accurate or meaningful results, considering the wide range and complexity of this field and the broad assumptions that would be required. The additional time and resource would be better focused on minimising Scope 1 and 2 emissions. Furthermore, the Council's Scope 3 emissions will represent the Scope 1 & 2 emissions of other parties and should hopefully reduce as they also decarbonise their operations.

The best way the Council can exert influence with regards to Scope 3 emissions is through procurement, where sustainability can be part of the selection process and reporting requirements to drive this decarbonisation agenda, which has been reflected in the Action Plan in Section 4.

2.2 Wealden District baseline

Fuel consumption

This section discusses the sectors and fuel types that contribute to CO_2e emissions in Wealden District, which helps to provide context for understanding the baseline.

Figure 6 presents a breakdown of fuel consumption in Wealden by sector and fuel type for 2017, as reported by the Department of Business, Energy and Industrial Strategy (BEIS).[20] Because the level of information varies for different sectors, in the interest of simplicity and clarity, for the purpose of this report sectors have been grouped as follows:[21]

- Non-domestic: Includes fuel used in the industrial, commercial, public and agricultural sectors, for uses other than transportation
- Domestic: Domestic sector uses other than transportation
- Transport: Includes both road and rail transportation, although rail represents a very small portion of the total. Electricity used for transport, is not yet represented in the BEIS dataset.
- Bioenergy and energy from waste (referred to as 'Bioenergy & Waste') are not reported by sector and are therefore shown separately.
- 'Petroleum products' includes fuels such as oil, kerosene, and liquefied petroleum gas.

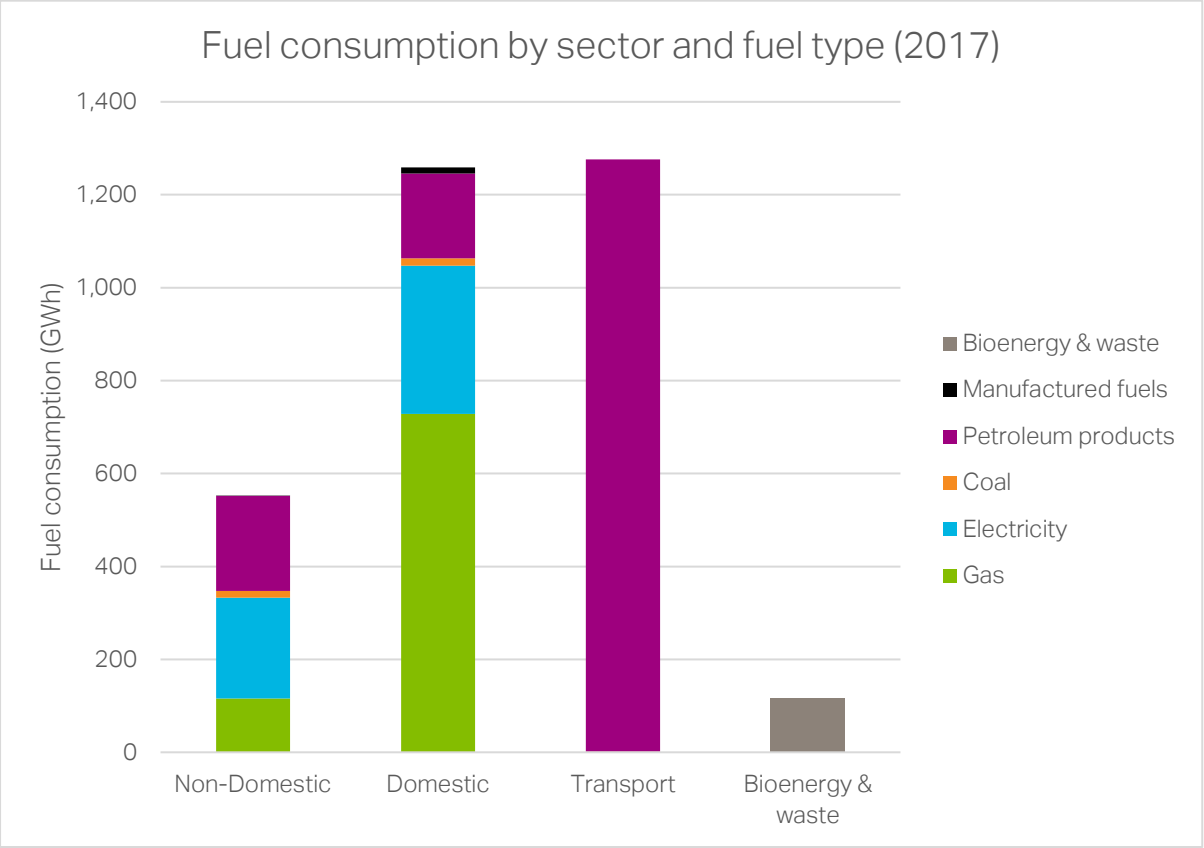


Figure 6: Wealden District fuel consumption by sector and fuel type

[20] BEIS, *'Sub-national total final energy consumption statistics: 2005-2017'* (published in 2019). Available at: https://www.gov.uk/government/statistical-data-sets/total-final-energy-consumption-at-regional-and-local-authority-level

[21] For further information, see BEIS, *'Sub-national methodology and guidance booklet'* (2018). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/771895/Sub-national_Methology_and_Guidance_Booklet_2018.pdf

As of 2017, the transportation sector accounts for the highest proportion of fuel consumption (39.8%), closely followed by the domestic sector (39.3%). The non-domestic sector accounts for approximately 17.2% of the total.

For buildings in the domestic sector, approximately 57.9% of fuel consumed is gas (used for heating and hot water), and 25.4% is electricity. Petroleum products account for around 14% of total fuel use in the domestic sector, reflecting the relatively high proportion of buildings that use oil for heating (used by around 14% of all domestic properties as of 2011 according to Census data).[22] In the non-domestic sector, on the other hand, demand for electricity and petroleum products is higher (39.3% and 37.1% respectively), whereas gas consumption makes up around 20% of the total for this sector.

Petroleum consumption, which represents 51.8% of total fuel used, is predominately associated with road transport. Focusing on road transportation in more detail, Figure 7 below shows that around 68.2% of fuel is used in either petrol or diesel cars.[23] Light goods vehicles (LGVs) make up around 20.8% of fuel use, and heavy goods vehicles (HGVs) around 8.3%. Buses and motorcycles combined account for less than 3%.

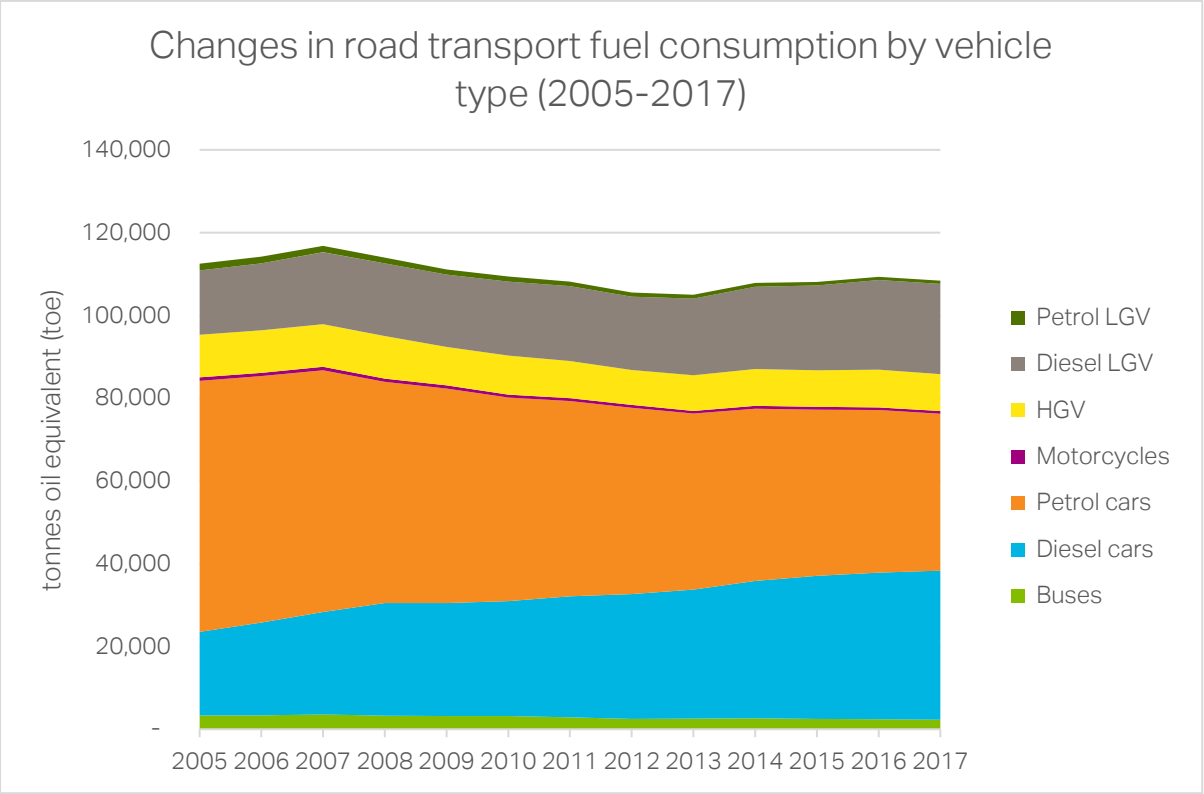


Figure 7: Wealden District fuel consumption by vehicle type

Since 2005, there has been a decrease in fuel use overall, including petroleum products (-8%), natural gas (-19%) and electricity (-4%). This is shown in Figure 8 below. All these factors contribute towards decreasing CO_2e emissions, but the change in electricity consumption has a disproportionately large impact. This will be discussed further in the next section.

[22] UK Census, *'Central Heating (Quick Stats) QS415EW'* (2011). Available at: http://www.ukcensusdata.com/wealden-e07000065
[23] BEIS, *'Sub-national road transport fuel consumption 2005-2017'* (published 2019). Available at: https://www.gov.uk/government/collections/road-transport-consumption-at-regional-and-local-level

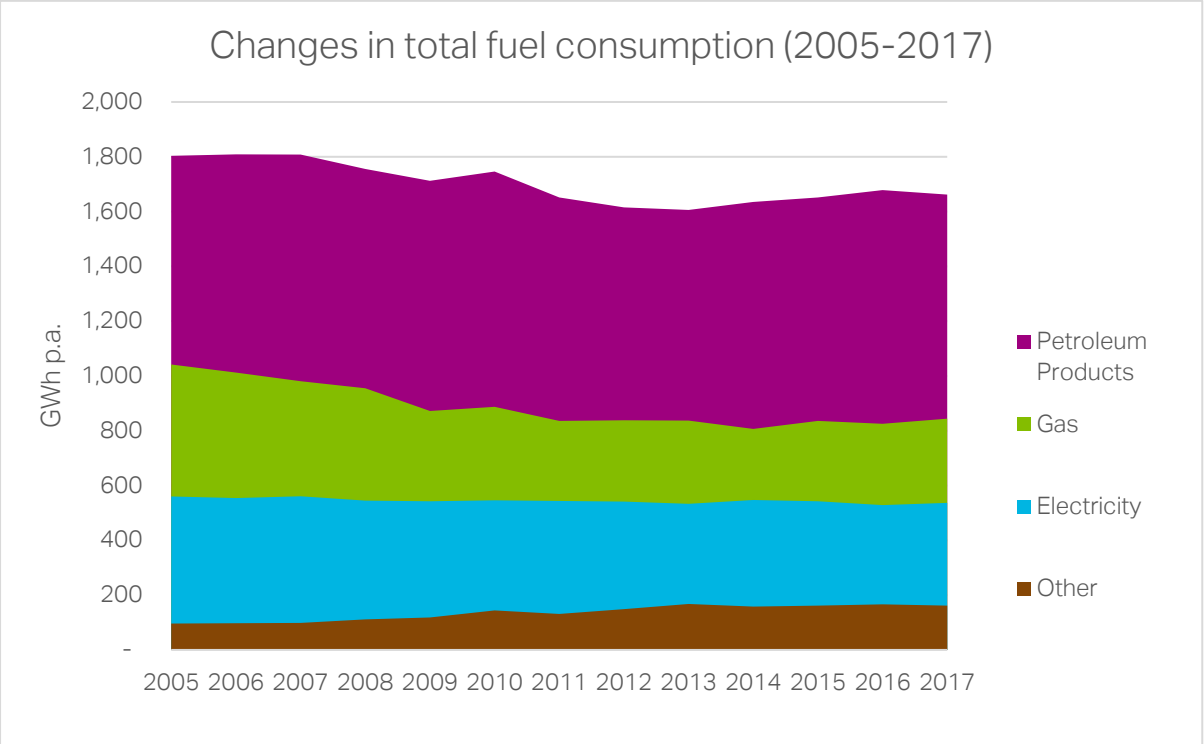


Figure 8: Wealden District changes in fuel consumption

Carbon emissions

Based on the above data, total CO_2e emissions in the Wealden District were 636 $ktCO_2e$ as of 2017. Table 1 presents a breakdown of emissions by sector and fuel type.[24]

	Non-domestic ($ktCO_2e$)	Domestic ($ktCO_2e$)	Transport ($ktCO_2e$)	Total (unadjusted) ($ktCO_2e$)	Total (adjusted) ($ktCO_2e$)
Gas	21.4	135.1	-	156.5	Land use, land use change and forestry (LULUCF)* adjustment: -135.7
Electricity	55.2	81.2	-	136.4	
Other	40.6	51.1	-	91.7	
Agriculture	23.0	-	-	23.0	
Transport	-	-	364.0	364.0	
Total by sector	**140.2**	**267.4**	**364.0**	**771.7**	**636.0**
Percent of total	*18.2%*	*34.7%*	*47.2%*		

Table 1: Wealden District CO_2e emissions (2017 data)

** The adjustment for Land Use, Land Use Change and Forestry[25] (LULUCF) emissions reflects the fact that certain land use activities, such as cutting down or planting trees, results in CO_2e being added or removed from the atmosphere.*

Figure 9 highlights that the majority of the CO_2e emissions (47.2%) in the District are related to the transport sector, followed by domestic buildings (34.7%). Non-domestic buildings account for the smallest proportion, at 18.2%. LULUCF activities result in a significant net *removal* of atmospheric CO_2e, and in 2017 this had the effect of reducing total emissions by around 17.5%. This reflects the relatively rural character of the District, which includes large areas of woodland.

[24] BEIS, *'UK local authority and regional carbon dioxide emissions national statistics: 2005-2017'* (published in 2019).
[25] BEIS, *'Local and Regional Carbon Dioxide Emissions Estimates 2005-2017: Technical Report'* (2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812146/Local_authority_CO2_technical_report_2017.pdf

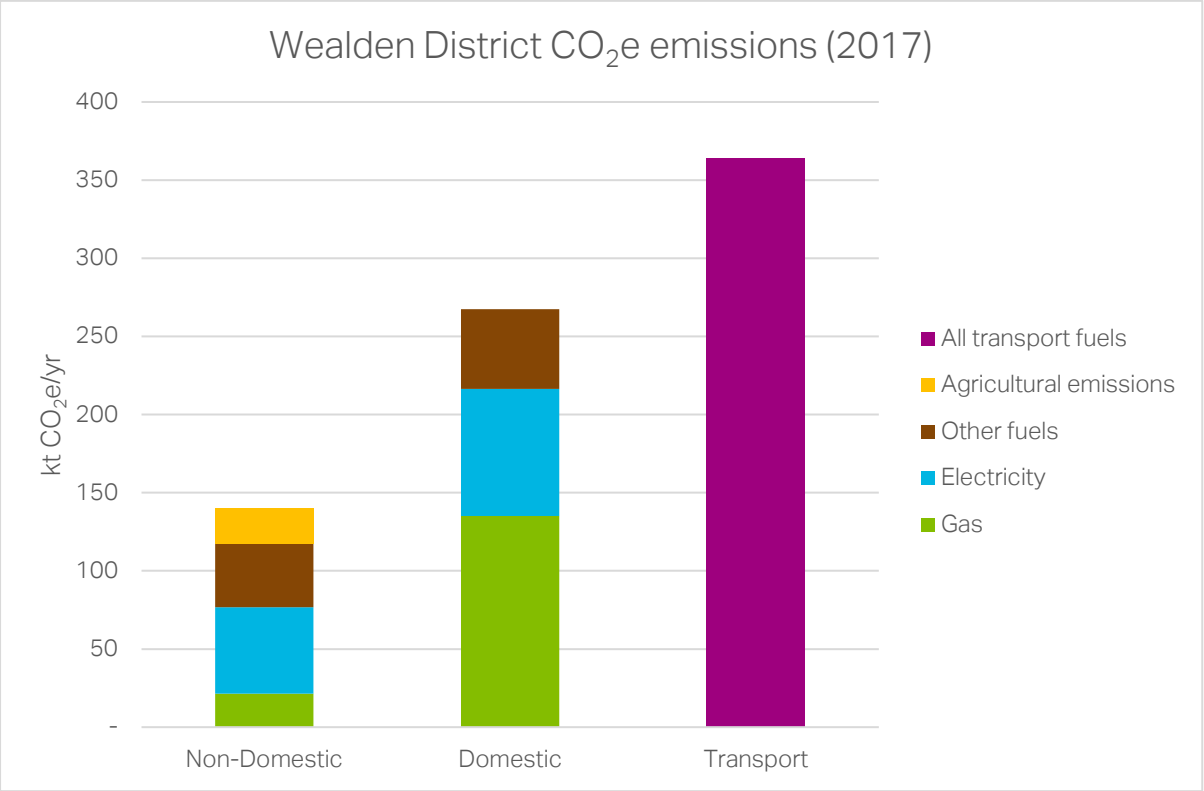


Figure 9: Wealden District CO_2e emissions by sector and fuel type in 2017

In order to place these figures into context, it is helpful to consider historic trends. On average, as shown in Figure 10, total CO_2e emissions have fallen by roughly 31% between 2005 and 2017. This is in line with national and regional trends (-32% nationally and -33% in East Sussex).

Decreasing fuel consumption (as illustrated in Figure 8) accounts for only a little more than half of the CO_2e emissions reductions achieved over this time. The remainder is due to decarbonisation of the national electricity grid, which saw emissions decrease from 0.52 $kgCO_2e/kWh$ in 2005 to 0.25 $kgCO_2e/kWh$ in 2017. This is a significant finding that is discussed further in Section 3.4.

The scale of carbon sequestration from LULUCF activities also increased by around 21% in this period, although it should be noted that there is a higher level of uncertainty associated with these estimates compared with estimates for CO_2e emissions from gas, electricity and petroleum products.

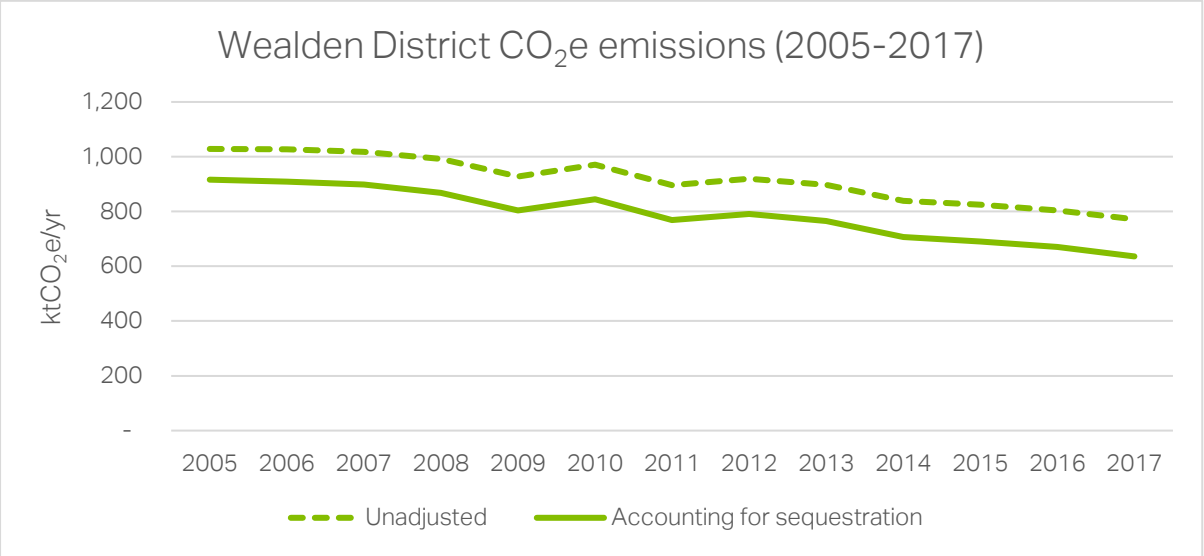


Figure 10: Wealden District historic carbon emissions, 2005-2017

2.3 Wealden District Council baseline

Carbon emissions

Wealden District Council's own Scope 1 and 2 emissions equate to roughly 0.2% of the total Wealden District Scope 1 and 2 emissions. Total CO_2e emissions for the Council for financial year 2018/19 were 1,424 tCO_2e. This was determined by metered energy consumption[26] and recorded vehicle mileage. Table 2 below presents a breakdown of carbon emissions by category and fuel type.

Fuel	Units	Retirement Living (residential)	Office	Cremat-orium	Other	Council Owned Vehicles	Total
Electricity	tCO_2e	193[27]	148	7	19	-	366
Gas	tCO_2e	978	41	-	-	-	1,019
Transport	tCO_2e	-	-	-	-	39	39
Total by sector	**tCO_2e**	**1,171**	**188**	**7**	**19**	**39**	**1,424**
Percent of total	-	82.2%	13.2%	0.5%	1.3%	2.7%	

Table 2: Wealden District Council Scope 1 and 2 carbon emissions (2018/19 data)

Figure 11 highlights that most of the Council's carbon emissions (82%) are from the residential stock where the energy bills are initially paid for by the Council. Most of the residential buildings are Retirement Living properties. 'General needs' Council houses, numbering at over 3,000 in the District, are not included in the Council's emissions as the bills are paid directly by the occupants. Emissions from these properties are included in the Wealden District statistics from Department of Business, Energy and Industrial Strategy (BEIS). However, where there are communal supplies paid for by the Council, such as stairwell lighting, then these are included in the Council's emissions.

The crematorium is a relatively new facility in the Wealden District. Figure 11 includes the predicted increase in annual emissions from the crematorium by 2024, by which time it is anticipated that the number of cremations will be approximately 1,200 per year. The energy use is based on a combination of historic metered electricity demand plus estimating the typical gas consumption per cremation given typical new cremator gas usage.

It should be recognised that, although the District's emissions increase by adding a new crematorium, it is expected to lower the number of cremations that would have been carried out in surrounding local authority districts and reduce travel distances. The newer facility should therefore offer the wider region a lower net carbon emission option for cremations.

[26] Gas and electricity data reported from April 2018 to March 2019
[27] The electricity consumption includes electricity supplied to the communal areas of the 'General needs' Council houses and paid for by the Council

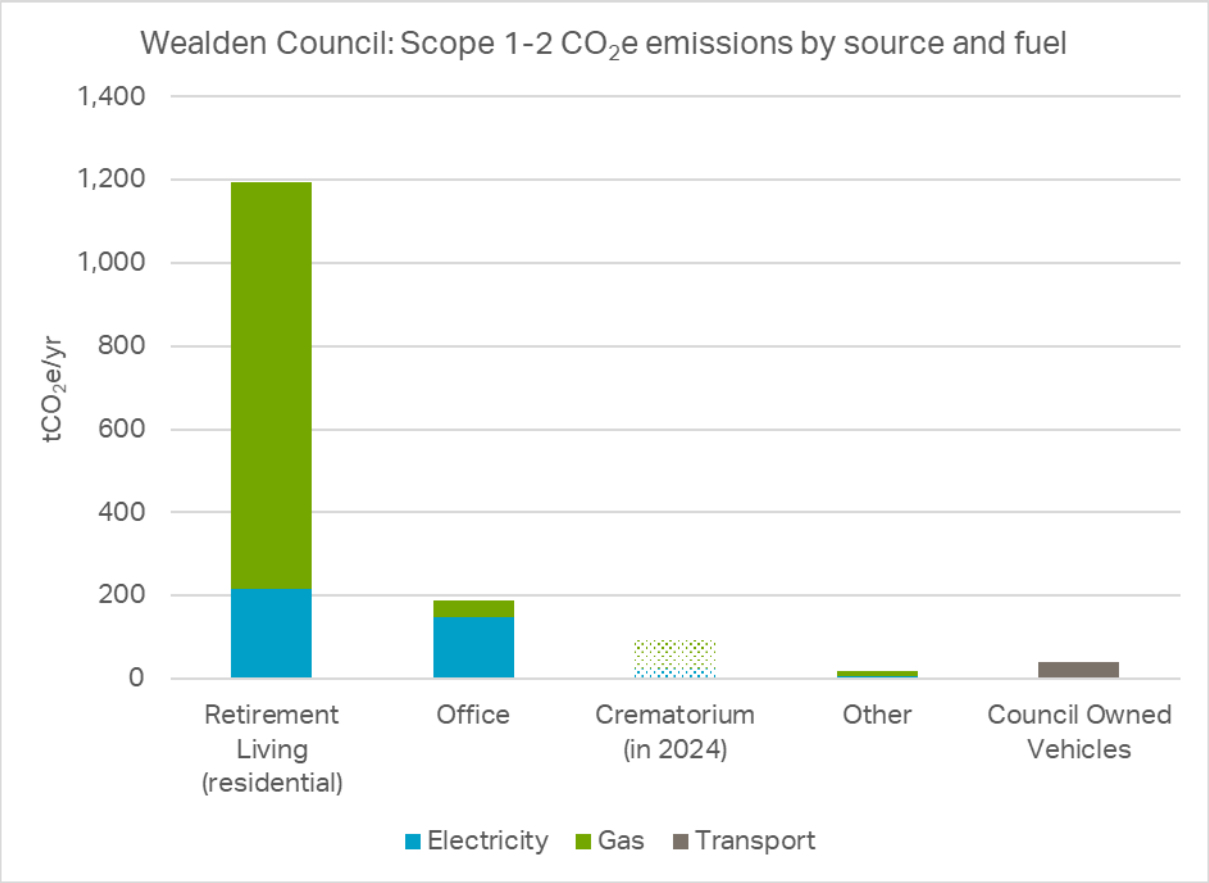


Figure 11: Wealden District Council Scope 1 and 2 CO_2e emissions (2018/19 data)

In Figure 12, the results show that gas and electricity use in buildings accounts for most of the Scope 1 and 2 emissions (72% and 26%, respectively). The emissions from the Council's own vehicles are relatively small at 2% but this is as expected, given that the fleet includes just 9 vehicles.

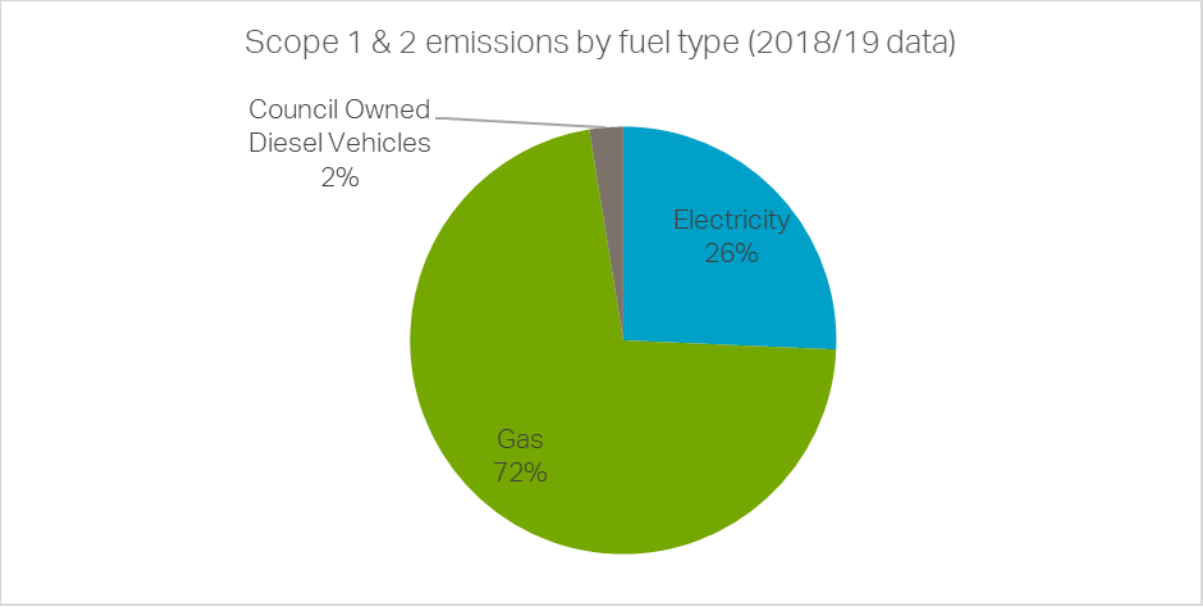


Figure 12: Wealden District Council Scope 1 and 2 CO_2e emissions by fuel type (2018/19 data)

A range of select Scope 3 annual carbon emissions for the District's Council are shown in Figure 13. If the emissions from the four leisure centres were included in the Scope 1 and 2 emissions total, they would equate to 38% (824 tCO_2e p.a). They are not included in Scope 1 and 2 as the energy bills are not directly paid for by the Council and the facilities are operated by a third party. However, it is understood

that the Hailsham Leisure Centre, which is located adjacent to the Council offices, uses the same meter for part of its electrical supply. This portion is therefore currently being included in the Council's scope 2 emissions. Sub-metering will be required to disaggregate this data for future reporting (see Action Plan S5).

The extent of the Scope 3 emissions reported is limited to the available data. Further emissions associated with District Council's own operations can be reported subject to the full availability of data. These include:

- Water consumption for some buildings (data was provided for the Council's office and most retirement living schemes)
- Waste Collection (the Council has recently let a new waste contract and data was not available at the time)
- Business travel other than vehicle mileage (already recorded) for example rail and bus public transport

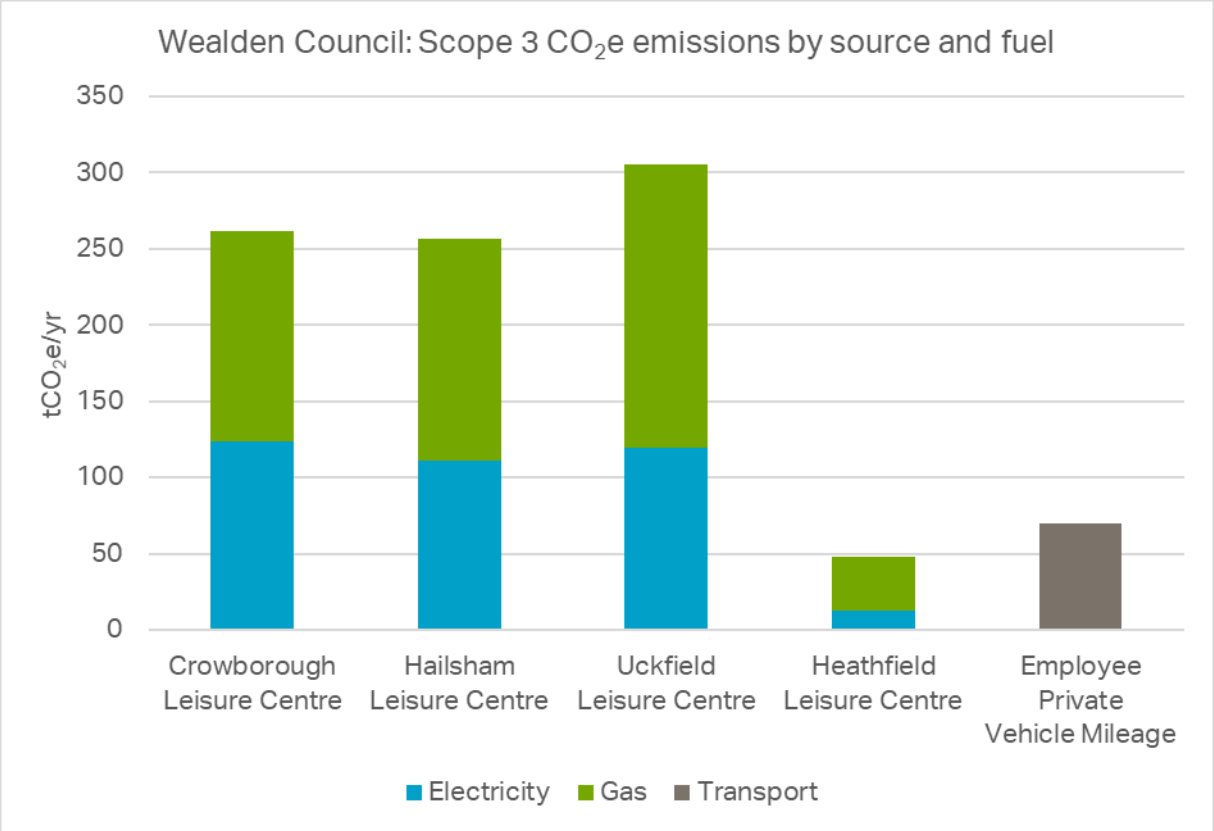


Figure 13: Wealden District Council select Scope 3 CO_2e emissions (2018/19 data)

Water consumption data has been provided by the Council for Vicarage Lane office and community hall for the financial year of 2018/19. The associated annual Scope 3 CO_2e emissions have been calculated as 6.1tCO_2e.

Water consumption data has also been provided by the Council for 11 of the 13 Retirement Living Courts for the financial year of 2018/19. The associated annual Scope 3 CO_2e emissions have been calculated as 20.3tCO_2e.

The Council are planning to work with the waste collection contractor to set up a reporting mechanism to obtain data for future reporting of the Council's Scope 3 emissions associated with their waste collection service. The emissions reported will include emissions from:

- Vehicle movements
- Building operation energy consumption required to provide the waste collection service provided on behalf of the Council

It is worth noting the data likely to be reported to the Council in future will increase the Council's reported Scope 3 emissions significantly.

2.4 Low carbon technologies in Wealden as of 2019

Renewable energy generation

According to the Renewable Energy Planning Database (REPD), there are a total of nine large-scale (100+ kW capacity) installations in operation as of September 2019, including eight solar farms and one onshore wind farm. One solar farm was granted planning permission in 2017 but has not been completed.[28]

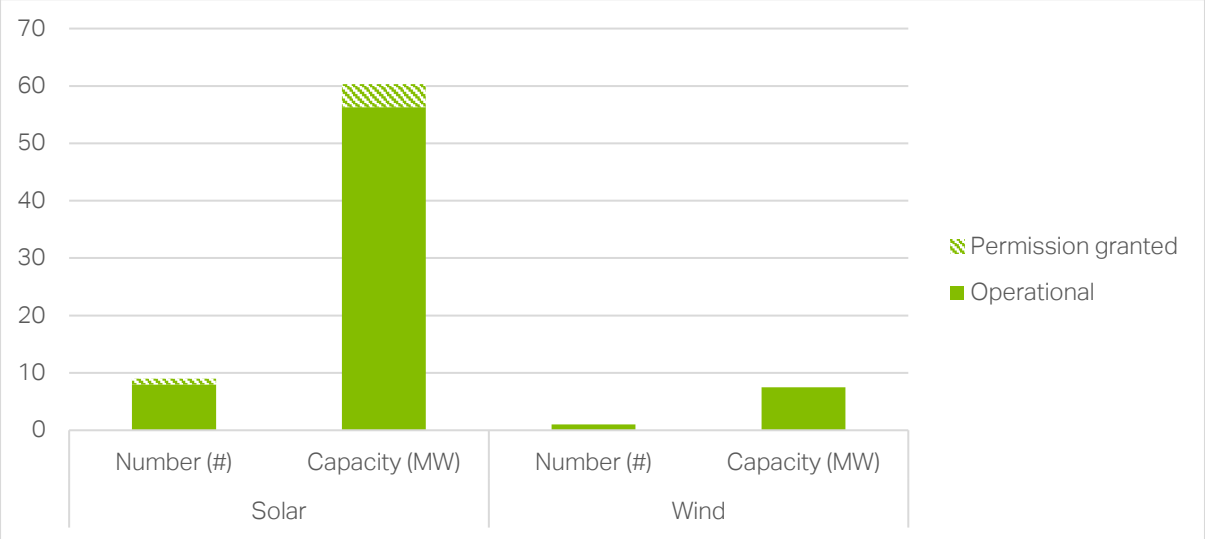


Figure 14: Large-scale (100kW+) LZC technologies in Wealden District

In addition, it is estimated that there are approximately 400 domestic photovoltaic (PV) installations per 10,000 households in Wealden District, based on Feed-in Tariff registrations. The table below shows the total number and type of smaller-scale Low or Zero Carbon (LZC) technology installations across the District.

Technology type	Photovoltaics			Wind	Micro CHP
Domestic / Non-Domestic	Domestic	Non-Domestic	Total	Total	Total
Cumulative number of installations	2,801	121	2,922	1	1
Cumulative installed capacity (kW)	11,524	7,865	19,390	5	1

Table 3: Small-scale (up to 100kW) LZC technologies in the Wealden District

Many of the Council's buildings have had solar PV panels installed on the roofs in order to harness and output electrical power. All are connected to the electricity grid, and any power not used by the building is exported to the grid. The benefit of reducing electricity demand from each building by installing the PV arrays is captured in the results reported in Table 2 and Figure 11. We are unable to quantify the energy yield that is exported to the grid as the buildings do not include export meters.

The recorded total solar PV yield for all the Council's arrays in 2018/19 was 171 MWh, which is equivalent to an emission offset of 43 tCO_2e based on the current carbon emission factor for the grid electricity displaced.

In addition, the Council has installed heat pumps in several of its buildings, including the main offices in Hailsham, 184 of its general needs houses and one retirement living scheme. A number of solar thermal

[28] BEIS, *'Renewable Energy Planning Database: Quarterly Extract – September 2019'* (2019). Available at: https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract

systems have also been installed on general needs housing and some 40 new build homes have had small solar PV arrays installed.

Low and zero emission vehicles

The chart below illustrates that there has been a significant increase in the number of Ultra Low Emission Vehicles (ULEVs)[29] registered in Wealden between 2011 and 2019 – although with only 604 registrations, these represent a small portion of the nearly 120,000 vehicles registered in the District.[30]

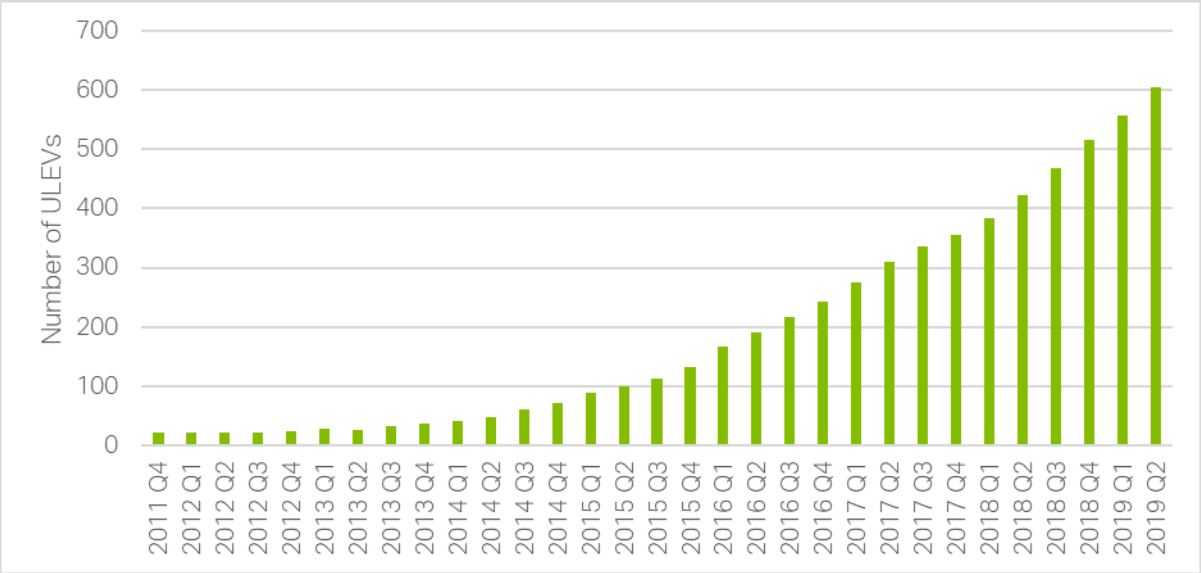


Figure 15: Ultra Low Emission Vehicle (ULEV) registrations in Wealden, 2011-2019

As of 2019, there are a total of 12 EV charging points within Wealden,[31] including two that are located at the Wealden District Council offices.

It is understood that none of the nine Council owned and operated vehicles are low or zero emission vehicles. All use diesel with annual mileage ranging from 6,000 to 20,000 miles and a combined total of 138,500 miles in 2018/19.

[29] Defined as *'vehicles that emit less than 75g of carbon dioxide (CO_2) from the tailpipe for every kilometre travelled. In practice, the term typically refers to battery electric, plug-in hybrid electric and fuel cell electric vehicles.'* See Department for Transport, *'VEH0132: Licensed ultra low emission vehicles by local authority'* (2019). Available at: https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01#licensed-vehicles

[30] Department for Transport, *'VEH0105: Licensed vehicles by body type and local authority'* (2019). Available at: https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01#licensed-vehicles

[31] According to maps produced by the Department for Transport: http://maps.dft.gov.uk/ev-charging-map/

3. Routes to Net Zero: Carbon emissions projections

3.1 Modelling approach and assumptions

Using the data collected in the baseline analysis, AECOM has projected carbon emissions to 2050, taking account of committed and planned national interventions, including national grid decarbonisation and the decarbonisation of heat and transport. The modelling methodology is described in detail in Appendix A.

The projections consider the relative scale and impact of the following variables:

- New dwellings and additional employment floorspace
- National grid decarbonisation
- Energy efficiency measures and behaviour change
- Switch to direct electric heating (DEH) or heat pumps
- Switch to zero emission vehicles
- Carbon offsetting through renewable energy generation
- Carbon sequestration

Because these changes are based on major national infrastructure transformations and are therefore subject to political and market forces, sensitivities associated with these actions will be tested to understand the potential range of emission reductions in a 'do-nothing more' baseline scenario.

It is important to note that these scenarios are *not* intended to predict actual fuel consumption or CO_2e emissions. Instead, they are used to highlight key issues, providing additional context and background to inform the actions and recommendations laid out in subsequent chapters of this Climate Emergency Plan.

3.2 Wealden District carbon emissions projections

The 'No Action' scenario

Figure 16 below shows the potential change in CO_2e emissions that would occur in a 'No Action' or business as usual scenario, in which fuel consumption remains steady, aside from a small increase due to the construction of new homes and office space as outlined in the submission Wealden Local Plan (Jan 2019). Although the new buildings are expected to be more energy efficient than the existing stock,[32] the projection assumes that no other actions are taken to reduce emissions.

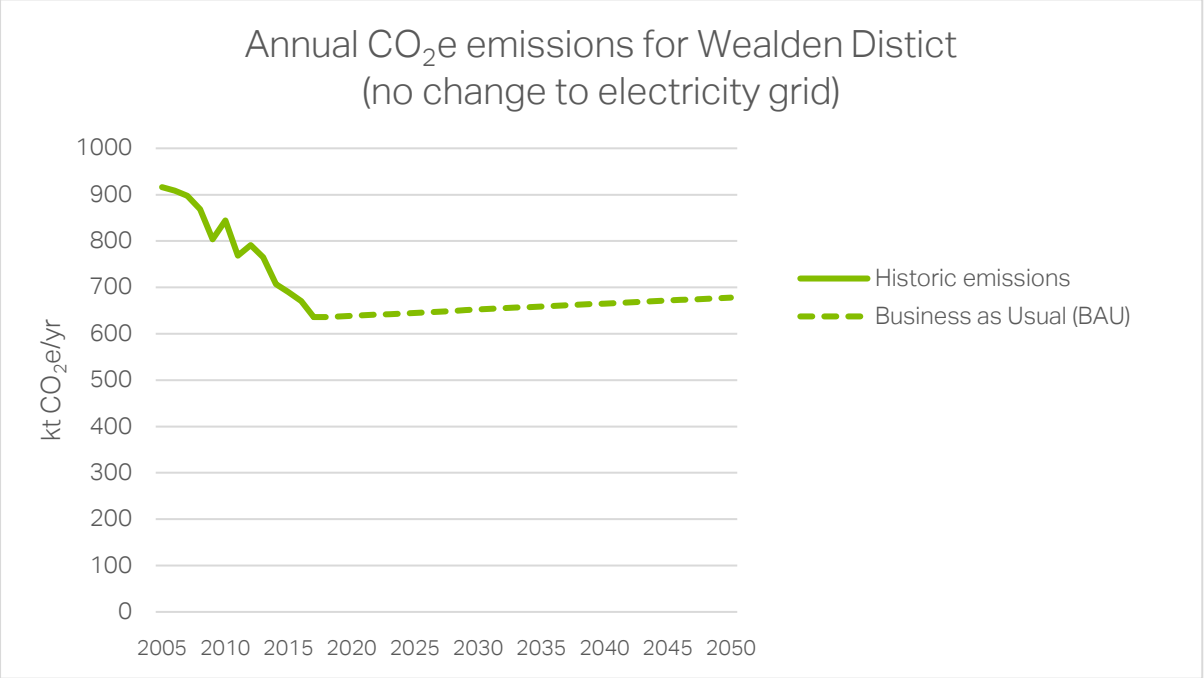


Figure 16: Wealden District-wide CO_2e emissions

This change could result in a roughly 7% increase in total CO_2e emissions for the District compared with 2017 levels.

Although this impact is relatively small, it is important to note that any increase in annual emissions will make the decarbonisation target more difficult to achieve. Therefore, it will be vital to ensure that all new development is constructed to the highest standard that is feasible.

In reality, this is a relatively optimistic 'No Action' scenario. CO_2e emissions depend on many variables, including changes in population, economic trends, energy prices, and weather, to name only a few, and many of these would tend to increase energy demand over time.[33] Nonetheless, the chart highlights two points:

First, in order to avoid increasing CO_2e emissions, all future development will need to be carbon neutral – or, if not, then the emissions must be mitigated through demand reduction measures, renewable energy generation and other forms of offsetting.

[32] Ministry of Housing, Communities and Local Government, *'The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings'* (2019). Available at: https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings

[33] For example, see the National Grid *'Future Energy Scenarios'* (2019). Available at: http://fes.nationalgrid.com/fes-document/



Second, as important as it is that all future development becomes carbon neural, the impact is relatively small compared to the scale of emissions from existing buildings and transportation.

This will require a transformation in the way that energy is used and delivered within all sectors. The remainder of this chapter will describe a range of potential intervention measures, along with their potential scale and impact, both individually and cumulatively.

Impacts of future trends

Changes to buildings

Emissions from fuel use in buildings[34] currently account for around 52.8% of total gross CO_2e emissions across the Wealden District (not accounting for LULUCF reductions). For the purpose of this analysis we have modelled three changes to the building stock: heating demand reduction, electricity demand reduction, and switching from gas boilers to electric heating (either direct electric or heat pumps).

1. Heating demand reduction (through fabric efficiency improvements)

Evidence from the National Energy Efficiency Database (NEED)[35] indicates that installing multiple energy saving measures (such as cavity wall / loft insulation or upgrading to a new boiler) can reduce heating bills by around 10%. From a technical standpoint, higher savings (over 75%) could be achieved with more ambitious retrofitting strategies,[36] so this assumption has been used as a conservative estimate for the potential savings in existing buildings. This would not necessarily require all buildings in the Wealden District to undergo a retrofit – it represents an average across the District, so some buildings could meet a higher standard, while others receive no upgrades.

New buildings are assumed to meet the CO_2e reduction levels described in the Future Homes Standard.

The Future Homes Standard

Under the Future Homes Standard, new buildings would be required to meet significantly higher targets for energy efficiency and carbon savings. The Government states that,

'As part of the journey to 2050 we have committed to introducing the Future Homes Standard in 2025. This consultation sets out what we think a home built to the Future Homes Standard will be like. We expect that an average home built to it will have 75- 80% less carbon emissions than one built to current energy efficiency requirements (Approved Document L 2013). We expect this will be achieved through very high fabric standards and a low carbon heating system. This means a new home built to the Future Homes Standard might have a heat pump, triple glazing and standards for walls, floors and roofs that significantly limit any heat loss.'

- BEIS, *'The Future Homes Standard Consultation'* (2019)

- Implementing the demand reduction measures described above could result in a **2-3% reduction** in total CO_2e emissions for the District compared with 2017 levels, if there is no new development. Accounting for the projected increase due to new development, these demand reduction measures would keep CO_2e emissions relatively stable compared with 2017 levels.

[34] That is, emissions from static sources other than transportation.
[35] NEED, *'Summary of Analysis, Great Britain'* (2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812561/National_Energy_Efficiency_Data_Framework__NEED__report_summary_of_analysis_2019.pdf
[36] See https://passipedia.org/certification/enerphit

In practice, absent a significant change in Government policy or introduction of new incentive schemes, this change might be difficult to implement, for several reasons:

- At present, owners of existing buildings are not typically compelled to introduce energy efficiency. In some cases, it is a requirement for planning permission (e.g. when extending a property) or as part of a building control application (e.g. when carrying out major work to the roof, walls, windows or floor). The Minimum Energy Efficiency Standard policy (see below for details) is intended to drive progressive improvements in the existing stock, but the impact this will have is not yet clear.

Minimum Energy Efficiency Standards (MEES)

Under the MEES regulations, as of 1st April 2018, any properties newly rented out in the private sector must have a minimum Energy Performance Certificate (EPC) rating of E (some exceptions apply). Fines will be applied for non-compliance.

Owners of buildings with a lower EPC rating will be required to implement energy efficiency measures, though consideration will be given to financial viability, the anticipated payback time and impacts on property value.

Over time, the Government intends to progressively increase the minimum EPC rating, meaning that buildings must become more efficient in order to be sold or rented. A recently-published consultation proposed that the minimum rating should be raised to B by 2030, subject to actions meeting a seven-year payback test.

- BEIS, *'The Non-Domestic Private Sector Minimum Energy Efficiency Standards: The Future Trajectory to 2030'* (2019)

- Another consideration is that there have been a variety of Government schemes to improve the efficiency of buildings in the last decade, such as the Carbon Emissions Reduction Target (CERT), the Community Energy Saving Programme (CESP), the Energy Company Obligation (ECO) and the Green Deal. Therefore, it is possible that some of the most cost-effective measures have already been implemented by property owners who want to take advantage of warmer homes and lower bills. This would make further gains harder to achieve.
- Wealden District has a relatively high number of older properties that are considered 'hard to treat' from an energy efficiency standpoint. For instance, there may be limitations on the types of intervention measures that are appropriate for Listed buildings or those in conservation areas. As a rural district, there are also numerous homes that are off the gas grid. These may use oil, coal, wood, or other fuels – perhaps lacking any form of central heating – making interventions more costly or difficult.

Given that existing buildings account for such a large portion of total emissions – and considering the technical obstacles to decarbonising our heating systems – demand reduction is a high priority for achieving the net zero target. From a technical standpoint, energy efficiency upgrades are a prerequisite for low carbon technologies such as heat pumps to work properly. It is also important to note that there are important reasons, other than carbon emissions, which support refurbishing the existing stock; fabric and building services efficiency improvements can help to protect consumers against changes in fuel prices, mitigate fuel poverty and improve comfort.

Taken together, these factors make it clear that Wealden District Council must take full advantage of all opportunities for improving the performance of the building stock, even though its influence in this area is relatively limited.

2. Electricity demand reduction

Electricity demand is expected to increase in future due to factors such as increasing use of electronic appliances and uptake of electric vehicles and heating systems. However, interventions such as

behavioural change measures and the use of smart meters can potentially reduce electricity consumption in buildings by around 5%.[37]

- Assuming no other increase in electricity consumption, this change could result in a **1-2% reduction** in total CO_2e emissions for the District compared with 2017 levels.

3. Switching to electrically-driven heating systems

As noted in the *Clean Growth Strategy*, in order to meet the carbon emissions requirements of the Climate Change Act 2008, it will be necessary to fully decarbonise the supply of heat. This will likely require a shift away from the use of gas boilers towards electrically-driven heating systems, such as heat pumps and direct electric heating (DEH)[38] across the entire building stock.

The Government recently published a consultation on the Future Homes Standard that would prohibit the use of gas boilers in new buildings from 2025 onwards, and this is reflected in our analysis. We have also assumed that 90% of existing buildings switch to either an air source heat pump (ASHP) or DEH, as these can be retrofitted without the need for additional groundwork or infrastructure (compared with a ground source heat pump or connecting to a heat network).

- If all new homes were off gas by 2025 and 90% of existing buildings switched to electric heating systems by 2050, the total CO_2e emissions for Wealden District would decrease by up to **6%** compared with 2017 levels. However, combined with electricity grid decarbonisation, this could be as much as **40%**.

Changes to transportation

Despite the heavy reliance on petroleum in the transport industry, the electric vehicle market has seen considerable growth in recent years, and Wealden is no exception (see Figure 15, Section 2.4). The government has announced an intention to prohibit the sale of new petroleum cars by 2040.[39] If all vehicles were supplied with renewable electricity (or another net zero emission fuel), this would have significant benefits for air quality while also reducing CO_2e emissions.

At the same time, it will become important to reduce the number and length of journeys travelled as much as possible. The National Grid report *'Future Energy Scenarios 2019'* suggests that there could be between 2.7 and 10.6 million EVs on the roads by 2030 which would present a broad-ranging challenge across all areas of electricity infrastructure.[40] The use of smart EV charging and, potentially, vehicle-to-grid systems could mitigate some of the effects on peak demand and help to moderate the effects of intermittent low and zero carbon (LZC) electricity generation.

Our model therefore considers the impact of all vehicles being replaced with ULEVs where technologically practicable (i.e. excluding larger commercial vehicles and HGVs). This change is assumed to happen in conjunction with a 10% reduction in the number of miles travelled / journeys undertaken.

- The total CO_2e emissions for Wealden District would decrease by around **35%** compared with 2017 levels. Depending on the level of electricity grid decarbonisation, this could increase to up to **45%**.

There are, of course, some CO_2e emissions associated with the electricity used to charge EVs (except where supplied by 100% renewable energy). There are also currently some technological and cost-

[37] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48123/2135-behaviour-change-and-energy-use.pdf

[38] In addition to electrification and use of heat networks, decarbonisation of the existing gas grid has been suggested as a possible option. This could be done in a variety of ways, for instance by increasing the use of either biomethane or hydrogen gas. However, there are significant uncertainties associated with this option and limited work has been undertaken to demonstrate its viability. Therefore, barring a technological step-change, it is anticipated that the focus will be on the electrification of heating systems.

[39] DEFRA, *'Air quality plan for nitrogen dioxide in the UK'* (2017) Available at: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017

[40] National Grid, *'Future Energy Scenarios'* (2019). Available at: http://fes.nationalgrid.com/media/1409/fes-2019.pdf

related obstacles to the uptake of low or zero emission vehicles, particularly for HGVs. Although the price of electric, hybrid and traditional fuel cars could converge within the next decade,[41] the uptake of this technology relies heavily on the development of charging infrastructure.[42] It is therefore important not to underestimate the scale of investment and change that must occur in order to reach this goal.

In practical terms, this suggests that the Council will need to identify ways that it can support the deployment of EV infrastructure. Consideration should be given to the location and capacity of charging points within the District. Spatial planning policies that reduce the need for journeys and promote walking and cycling will also become more important.

Case study: Cost of installing EV Infrastructure

A report commissioned by Winchester City Council considered opportunities for installing charging points across the District. It found that that installing 2 x rapid chargers for taxis, 50 x fast chargers for car parks and 3 x slow chargers would cost roughly £250,000.

- Horizon, *'Electric vehicle charging infrastructure study for Winchester City Centre and District'* (October 2018)

Decarbonising the electricity grid

The emission factor for grid electricity is expected to fall progressively over time, as it will be generated using less coal and more renewable energy. Figure 17 shows the historic and predicted emission factors from 2010 to 2050 provided by BEIS.[43] The projection forward is not certain. but it reflects the ambitions set by the Government and is seen as necessary to meet the Country's carbon emission reduction commitments.

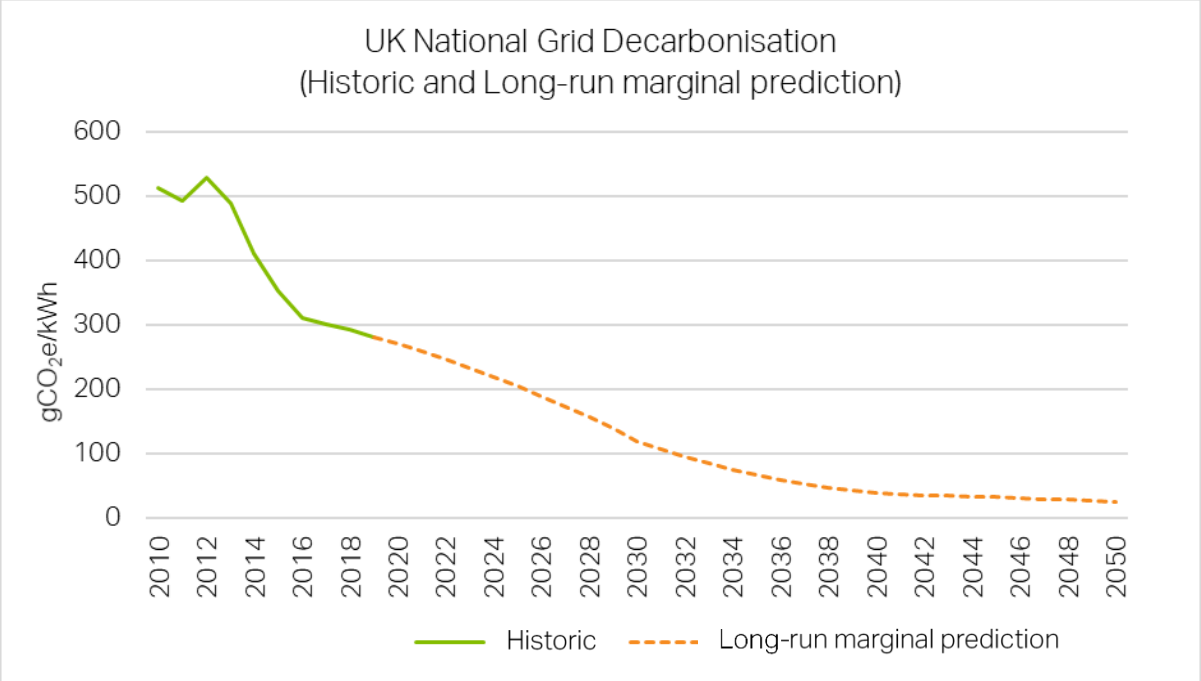


Figure 17: Historic and Long-run marginal grid decarbonisation

[41] Cambridge Econometrics and Element Energy, *'Fuelling Europe's Future: How the transition from oil strengthens the economy'* (2018). Available at: https://europeanclimate.org/wp-content/uploads/2018/02/FEF_transition.pdf

[42] BEIS, *'Electric vehicles: Driving the transition'* (2018). Available at: https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/383/383.pdf

[43] HM Treasury/BEIS *'Green Book Supplementary Guidance: Toolkit for valuing changes in greenhouse gas emissions,* Table 1' (2019). Available at: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

- This rate of grid decarbonisation could reduce District-wide emissions by up to 14% compared with 2017 levels, even if no other measures were adopted.
- The impacts of switching to electric heating systems and vehicles would also be magnified by this shift – this is discussed below (see 'Cumulative impacts').

These results show that grid decarbonisation is among the most important single factor affecting whether the net zero target is achieved, which presents both a significant opportunity and a significant risk, due to the Council's limited ability to influence this trend.

Carbon sequestration through land management and afforestation

LULUCF emissions resulted in a 17.5% net *reduction* in District-wide CO_2e levels in 2018. Nation-wide projections indicate that there will be significant opportunities to increase this through sustainable land management practices. However, they also indicate that any increase must be supported by robust policies to ensure long-term improvements are maintained.[44]

Wealden District Council previously undertook a renewable energy opportunities study which mapped the existing areas of managed and unmanaged woodland within the District (extract shown in Figure 18 below).[45]

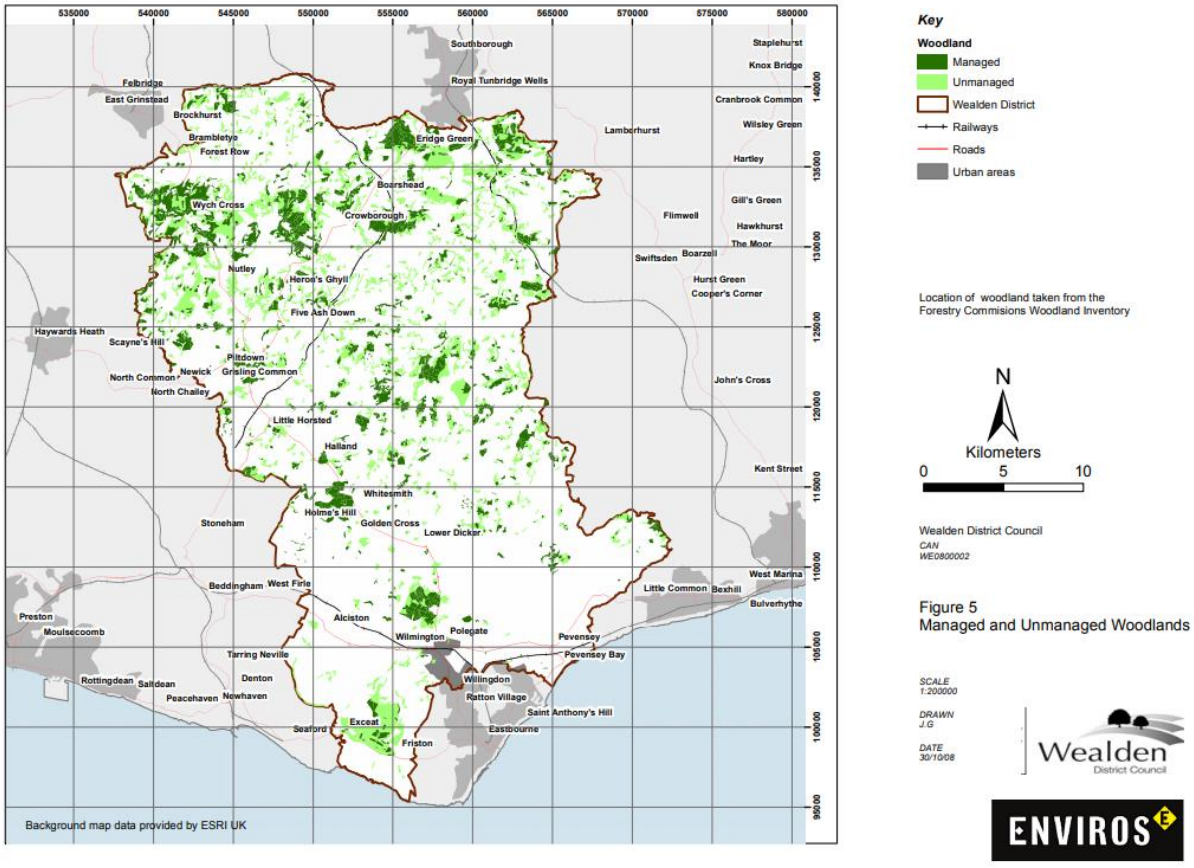


Figure 18: Wealden District: Map of managed and unmanaged woodlands. Extract from SKM Enviros, *'Wealden Renewable Energy Potential Study'* (2010)

This study should be updated, and the Council should carry out an in-depth assessment to identify specific opportunities for sustainable land management and afforestation. However, for the purpose of this analysis, we have assumed that LULUCF emissions remain constant for the foreseeable future.

[44] Forest Research, *'Projections of emissions and removals from the LULUCF sector to 2050'* (2017). Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1703161052_LULUCF_Projections_to_2050_Published_2017_03_15.pdf.
[45] SKM Enviros, *'Wealden Renewable Energy Potential Study'* (2010). Available at: http://www.wealden.gov.uk/nmsruntime/saveasdialog.aspx?lID=7941&sID=3018

Technologies excluded from the quantitative analysis

- **Smart energy management:** The *Clean Growth Strategy* includes a target of making smart meters available to all homes by 2020. One of the key benefits of smart meters is improving transparency and user access to their own energy data, making it easier to identify areas of waste. Although it is not clear to what extent this affects user behaviour in the long term, the improved data collection could also facilitate the introduction of demand side response, and on a broader scale, help to balance energy demand and supply, which is particularly important at peak times.[46] In principle, therefore, these have the potential to reduce energy consumption.
- **Battery storage:** There have been significant improvements in battery storage in recent years with implications for energy consumption across all sectors. Although batteries are likely to become crucial to future energy infrastructure, they do not offer carbon savings per se. Instead, they help to facilitate uptake of LZCs by moderating the intermittency of wind and solar energy generation. Combined with EV uptake and the introduction of vehicle-to-grid systems, this could have a transformative effect on the design of energy infrastructure and the built environment.
- **Carbon capture and storage:** At present, carbon capture and storage technologies have been deployed as pilot projects in the UK. Although these form part of the Government's *Clean Growth Strategy* (2017), at present there is insufficient evidence to provide a realistic estimate of their potential contribution towards the decarbonisation target.[47]

Cumulative impacts

The table below summarises the CO_2e emissions reductions that could be achieved by implementing the measures, as described in the previous sections. It considers two scenarios:

A. No change in the emissions associated with grid electricity
B. Grid emissions fall progressively to 2050

Potential change in carbon emissions from these measures…	Without grid decarbonisation	With grid decarbonisation
Changes to electricity grid		
Grid decarbonisation, no other changes	n/a	-14%
Demand reduction in buildings (accounting for new development)		
Reduce demand for electricity and heat	Negligible	-20%
Reduce demand and switch to electric heating systems	-6%	-40%
Low carbon transport		
Mileage reduction, no other changes	-6%	-6%
Switch to ULEVs (excludes HGVs)	-35%	-50%
Switch to ULEVs (includes HGVs)*	-38%	-55%

** Requires significant technological advances – not likely in the short term.*

Table 4: Wealden District potential change in CO_2e emissions by 2050

The results show that achieving the level of decarbonisation required will depend on future trends that occur at a national level, specifically the decarbonisation of the national grid and availability of key technologies and cannot solely be delivered through measures that can be implemented within Wealden. This point can be seen by comparing the graphs shown in Figure 19, which assumes no change in the national electricity grid and Figure 20, which accounts for electricity grid decarbonisation.

[46] BEIS, 'Smart Meters and Demand Side Response' https://www.gov.uk/government/publications/smart-meters-and-demand-side-response
[47] For more information, see https://www.gov.uk/guidance/uk-carbon-capture-and-storage-government-funding-and-support

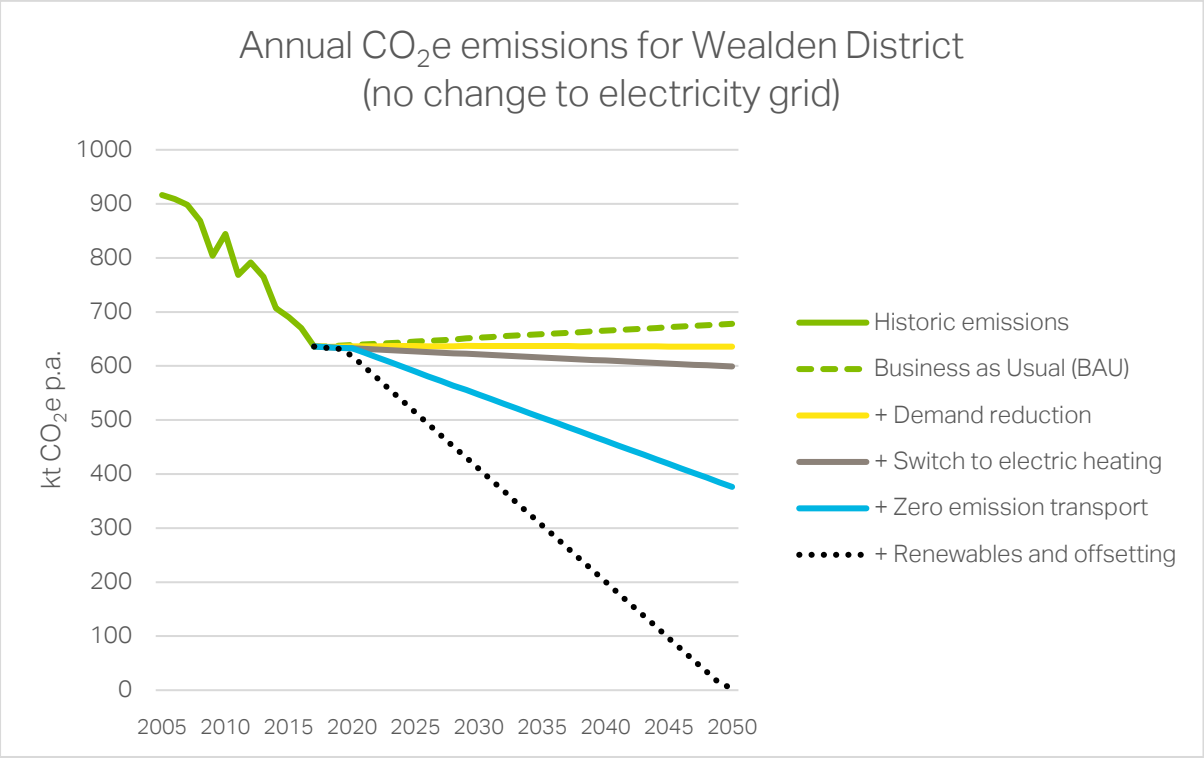


Figure 19: Wealden District CO_2e emissions – No change to electricity grid emissions (2011-2050)

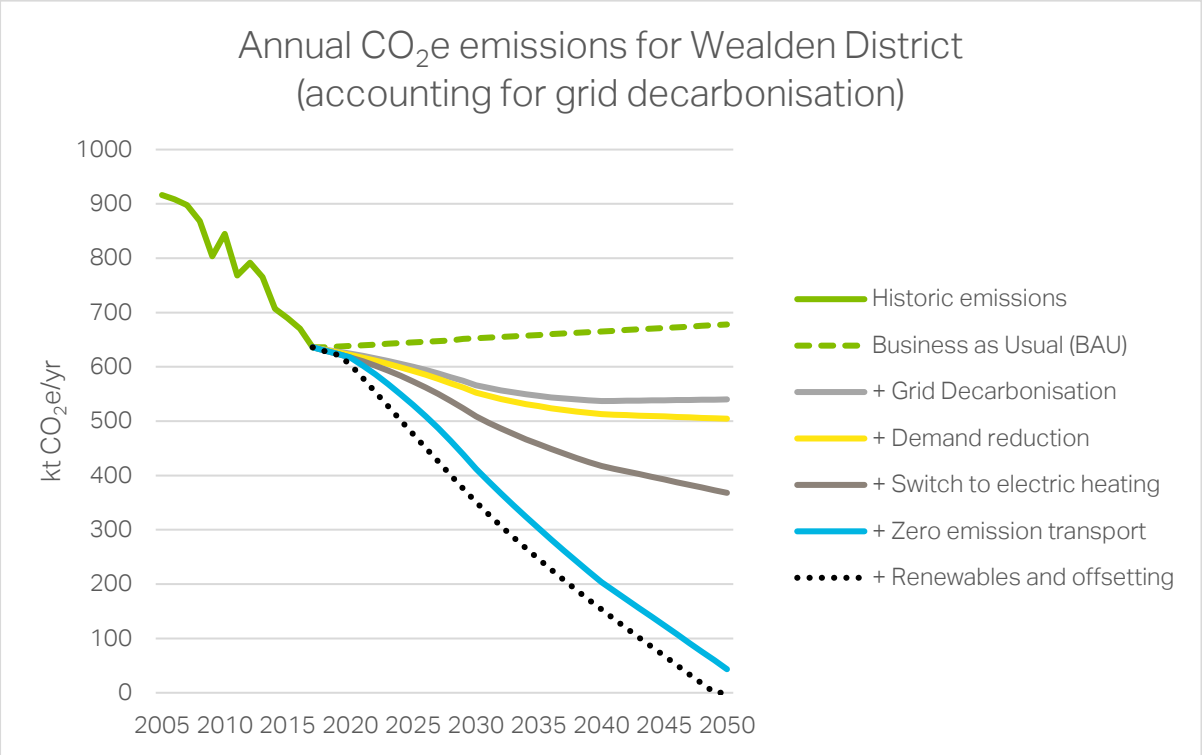


Figure 20: Wealden District CO_2e emissions – Accounting for grid decarbonisation (2011-2050)

These highlight how the relative impact of different measures can vary widely depending on changes in fuel emission factors. There are several important points to note:

- Demand reduction has relatively little impact on its own (although note that greater improvements could be achieved through a more ambitious retrofitting programme). However, energy efficiency upgrades that reduce energy demand are a prerequisite for the installation of low carbon heating systems, because it positively affects the financial case for installing them, ensures that the systems work at optimum efficiency levels, and helps to mitigate the increase in pressure on the electricity grid.
- A significant reduction in CO_2e emissions is achieved through installing electric heating systems. These gains are magnified as the electricity grid decarbonises. A similar principle applies to increasing uptake of electric vehicles.
- However, these measures are still not sufficient to achieve the target; therefore, it is inevitable that some form of CO_2e offsetting will be required. Although this could potentially come from LULUCF emissions / tree planting / carbon sequestration, in practical terms it may be easier to invest in large-scale LZC energy generation.
- Due to the wide range of potential decarbonisation outcomes, it is difficult to predict the scale of offsetting that will be required. Unfortunately, this presents an additional challenge, because as the CO_2e emissions associated with electricity decrease, more LZC capacity is needed to offset those emissions.
- Finally, and most importantly, this analysis shows that achieving the decarbonisation target relies on all possible CO_2e reduction measures being adopted – and avoiding the negative impacts of climate change also depends on the speed at which they are adopted.

3.3 Wealden District Council carbon emissions projections

The 'No Action' scenario

Figure 21 shows the potential change in CO_2e emissions that would occur in a 'No Action' or business as usual scenario, in which fuel consumption remains steady aside from the increased use of the new Crematorium. The projection assumes no changes are made to the building portfolio or services offered by the Council that will alter its energy consumption.

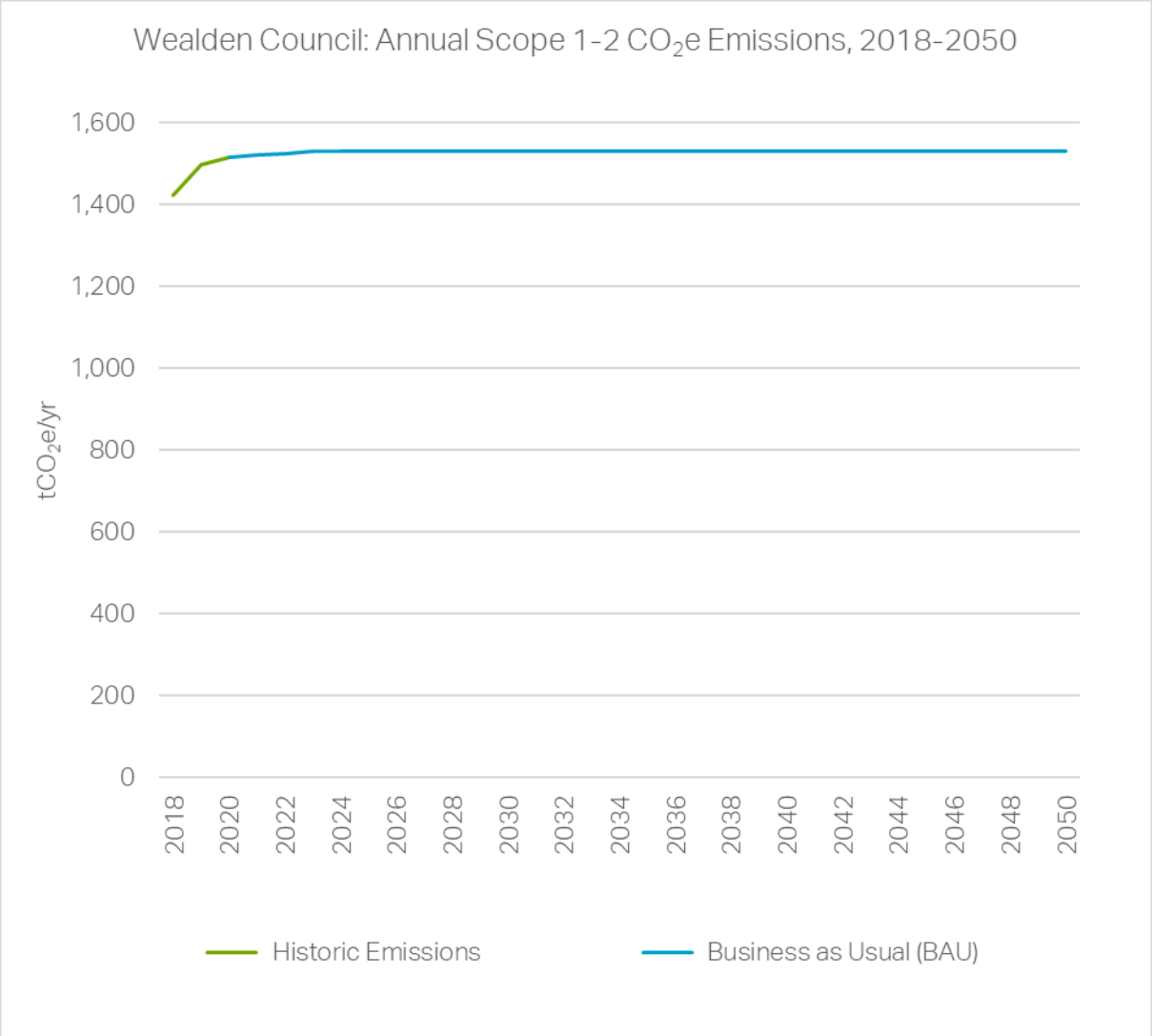


Figure 21: Wealden District Council Scope 1 and 2 'No Action' CO_2e emissions (2018-2050)

Cumulative impacts

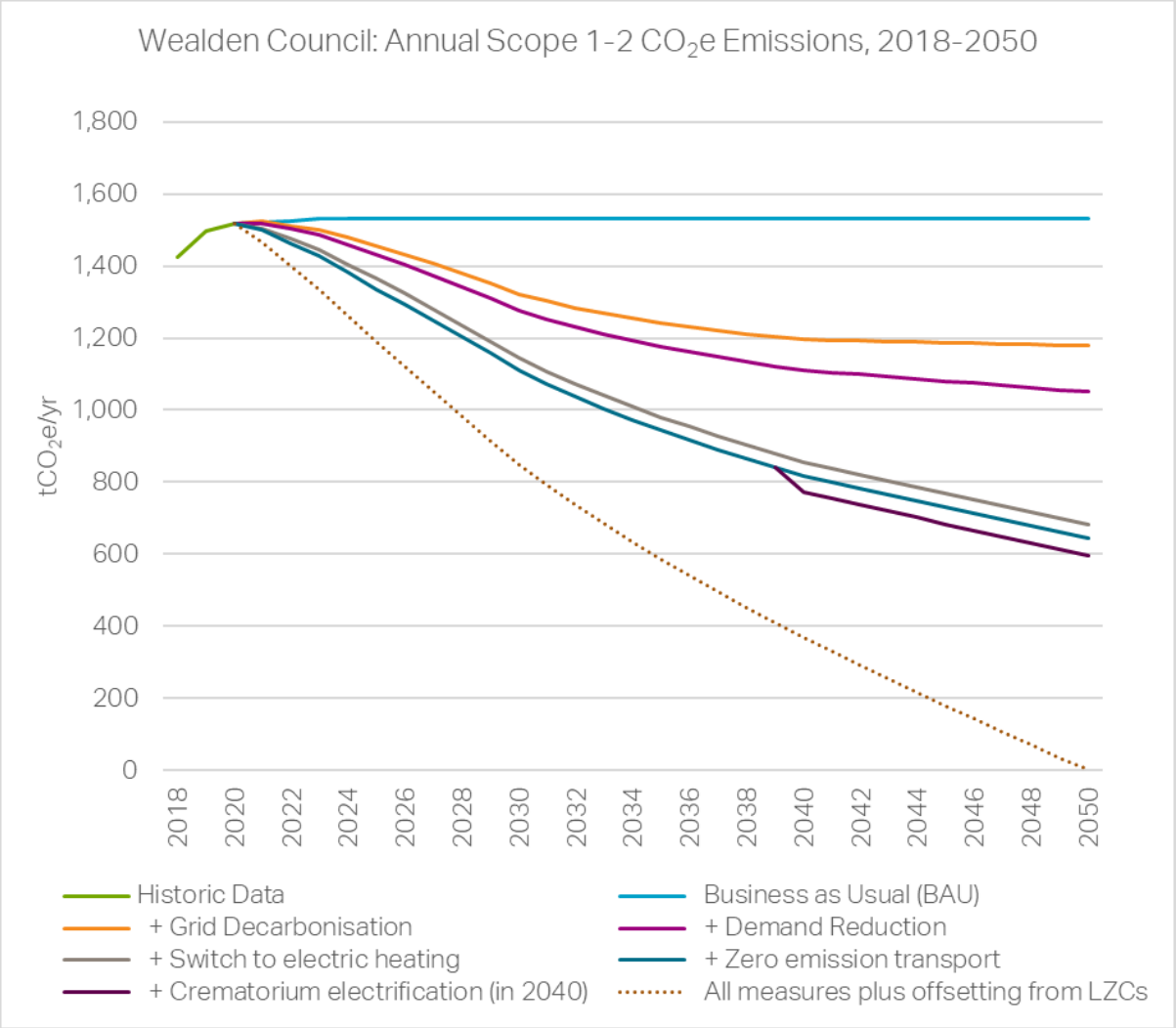


Figure 22: Wealden District Council annual Scope 1 and 2 'Future Trend' emissions (2018-2050)

In Figure 22, a range of changes and interventions are compared to the 'No Action' emissions initially shown in Figure 21. The trends applied are much like those described in Section 3.2 and applied to the Wealden District projection.

Grid decarbonisation delivered by the National Grid will reduce the Council's emissions and, like the Wealden District analysis, moving from gas energy to electricity will enable buildings and services to benefit from the decarbonisation programme.

The level of impact of each trend on the Council's emissions is different to the wider District given the baseline differences. For example, proportionally the switch to low or zero emission vehicles will have a lower impact due to the relatively low Council emissions from transport. The resultant Wealden District Council emission change for each trend by 2050 is summarised in Table 5.

Potential change in carbon emissions from these measures...	Without grid decarbonisation	With grid decarbonisation
Changes to electricity grid		
Grid decarbonisation, no other changes[48]	8%	-19%
Demand reduction in buildings (accounting for new development)		
Reduce demand for electricity and heat	-2%	-27%
Reduce demand and switch to electric heating systems	-28%	-53%
Low carbon transport		
Mileage reduction, no other changes	Negligible	Negligible
Switch to ULEVs	-1.7%	-2.5%

Table 5: Wealden District Council potential change in CO_2e emissions by 2050

With regards to the emissions from the Crematorium, it is possible to install electric cremators but, assuming that this is only likely to be viable at the end of the cremator service life, a switch has been considered possible only by 2040. This change, along with all the potential trends described above, would result in a reduction of 58% by 2050, leaving 598 tCO_2e as the annual 'gap' in reaching net zero.

To bridge this gap, it is anticipated that the Council will need to invest in carbon offsetting measures. If this were to be achieved through renewable electricity generation then by 2050 it is estimated that approximately 24GWh would need to be generated by or on behalf of the Council annually. This could be delivered by solar PV with a capacity of around 28.5 MW and the power generated could be used by the Council either directly (if located close enough to be connected by private wire) or via a sleeving arrangement. If new renewable generating capacity installations are spread evenly from 2020 to 2050 the projected trend to net zero follows the dotted line in Figure 22. Alternatively, as a rough estimate, the residual CO_2e emissions after all measures were adopted could be offset by planting approximately 170 hectares of new woodland (1.7 square kilometres).

When interpreting these figures, it should be noted that carbon savings from LZC technologies are based on the amount of grid electricity that would be *displaced* by renewable electricity. This means that although grid decarbonisation results in better CO_2e savings from demand reduction, fuel switching, and sustainable transport measures, more LZC electricity generation would be needed to offset any residual emissions. For context, if all measures were adopted but there was no electricity grid decarbonisation, offsetting the Council's residual emissions would require only 7MW of PV.

In other words, LZCs will show diminishing carbon savings over time as the grid decarbonises. However, there are still several other compelling reasons to invest in a high level of LZCs, which include:

- Mitigating pressure on the national grid, which reduces the amount of resources needed for improving power infrastructure
- Providing security of electricity supply, particularly when this is being used to supply heating
- Helping to protect against electricity price increases
- Offering higher CO_2e reductions in the event that the national grid does not decarbonise as quickly or as deeply as the Government intends

In reality, there is significant uncertainty regarding the level of CO_2e saving measures that can be implemented in the given timeframe, in which case offsetting the Council's emissions would require even more investment in LZCs and woodland creation than cited above. This reinforces the key message that reducing demand and delivering energy efficiently should be the highest priorities.

[48] This includes the anticipated change from increased emissions associated with the increased cremations per year (i.e. approximately 1,200 cremations per year by 2024).

3.4 Implications

Priority measures

This work highlights that there is considerable uncertainty in the trajectory to 2050, and that there will be significant challenges in reducing energy demands and offsetting any remaining CO_2e emissions for both the Council's own emissions and that of the District as a whole. Wealden District Council will need to actively work towards enabling the following:



In buildings, it will be necessary to reduce heat and power demands through fabric efficiency improvements and behavioural change. In addition to investing in the existing building stock, this means ensuring that all future development achieves a high standard of energy efficiency in order to minimise any increase in fuel consumption. Long term, all buildings will need to switch from gas / fossil fuels to LZC heat sources.



Uptake of LZC technologies and battery storage will reduce reliance on fossil fuels, reduce pressure on existing utility infrastructure, improve security of supply, and mitigate against price fluctuations.



A transformation in the transport sector must take place, which would replace all existing vehicles with low and zero emission vehicles. In addition, it will be necessary to reduce vehicle use / mileage through behavioural change and modal shift.



In order to offset any remaining CO_2e emissions, whether for the Council or the District as a whole, Wealden District Council will need to explore additional measures, such as promoting carbon sequestration through sustainable woodland management. It is important to note, however, that carbon offsetting alone is not enough to achieve the net zero target.

Key sensitivities and risks

National grid decarbonisation

One of the clear findings is that, in order to reach net zero, it will be necessary to virtually eliminate the use of fossil fuels by switching to renewable electricity sources. This means that much of the reliance on achieving the net zero target will depend on National Grid decarbonisation – this is a key risk because it is outside of the Council's control.

Although there has been significant progress in this area in recent years, future decarbonisation is anticipated to be much more difficult to achieve.[49] To address and mitigate this risk, consideration must be given to how the Council can best facilitate the government's objectives in decarbonising the grid as well as what measures it can take to best insulate itself from the eventuality that grid decarbonisation does not happen as quickly and/or as deeply as the Government intends.

On the other hand, it is important to note that, because the savings from LZCs are measured by the amount of grid electricity (or gas) that they displace, as the grid decarbonises, it becomes progressively more difficult to offset CO_2e emissions.

[49] To date, the decarbonisation of the national grid has been primarily achieved through the significant reduction in the use of coal fired power stations and the increase in the use of renewable technologies, particularly large-scale wind and biomass (where it is used for co-firing in power stations). However, the use of gas remains a significant component of the generation mix, and the timely replacement of the existing nuclear plant is already proving to be challenging. Furthermore, significant additional pressures from the use of electricity to provide heating and power vehicles may incentivise further power generation from fossil fuel sources to deal with greater peaks in demand.

Uncertainty on national policy, technology development, market forces, etc.

In order to take advantage of the national grid decarbonisation, there will need to be significant shifts in the built environment and transportation sectors. In buildings, fabric efficiency improvements and fuel switching will incur high capital costs, and operational costs could increase in the event of electricity prices rising. A switch to zero emission vehicles, on the other hand, would likely be subject to market forces, and would also require support via large-scale investment in transportation and electricity grid infrastructure. Uptake of these and other renewable technologies would likely require additional government funding in the form of subsidies, incentive schemes and research and development.

These factors are largely outside of Wealden District Council's control, relying on shifts in technologies, consumer behaviour, and national policy interventions. The action plan therefore aims to identify key areas where the Council can exert influence to help facilitate these changes.

A note on overheating, cooling and climate change

Although one of the biggest challenges in decarbonising buildings in the UK relates to heat demand, it is generally agreed that demand for cooling is likely to increase in the future as a result of climate change.[50,51] The potential effects have not been quantified in this report; however, they would tend to exacerbate the pressure on existing energy infrastructure and make it more important to achieve a decarbonised national grid. Therefore, when considering interventions in its own building stock, as well as future planning policy changes, it will be important for Wealden District Council to:

- prioritise passive cooling measures, in order to reduce the need for air conditioning; and
- incorporate building-mounted PV (where appropriate), as solar panels will tend to generate more power on hotter days with higher cooling demands.

[50] JRC Science for Policy report by the European Commission, *'Assessment of the impact of climate change on residential energy demand for heating and cooling'* (2018)
[51] Aebischer, B., Catenazzi, G., Jacob, M. and Henderson, G., *'Impact of climate change on thermal comfort, heating and cooling energy demand in Europe'* (2007)

4. Achieving Net Zero: An action plan for Wealden

4.1 Action plan

Key areas of influence

As illustrated in the diagram below, the Council only has direct control over a small portion of the total emissions in Wealden, which are affected by a wide variety of trends that occur on a primarily national or regional level. However, the Council does have opportunities to exert pressure across multiple spheres of influence, even if this is indirect.

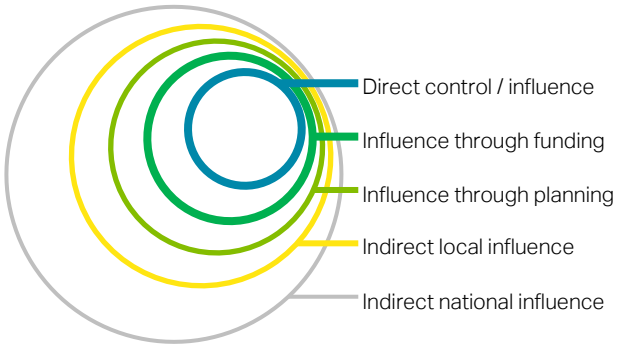


Figure 23: Wealden District Council spheres of influence

On this basis, potential responses from Wealden District Council could include:

- Direct control: Taking a leadership role by adopting best practices wherever possible by reducing energy demand in its own building stock, adopting behavioural change programmes, switching to renewable energy sources, adopting a zero-emission vehicle fleet and installing EV charging points in Council-owned car parks.
- Influence through funding: For instance, by offering subsidies to SMEs wishing to undertake building energy audits if ESCC discontinues its existing programme.
- Influence through planning: Supporting the delivery of heat networks and renewable energy projects within the District by taking a positive approach to renewable energy generation in forthcoming editions of any local planning policies. Minimising emissions from transport through design of infrastructure and traffic management, adopting an approach to spatial planning that reduces reliance on private vehicles, and supporting initiatives to encourage the use of public transport, ridesharing, walking and cycling.
- Indirect local influence: Supporting higher standards of sustainable design and construction and the shift towards sustainable transport. This could be done through awareness and training; for instance, by establishing best practice networks or offering training to facilities managers.
- Indirect national influence: Lobbying the Government to bring forward more ambitious policies (e.g. transport strategies, research and development, updates to Building Regulations).

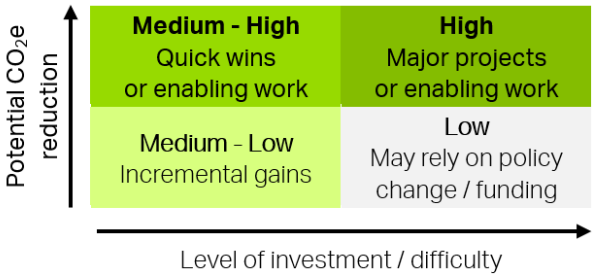
Action Plan

The following pages describe a set of proposed actions for Wealden District Council that reflect the findings of this analysis. These will need to be reviewed and agreed by the Council prior to being adopted and taken forward. Proposed actions have been presented with the following information:

- Reference code
- Action – Summary of the proposed action
- Description – Any other relevant details relating to the proposed action
- Timeframe – Describes the timeframe (short, medium or long-term) during which the proposed action needs to be initiated, either short term (0-6 months), medium term (6-12 months) or long term (1-5 years).
- Effectiveness – This is framed in terms of the level of potential CO_2e reductions that could be achieved, informed by the analysis presented in Sections 2 and 3.
- Deliverability/Roles – Key considerations and relative effort and resource required, considering factors such as the level of complexity in delivering the action, Wealden District Council's level of influence or role in delivery and required involvement of other parties.
- Investment Resource implications – The relative level of resource (e.g. officer time) that Wealden District Council would need to commit in order to deliver the proposed action. Where possible, we have provided an estimate of the scale of investment required, based on published industry figures and AECOM's own experience in delivering similar projects (where applicable).

  Note that these are preliminary figures intended only to provide a sense of potential scale of investment required, subject to further detailed analysis. These are labelled as 'investments' rather than costs because many of them have potential financial returns and some or all of the required financing could come from other parties.

- Priority – This field sets out the relative priority of the proposed action, based on the considerations listed above. Note that some projects with a higher priority ranking may not result directly in CO_2e savings but enable other high-priority actions to take place. This is illustrated in the diagram below.



Abbreviations (General)

- BEIS – Department of Business, Energy and Industrial Strategy
- BRE – Building Research Establishment
- DEC – Display Energy Certificate
- DfT – Department for Transport
- ECO – Energy Company Obligation
- EHS – English Housing Survey
- EPC – Energy Performance Certificate
- ESCC – East Sussex County Council
- EV – Electric vehicle
- EVHS – Electric Vehicle Homecharge Scheme
- FiT – Feed-in Tariff
- HNDU - Heat Network Development Unit
- HNIP - Heat Network Investment Programme
- LULUCF [emissions] – Land-use, Land-use Change and Forestry emissions
- NEED – National Energy Efficiency Database
- NPPF – National Planning Policy Framework
- ORCS – On-street Residential Chargepoint Scheme
- PV – Photovoltaic
- RHI – Renewable Heat Incentive
- SME – Small and medium enterprises
- UKPN – UK Power Networks
- ULEVs – Ultra low emission vehicles
- WCS – Workplace Charging Scheme
- WDC – Wealden District Council

Abbreviations (Units of measurement)

- CO_2 – carbon dioxide
- CO_2 e – carbon dioxide equivalent
- GWh – gigawatt hours
- kg – kilogram
- kt - kilotonnes
- kW – kilowatt
- kWh – kilowatt hours
- MW – megawatt
- MWh – megawatt hours
- t – tonnes

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
	General actions *These measures enable the CO_2e reduction measures to take place*							
G1	Disseminate the results, conclusions and recommendations of this study within the Council	Send out copies of the report and promote the Climate Emergency Plan to build capacity and support within the Council to take the recommendations and actions forward	Short term	Medium Supporting action but crucial for raising profile	High	Limited officer resource and time required for meetings, etc.	n/a	High
G2	Develop an external engagement plan and disseminate the results, conclusions and recommendations of this study to key stakeholders within the District more broadly	Send out copies of the report and promote the Climate Emergency Plan to build capacity and support within the District for taking the recommendations and actions forward	Short term	Medium Supporting action but crucial for raising profile	High	Limited officer resource and time required for meetings, etc.	n/a	High
G3	Identify senior officers and members to champion the programme and key projects	Senior officers and members will be vital in taking forward the recommendations and actions proposed in this report	Short term	High Supporting action but crucial for raising profile	High	Limited officer and senior management time required for meetings, etc.	n/a	High
G4	Establish a means of monitoring and reporting progress against the	Set up a monitoring and reporting mechanism to enable progress towards the decarbonisation target to be	Short to medium term	Medium Supporting action to ensure delivery	Medium-High The establishment of a monitoring strategy will require relevant officer(s) to become familiar with	Significant officer resource required – may require hiring new staff	n/a	High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
	recommendations and action plan	assessed over time as well as re-appraising actions and priorities			existing data, tools and resources [1]			
G5	Establish roles of individuals within WDC for delivering the actions and recommendations	The agreed set of actions following on from this study should be allocated to specific officers to ensure responsibility for delivery	Short term	Medium Supporting action to ensure delivery	High	Limited officer resource required	n/a	Medium
G6	Work with the Government, ESCC and other East Sussex Local Authorities to identify existing and forthcoming funding sources to support further studies and specific projects	Many measures identified within this report will have significant capital cost implications and therefore funding may be required to support their implementation. Any further work to define specific project opportunities should include an analysis of funding options	Short term but must be ongoing to reflect future opportunities	Medium	Medium-High Council to work with government and other local authorities	Moderate officer resource required	n/a	Medium
	Grid decarbonisation *These measures support decarbonisation of the electricity grid, which could deliver a CO_2e reduction of up to 19% for the Council / 14% for the wider District*							
D1	Continue to speak to UKPN about future energy infrastructure plans	Arrange further meetings with UKPN to discuss the plans for future electricity infrastructure in the District and how WDC can support	Short term but ongoing	High The route to net zero relies upon significant electrification	Medium This should be done in parallel with Actions T1-T6 which relate to installing EV infrastructure and uptake of ULEVs	Limited officer resources required	n/a	High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		and facilitate this through planning policy and other mechanisms						
D2	Monitor progress on national grid decarbonisation	Monitor progress of the decarbonisation of the national grid to understand the implications for meeting the decarbonisation target	Medium to long term	Low	High Will require officer(s) to become familiar with existing data, tools and resources [2]	Limited officer resource required	n/a	Medium
D3	Support decarbonisation of the national grid through planning policy where appropriate	In accordance with the NPPF, provide support through planning policy for strategic energy infrastructure developments that seek to deliver and support the national decarbonisation target	Medium to long term	Medium	Low Relies upon landowners/interested parties bringing forward schemes to form part of allocations Also relies upon various and wide-ranging factors e.g. compliance with national policy and agreement with internal and external stakeholders including local community members	Moderate officer resource required, but this is likely to be included as part of policy development work that would take place regardless	n/a	Low
	Demand reduction *These measures could help to deliver a CO_2e reduction of up to 27% for the Council / 20% for the wider District (with grid decarbonisation)*							
R1	Develop a WDC estate carbon management plan	Where appropriate, commission further audits of Council	Short term	High	Medium	Budget required to carry out further audits	n/a	High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		assets to understand the potential for delivering CO_2e emissions reductions and demonstrate leadership in this area			*Note: Some high-level initial audits have been undertaken as part of this study to illustrate and inform this process*	Energy audits for a single building range from £2-5K, so the total budget could range from £5-50K depending on scope and complexity Officer resource also required to commission and manage carbon management plan		
R2	Undertake further energy efficiency retrofits of all Council properties	Deliver the recommendation from the audits carried out in action R1. This should be co-ordinated with Action H3 for switching to heat pumps. It should also consider ways to prevent future overheating	Short to medium term	High Critical for delivering the Council decarbonisation plan	Medium A programme would need to be developed for carrying out the energy efficiency works identified in the carbon management plan and identify a delivery approach including funding opportunities	Costs cannot be estimated at this stage, due to the range of building types and uncertainty of the package of measures that would be required for each, but this would be identified by the carbon management plan in R1	– Salix – ECO – Capital budget – Reserves – Prudential borrowing – Commercial borrowing	High
R3	Develop and instigate a behavioural change programme across all Council properties to reduce energy consumption	Senior level involvement will be crucial. This should be linked to the climate emergency declaration	Short term	High Critical for delivering the Council decarbonisation plan	Medium-High Within the Council's ownership but will require senior level support and employee buy-in	Significant officer resources to instigate and maintain, including a member of staff with overall responsibility and time for staff within each building – may require hiring new staff	n/a	High
R4	Undertake a further, detailed, assessment	Commission a study to understand the	Medium term	Medium-High	Medium	Budget required to commission a study	n/a	Medium

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
	of the existing building stock within the District	typology and age of buildings. This can be used to inform more targeted interventions for projects, guidance and funding				(estimate £10-£35K depending on scope) plus officer resource [3]		
R5	Develop and implement a programme of business engagement and support, particularly for SMEs, related to energy efficiency	Provide guidance to SMEs, for instance in the form of forums, presentations, events, training or funding, to deliver energy efficiency improvements	Medium term	Medium Important for showing leadership within the community and supporting intervention identification	Low-Medium Potential to coordinate with ESCC to promote existing schemes depending on their continuation (linked to Action R6)	Budget required to provide this service, which will depend on what is delivered, as well as officer resource to establish and manage Cost to WDC will depend on the service/support offered	n/a	Low-Medium
R6	Lobby / work with ESCC to ensure funding remains in place for subsidised energy audits and promote these to Wealden SMEs	At present, ESCC offers subsidised energy audits to support SMEs in identifying energy improvement opportunities [4]	Medium term	Low Important for showing leadership within the community although effectiveness will rely on actions of other parties (SMEs)	Medium Although not controlled by WDC, it is essential that these continue and are promoted within the District (linked to Action R5)	Moderate officer resource required to promote existing grants and subsidies	n/a	Low-Medium
R7	Lobby the Government to change national policy to improve energy performance in existing buildings	The Council should respond to the current consultation on the proposals for Building Regulations Part L 2020 and the Future Homes Standard as well as	Short term and whenever the Government introduces relevant policies	Low	Low	Limited officer resources required to respond to consultations	n/a	Low

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		other planning related policy						
R8	Investigate the potential to use business rates to drive energy performance	If appropriate, consider the option of linking business rates to EPC / DEC ratings, offering a discount for better performing buildings and / or where buildings can demonstrate an improvement through investment in energy efficiency	Medium to long term	Low-Medium Depends on the ability to introduce such a scheme and the level of energy efficiency improvements it can deliver	Low-Medium This type of policy could be challenging or controversial and, if implemented, could lead to a reduction in Council revenue	Officer resources required to assess the potential costs and benefits (depending on whether this type of policy is found to be viable and the extent to which it is pursued) Also note that there is a potential cost to Council in relation to the reduction in Business Rate revenue	n/a	Low
R9	Monitor results of energy efficiency programmes to provide further support	Identify existing and emerging energy efficiency programmes and identify opportunities for the Council to support uptake	Medium to long term	Low-Medium	Medium WDC's role is likely to be relatively small	Limited officer resources required	n/a	Low
R10	Understand the use of other fuels (aside from gas, electricity and fuels used for transport) in the District	Undertake an assessment of the use of fuels other than gas and to understand the opportunities for interventions	Medium term	Low-Medium BEIS statistics indicate that 'other fuels' account for around 14% of total emissions in the District and identifying intervention measures to reduce this will rely on	Low-Medium WDC to commission / undertake study	The cost of such a study would depend on the scope but might be £20-50k	n/a	Low-Medium

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
				gaining further information about these activities / uses				
R11	Community engagement to support behaviour change – Buildings	Develop a community engagement programme that promotes energy demand reduction through behaviour change measures. This must be coordinated with any other initiatives relevant to reducing fuel poverty and /or provision of domestic energy advice. It could also be carried out in conjunction with Actions H4 and H5	Short to medium term Although this could be initiated in the short to medium term, this type of initiative should be regular or ongoing to ensure that benefits are maintained over time	Medium Behaviour change measures will be crucial to mitigate any increase in demands that could occur, for instance, as a result of rising population levels	High	Moderate officer resources required to plan and deliver an engagement scheme Resource implications will depend on the type of activities undertaken	n/a	High
	Low carbon heating systems *These measures could help to deliver a CO_2e reduction of up to 53% for the Council / 40% for the wider District (with grid decarbonisation and demand reduction)*							
H1	Investigate the potential for a low carbon heat network at Vicarage Field (Hailsham Aspires)	Undertake a feasibility study to assess the technical and financial viability of delivering a heat-pump led heat network as part of the Vicarage Field	Medium term	High Delivering a heat network could decarbonise the heat supply of multiple buildings quickly and offer higher reductions than	Medium The first step would be to undertake a feasibility study which would define the steps for delivering a network	Budget required to commission an initial feasibility study (estimate £20-30K depending on scope) to define the total capital costs, whole lifecycle financial and carbon benefits of delivering a heat network in this location	– HNDU – HNIP	High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		redevelopment (Hailsham Aspires)		individual systems with lower capital and operational costs		Significant officer resources also required		
H2	Explore opportunities for other heat networks	Review other opportunities for heat networks in the District	Medium to long term	High Decarbonising heat is a key challenge in Wealden – heat networks can offer CO_2e reductions compared with individual systems, with lower capital and operational costs	Medium	Budget required to commission a study (estimate £20-30K depending on scope) and provide officer resource	– HNDU – HNIP	High
H3	Develop heating system replacement programme for Council properties to replace all gas boilers	Review heating system asset plan for Council owned buildings and identify opportunities for switching to heat pumps. Specific opportunities have been identified through energy audits of key Council buildings; see Appendix B for more details	Short term and ongoing	High This measure is critical for the Council to deliver net zero on its own operations Modelling indicates that switching to heat pumps could potentially reduce the Council's own CO_2e emissions by 20-50% by 2050, subject to electricity grid decarbonisation	Low-Medium This measure will have significant cost and disruption implications	Significant officer resources required to develop and implement heating replacement programme Indicative cost of installing a heat pump are [5]: • £500-1000/kW for non-domestic buildings • £4-10k for domestic buildings Costs will depend on the type of system and level of additional infrastructure	– RHI (and any future replacement scheme) – Enhanced capital allowances – Direct spend – Public borrowing – Commercial borrowing	High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
						required, including electrical capacity reinforcements		
H4	Create or promote guidance to encourage uptake of low carbon heating systems in new homes	The Council could produce a design guide on delivering low carbon homes (or promote a design guide developed by a separate organisation) covering the use of heat pumps in place of gas boilers in new dwellings	Short term	Low The realisation of emission reductions will depend upon the adoption of the recommendations by housebuilders and developers – higher impacts will stem from central Government regulations / actions	Medium Relatively straightforward to produce a guidance document either internally or with expert external support	Low officer resources required if using or adapting existing design guides As a rough estimate, cost of hiring an external company to produce a new design guide could be £5-15K depending on scope	n/a	Low-Medium
H5	Create or promote guidance to encourage uptake of low carbon heating systems in existing homes	Similar to Action H4, but with a focus on *existing* homes. One key component would be to ensure that heat pumps are not installed in properties where they are not suitable (e.g. buildings with poor fabric efficiency standards)	Short term	Low Decarbonising heat supply is a critical part of the plan for delivering net zero emissions across the district, but effectiveness will rely on homeowners and central Government policy / funding / other initiatives	Medium Relatively straightforward to produce a guidance document either internally or with expert external support	Low officer resources required	n/a	Low-Medium
	Building integrated renewable energy generation and storage *Renewable energy installations within Wealden or elsewhere could, in principle, be used to meet 100% of the energy demands for the Council and wider District*							

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
E1	Assess the suitability of remaining Council assets for further PV installations	Building on previous experience, WDC should assess remaining Council assets and, where appropriate, plan and deliver a programme of PV installations across its estate, including buildings, car parks and other suitable locations. This should be aligned with the roll out of heat pumps and EV charging points where the benefits of on-site generation will be greater	Medium to long term	High Good carbon savings in the short term, although savings are based on displacing grid electricity and would therefore decrease over time as the grid decarbonises Significant benefits in supporting operational costs and security of supply for Council buildings especially where heat pumps and EV charging points are installed	Medium WDC has successful experience of PV installations	Roof-mounted PV is likely to cost in the region of £750-1500/kW fully installed depending on the scale and complexity of installation Industry estimates [6] suggest that roughly 2kW PV can be installed per car parking space and fully installed costs could be in the range of £900-1400/kW Significant officer resources required to develop and implement a roll-out programme	– Direct spend – Public borrowing – Commercial borrowing	High
E2	Support the uptake of building integrated PV by SMEs and homeowners	The council should support PV installations on private buildings in the District by providing information and guidance	Medium to long term	Low-Medium	Low-Medium	Moderate officer time required to produce guidance and marketing materials	n/a	Medium
E3	Investigate opportunities to install batteries in Council buildings	Monitor the viability of battery systems and assess whether these could be incorporated into projects involving heat pump	Medium to long term	Low-Medium Battery storage will not deliver direct CO_2e reductions but can improve the efficiency of other	Low-Medium At current prices the installation of batteries is likely to make more commercial sense for larger projects	Costs will depend on the technology in question Prices are likely to decrease in the coming years and this may be	– Direct spend – Public borrowing – Commercial borrowing	Low-Medium

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		installations / replacements, PV installations and / or EV charging points		systems, helping to improve the viability of renewable technologies, increase security of supply and save money	If a heat pump-led heat network is delivered for Vicarage Field (potentially along with PV and EV charging), this may be of sufficient scale to make a battery system viable	supported by additional incentive schemes Battery systems can offer net cost benefits in some circumstances, particularly when combined with PV and / or EV charging points		
	Low carbon transport *These measures could help to deliver a CO_2e reduction of up to 2.5% for the Council / 50% for the wider District (with grid decarbonisation)*							
T1	Work with Government and other relevant stakeholders to identify methods to drive private transport decarbonisation within the District	Arrange a meeting with relevant stakeholders to discuss the implications of this study and the practical measures that WDC can take to facilitate the uptake of ULEVs	Short term	Medium The speed of transport decarbonisation will have a huge impact on the rate of progress towards net zero as it currently accounts for nearly half of CO_2 emissions in the District	Low-Medium Relies upon other stakeholders	Moderate officer resources required to speak to stakeholders and co-ordinate activities	n/a	Low-Medium
T2	Continue to support the transport decarbonisation agenda through planning policy	Whilst acknowledging policies within the emerging Wealden Local Plan, ensure any future iterations of policy supports the delivery of low carbon vehicle infrastructure as well as strategic spatial planning that can	Short term	Medium Measures driven through planning policy to reduce car use, promote alternative modes of transport and encourage uptake of electric vehicles will be crucial to reduce	Medium-High WDC has influence on transport through the planning system	Significant officer resources required for local plan preparation; however, this would be carried out as part of any policy development process	n/a	Medium-High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		encourage walking, cycling, etc.		transport emissions in the District				
T3	Review WDC fleet and replacement plans	Conduct an audit of the Council's vehicle fleet to assess opportunities for renewal with zero emission alternatives	Short term (already in progress)	Medium Savings will be limited but this will be important to show leadership	High	Limited officer resources required to undertake a review of fleet replacement plans	n/a	Medium
T4	Replace WDC fleet with zero emission alternatives	Based on the audit carried out as part of Action T3, replace WDC vehicles with zero emission alternatives where feasible	Medium term	Medium-High Transport only represents around 3% of WDC's own emissions but, given that transport accounts for nearly half of CO_2 emissions in the District, it will be important for WDC to show leadership in this area	Medium	Costs depend on technology in question – currently ULEVs tend to be more expensive in whole lifecycle costs However, note that the cost to drivers of using electric, hybrid and traditional fuel vehicles may converge in the coming decade, and this may be supported by additional incentive schemes	– Government Plug-In Grant	Medium
T5	Work with Stakeholders to assess options for increasing uptake of ULEVs	Identify stakeholders in the District with large fleets and / or car parks and work with them to support investment in charging points and ULEVs	Medium to long term	Low-Medium Helps to overcome the 'chicken and egg' problem whereby EV uptake relies on the availability of charging infrastructure	Low-Medium WDC to coordinate with stakeholders	Low to moderate officer resources required (depending on the opportunities that are available)	– EVHS – WCS	Medium

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
T6	Install public charging infrastructure in the Council's own estate	Plan and install EV charging points at Council owned buildings, car parks and other locations. This would involve carrying out a review of existing car parks and parking spots, assessing the current and future level of demand for EV charging, and identifying locations that would be suitable based on the findings	Short to medium term	High Shows leadership in promoting sustainable transport	Medium This should be coordinated with Action D1 (discussions with UKPN) to understand infrastructure capacity / constraints	Budget required to commission a study of suitable locations and types (estimate £15-30K depending on scope) Significant officer resource required to support both planning and implementation Indicative costs for different EV charging points are as follows [7]: • Slow (3.50-7kW): £500-1000 • Fast (7-22kW): £2,000-3,000 (AC) or £19,000 (DC) • Rapid (up to 50kW): £20K-40K Costs will depend on the level of additional infrastructure required, including electrical capacity reinforcements	– WCS – ORCS	Medium-High
T7	Community engagement to support behaviour change – Transport	Develop a community engagement programme that	Short to medium term	Medium Behaviour change measures will be	High	Moderate officer resources required to plan and deliver an engagement scheme,	n/a	High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		promotes a reduction in demand for private transport and increases uptake of sustainable transport modes such as walking, cycling, and use of public transport. This could include providing information about car clubs and carpooling opportunities or offering personalised sustainable travel plans	This type of initiative should be regular / ongoing to ensure that benefits are maintained over time	crucial to mitigate any increase in demands that could occur, for instance, as a result of rising population levels		depending on the type of activities undertaken		
	Offsetting *These measures can help to offset any residual CO_2e emissions for the Council and wider District after the other measures are adopted*							
O1	Identify existing sources of LULUCF emissions and further opportunities for woodland creation	Undertake a study to understand the existing LULUCF emissions within the District and potential opportunities for increasing sequestration	Medium term	High Energy demand reduction measures, reducing the use of fossil fuels and maintaining current levels of LULUCF emissions are a higher priority than carbon offsetting, even though some amount of offsetting will be required	Medium WDC could undertake this study or commission an expert	Overall costs of woodland creation depend on multiple factors, such as the potential timber revenue, agricultural opportunity costs, etc. but are estimated at around £5,095 per hectare for planting and fencing, plus government / local authority administration costs of around £637 per hectare	– Countryside Stewardship Woodland Creation Grant – Woodland Carbon Guarantee – Urban Tree Challenge Fund	Medium
O2	Undertake an assessment of	Commission a study to review specific	Medium term	High	Medium	Budget required to commission a study	– Capital investment – Public borrowing	Medium-High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
	opportunities for offsetting residual CO_2e emissions through investment in renewable energy technologies	project opportunities for delivering CO_2e savings through investment in renewables, such as solar farms and wind turbines, both within and outside of the District. This study should assess the financial viability and wider benefits in addition to potential CO_2e savings		Although offsetting is a required component of delivering the net zero target, it is important to note that energy demand reduction measures, reducing the use of fossil fuels and maintaining current levels of LULUCF emissions are a higher priority	This work could build on previous mapping analysis – see SKM Enviros, *'Wealden Renewable Energy Potential Study'* (2010)	(estimate £20-30K depending on scope) plus significant officer resources Costs associated with delivering a renewable energy installation would require a specific study to determine, but estimates based on industry figures are provided below [9]: • Solar farms – Cost in the UK can be around £1,000,000 per MW • Large-scale wind – Cost of onshore wind can be around £1,000,000 per MW Also note the spatial / visual impacts: a 5 MW solar farm may occupy around 25 acres and large wind turbines can be 100m in height	– Commercial borrowing – Power purchase agreements	
O3	Undertake internal consultation on the offsetting options	Based on the results of this study (and outputs from Actions O1 and O2) the Council will need to agree on an acceptable approach to offsetting	Short to medium term	High Offsetting is a required component of delivering the net zero target	Medium Discussions will need to be intermittent or ongoing to account for changes taking place in the coming decades	Moderate officer resources required to co-ordinate meetings and obtain agreements	n/a	High

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
	Scope 3 Emissions *These measures will help to reduce Scope 3 emissions, although the total impacts have not been quantified*							
S1	Work with suppliers to provide better emissions data	In order for WDC to better understand its Scope 3 emissions, further information will be required from its suppliers in relation to the CO_2e emissions associated with any services procured	Short to medium term	Medium	Medium This needs to be discussed with existing suppliers and built into all new contracts	No additional costs, but limited officer resources will be required to engage with suppliers	n/a	Medium
S2	Reduce waste production in Council offices	Review existing waste streams, identify relevant opportunities and guidance related to waste reduction, and implement measures to promote waste reduction and recycling	Short term	Low-Medium Although the emissions associated with waste generated by WDC (covering transportation and processing) have not yet been quantified, any measures to reduce waste generation will have a positive impact	Medium	Limited officer resources required to review existing waste streams and identify suitable measures	n/a	Medium
S3	Support waste reduction across the District	Identify and keep informed of waste reduction initiatives in the District and actively seek out opportunities to engage / promote	Short term	Low-Medium	Low-Medium Would require involvement from the waste contractor	Officer resources required to promote waste reduction and recycling, depending on the nature of engagement activities undertaken	n/a	Low

Ref	Action	Description	Timeframe	Effectiveness	Deliverability	Investment / resource implications	Potential Funding	Priority
		these schemes on an ongoing basis						
S4	Reduce water consumption in Council offices	Reduce water consumption in buildings through installation of low water-use fittings and sanitaryware, flow restrictors on taps and showers and leak detection systems. Grey/rain water systems could also be investigated	Medium term	Low-medium Relatively limited CO_2e emissions reductions but offers other benefits (conservation of water resources)	Medium Easy-win measures will be installing flow restrictors and specifying low water-use fittings and sanitaryware as part of any refurbishment programmes	Flow restrictors and low water-use fittings and sanitaryware likely to incur minimal additional costs if specified as part of planned replacement / maintenance works Grey/rainwater systems would incur higher costs	– Direct spend	Low
S5	Support leisure centre operator to improve data and reduce emissions	The data for Hailsham leisure centre needs to be improved by submetering. Opportunities for energy demand reduction and switching to low carbon systems should be identified	Short and medium term	Medium	Medium WDC to work with Freedom Leisure	An electricity sub-meter is likely to cost around £300 to install Costs of installing energy efficiency and low carbon energy systems will be significant but depend upon the approach taken so would require a separate study to quantify	– Salix – Direct spend	Medium

Notes and further guidance on the Action Plan

[1] Action G4: For guidance, see BEIS, *'Emissions reduction pledge 2020: Emissions reporting in public and higher education sectors'* (2018). Available at: https://www.gov.uk/government/publications/emissions-reduction-pledge-2020-emissions-reporting-in-public-and-higher-education-sectors

[2] Action D2: This can be done by accessing national BEIS datasets on an annual basis. See BEIS, *'Emissions of carbon dioxide for Local Authority Areas'* (online). Available at: https://data.gov.uk/dataset/723c243d-2f1a-4d27-8b61-cdb93e5b10ff/emissions-of-carbon-dioxide-for-local-authority-areas

[3] Action R4: For example, a high-level desk-based study could use English Housing Survey (EHS) or National Energy Efficiency Database (NEED) data as a starting point. This would represent the lower end of the range, whereas the higher end might involve additional physical surveys or building audits.

[4] Action R6: For information about the existing energy audit scheme offered by ESCC, see https://www.eastsussex.gov.uk/business/eastsussex/green/

[5] Action H3: At present, it is more expensive to replace a gas boiler with a heat pump. For comparison, if replacing an existing gas boiler with a new gas boiler, costs are roughly as follows:

- £60-100/kW for non-domestic buildings
- £1-2k for domestic buildings

Also note that, based on current energy prices, the operational costs of a heat pump are likely to be higher than a gas boiler unless additional revenue is secured from an incentive scheme like the RHI.

[6] Action E1: For guidance, see BRE, *'Solar Car Parks: A guide for owners and developers'* (2016). Available at: http://www.bre.co.uk/filelibrary/nsc/Documents%20Library/NSC%20Publications/BRE_solar-carpark-guide.pdf

[7] Action T6: Costs are taken from Energy Saving Trust, *'Guide to chargepoint infrastructure for business users'* (2017). Available at: https://www.energysavingtrust.org.uk/sites/default/files/reports/6390%20EST%20A4%20Chargepoints%20guide_v10b.pdf

Note that costs may be higher where charging points are retrofitted into existing parking infrastructure:

- Typical domestic: £976 for upfront versus £2,040 for retrofitting
- Typical non-domestic: £3,822 for upfront versus £4,925 for retrofitting

For more information about the difference in cost, see Department for Transport, *'Industrial Strategy: Electric Vehicle Charging in Residential and Non-Residential Buildings'* (July 2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/818810/electric-vehicle-charging-in-residential-and-non-residential-buildings.pdf

[8] Action O1: Forestry Commission, *'Comparing the cost-effectiveness of forestry options for climate change mitigation'* (January 2019) – see 'Table 3: Afforestation Costs by Country'. Available at: https://www.forestresearch.gov.uk/research/comparing-cost-effectiveness-forestry-options-climate-change-mitigation/

[9] Action O2: Costs are based on International Renewable Energy Agency, *'Renewable Power Generation Costs in 2018'* (2018). Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/May/IRENA_Renewable-Power-Generations-Costs-in-2018.pdf

Spatial requirements for solar farms are based on information provided by the UK Solar Trade Association (accessed November 2019): https://www.solar-trade.org.uk/solar-farms/

4.2 Potential sources of funding

The table below lists some examples of the potential sources of funding that have been used previously for the types of projects listed in the Action Plan.

The availability of funding has been in flux in recent years, so this list is intended only as a starting point for identifying opportunities. Action G6 recommends that WDC should work with other local authorities and organisations to identify other sources of funding.

Funding source	Description	Applicability to Wealden's Climate Emergency Action Plan
Specific potential funding opportunities – *as of November 2019*		
SALIX finance	BEIS funded programme offering interest-free funding for energy efficiency projects to local authorities. SALIX funding is generally aimed at smaller projects (e.g. boilers and lighting upgrades) but can also contribute towards larger projects.	As part of improvement works to Council-owned buildings – see Actions R1 and R2.
Heat Network Development Unit (HNDU) funding and Heat Network Investment Project (HNIP)	Government funding programme that aims to help deliver heat networks through provision of £320 million in capital (gap) funding.	Could be used to help deliver a heat network in Hailsham (or elsewhere) – see Actions H1 and H2.
Carbon Trust Green Business Fund	Provides energy efficiency support for SMEs in England, Wales and Scotland, including funding for energy assessments, training and equipment procurement support.	Not applicable to public sector organisations but potential for WDC to coordinate to deliver energy efficiency improvements in SMEs – see Actions R5 and R6.
Energy Efficiency Grants for East Sussex Businesses	SMEs can receive grants of £200-£1000 to cover up to 40% of the cost of an energy efficiency project.	As above.
Rural Community Energy Fund (RCEF)	£10 million government fund which aims to promote renewable energy projects in rural communities. Grants of up to £40,000 are available for feasibility studies and grants of up to £100,000 for business development and planning of schemes.	Not applicable to public sector organisations but potential for WDC to coordinate to deliver renewable energy projects in rural areas – see Action E2.
Alternative / innovative financing models		
Energy performance contracting	In this model, a contractor will deliver an energy efficiency project and guarantee a certain level of energy savings, which are then used to repay the cost of the project.	
Power Purchase Agreement (PPA)	An arrangement where one party owns, operates and maintains an energy system (e.g. solar PV), while a second party agrees to host the system and purchase power for a	

	predetermined period, often at a fixed price.	
Leasing roof space	An arrangement where one party owns, operates and maintains a PV system and leases roof space to do so. For example, third party developers could lease roof space from WDC, creating a source of revenue for the Council. Power generated by the panels could be sold to the building tenants.	Offers a means of installing additional LZC capacity without upfront costs for WDC.
Cooperative models	Ownership models where community groups invest to deliver local renewable energy. For example, see Community Energy South (CES).	WDC could investigate opportunities to promote community energy projects.
Crowdfunding	Generating funds through open calls for public donations.	

In addition to the options listed above, developer contributions such as Section 106 (S106) agreements and Community Infrastructure Levy (CIL) payments could also be used to help mitigate the environmental impacts of new developments.

More broadly, WDC should consider whether existing sources of Council funding could be used in part to support the projects listed in the Action Plan. Examples include:

- User fee / toll collection
- Business rates
- Special purpose local taxes
- Council tax and council tax precepts
- Revenue generating assets
- Sale or development of surplus assets
- Third party contributions

5. Measuring progress

5.1 Carbon emissions

We recommend that the Council set up a monitoring process to review progress against the CO_2e emission projections. This could be done on an annual basis or, to align with the Committee on Climate Change's national carbon budgets, be split into 5-year periods.

The monitoring and review process for CO_2e emissions reductions could cover the following, depending on the resources available for gathering and analysing data:

- Review of annual carbon emission data for the District, using the data published by BEIS to track year-on-year progress towards the decarbonisation target.[52]
- Assessment of the progress of national electric decarbonisation, which can be achieved by assessing carbon factors published annually by BEIS against the assumptions used in the modelled scenarios presented in this report.[53]
- Assessment of the uptake of low carbon heating systems (heat pumps and heat networks), which can be achieved by reviewing planning applications for new buildings/change of use and through the national EPC database.[54]
- Assessment of the uptake of low carbon vehicles, including buses, which can be achieved by reviewing data collected by the Department for Transport and assessment of the usage of charging points within the District.[55]
- Assessment of the performance of the building stock within the District, using the national EPC and DEC databases or other national / local surveys.
- Assessment of the CO_2e emissions from the Council's own estate, using existing energy datasets and carbon reporting methodologies.
- Assessment of progress against actions listed in the Action Plan above, and assessment of CO_2e emissions reductions from specific projects completed over the year.

The indicators and targets listed in the submission Local Plan (Jan 2019), Policy NE7 are as follows:

Policy NE 7 Target(s):

- To increase the number of low carbon and renewable energy schemes within the District.
- A reduction in total emissions of CO_2e within the District
- A reduction in total emissions of CO_2e by sector within the District

Policy NE 7 Indicator(s):

- NE 011 - The number of planning applications granted for renewable energy development within the District
- NE 012 - Total emissions of CO_2e within the District
- NE 013 - Carbon emissions by sector (industrial and commercial, domestic and road) and per capita within the District

BEIS, *'Emissions of carbon dioxide for Local Authority areas'* (updated annually). Available at: https://data.gov.uk/dataset/723c243d-2f1a-4d27-8b61-cdb93e5b10ff/emissions-of-carbon-dioxide-for-local-authority-areas

[53] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017

[54] The national EPC database is available at: https://epc.opendatacommunities.org/

[55] For ULEV registrations by, see BEIS, *'VEH0132: Licensed ultra low emission vehicles by local authority'* at: https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01
For information about the number of charging points, see the website *'Electric vehicle charging devices by local authority'* and supporting data tables published by the Department for Transport at http://maps.dft.gov.uk/ev-charging-map/

5.2 Additional sustainability metrics

Existing guidance

The Government has produced guidance on sustainability reporting in the public sector[56,57] which, although aimed at central government institutions and not required for Local Authorities, could be adapted by Wealden District Council as a means of identifying and setting additional standards.

The table below summarises some of the key topics outlined in the Sustainability Reporting Guidance (2018). It also lists sources of further guidance or information that could be used by WDC to identify and set additional reporting standards.

Area of focus	Information required – *per the Sustainability Reporting Guidance (2018)*	Further guidance and sources of information
Greenhouse gas emissions	Reporting must include fuel consumption, expenditure and the associated CO_2e emissions for: • All Scope 1 and 2 emissions • Scope 3 emissions related to official business travel (at minimum)	Current guidelines on reporting GHG emissions are found in HM Government, *'Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance'* (2019).[58]
Waste minimisation and management	• Total waste arising • Proportion of waste that is: – Sent to landfill – Recycled, reused, or composted – Used to provide energy (e.g. incineration, anaerobic digestion)	The Waste and Resources Action Programme (WRAP) provides guidance on waste reduction that is specifically aimed at Local Authorities, including a Toolkit and Data Portal. It also provides tools and resources for assessing recycling collection services, and specific advice on topics such as sustainable procurement.[59]
Finite resource consumption	• Water consumption (m^3)	HM Government, *'Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance'* (2019)
Biodiversity action planning	• Performance against biodiversity action plans in line with the GGC, if relevant	According to DEFRA (2006): *'There is no single, universally accepted method for measuring the impacts of company activity on biodiversity.'*

[56] HM Treasury, *'Sustainability Reporting Guidance'* (published 2018). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/772723/Sustainability_report_19.pdf

[57] DEFRA, *'Greening Government Commitments: Overview of Reporting Requirements'* (2016). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/585344/greening-government-commitments-overview-reporting-requirements-2016-2020.pdf

[58] For more information, see https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791529/Env-reporting-guidance_inc_SECR_31March.pdf

[59] See http://www.wrap.org.uk/local-authorities for more details.

Area of focus	Information required – *per the Sustainability Reporting Guidance (2018)*	Further guidance and sources of information
		Reporting standards set by Global Reporting Initiative (GRI) cover topics such as:[60] • Management approaches • Impact of activities, products and services • Habitats restored and protected • Conservation list species affected by operations In addition, the UK Wildlife Trust operates the Biodiversity Benchmark[61] scheme which can be used by landowning organisations and is designed to integrate with existing environmental management systems such as ISO14001.
Sustainable procurement (including food and catering)	Metrics include, but are not limited to: • Approach to embedding sustainability into procurement, e.g. Flexible Framework, British Standard 8903:2010, Government Buying Standards • Approach to management of supply chain impacts • Sourcing / procurement of food and catering services	DEFRA, *'Sustainable Procurement in Government: Guidance to the Flexible Framework'* (2011).[62]This self-assessment framework helps organisations measure and monitor their actions and progress relating to sustainable procurement. Government Buying Standards (GBS) [63] are a set of product specifications developed by DEFRA to assist public procurers in embedding sustainability into the procurement process. See also British Standard 8903, *'Principles and framework for procuring sustainably'* (2010).
Climate change adaptation (CCA)	• Organisations should provide *'[a] general statement giving assurance that action has been taken to ensure that those policies with long term implications are robust in the face of changing*	DEFRA, *'Preparing for a changing climate: Good practice guidance for local government'* (2019) provides an overview of the key topics affecting Local Authorities, their role in addressing – and adapting to – climate change. It also describes the current regulatory context.[64] This can be used as a starting point to

[60] Global Reporting Initiative, *'GRI 304: Biodiversity'* (2016). Available at: https://www.globalreporting.org/standards/gri-standards-download-center/gri-304-biodiversity-2016/
[61] For more information, see https://www.wildlifetrusts.org/help-manage-land/biodiversity-benchmark
[62] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69471/pb13423-flexible-framework-guidance-110928.pdf
[63] For more information, see https://www.gov.uk/government/collections/sustainable-procurement-the-government-buying-standards-gbs
[64] DEFRA, *'Preparing for a changing climate: Good practice guidance for local government'* (2019). Available at: https://www.adeptnet.org.uk/system/files/documents/Good%20Practice%20Guide%20ADEPT%202019f.pdf

Area of focus	Information required – *per the Sustainability Reporting Guidance (2018)*	Further guidance and sources of information
	weather, extreme events and sea level rises from climate change.'	understand potential actions that could be monitored and reported on.
	• Provide updates on progress (as relevant)	The Global Covenant of Mayors on Climate and Energy provides an internationally-recognised monitoring and reporting framework aimed specifically at local governments.[65]
Sustainable construction	• Measures taken to ensure any construction work prioritises sustainability	Government Buying Standards (see above)

Examples of commitments / targets

The Greening Government Commitments (2016) include the following targets, which are provided as examples of the types of measures WDC might implement.

> *'Compared to a 2009-10 baseline, by 2019-20, the government will:*
>
> - *reduce the number of domestic business flights taken by 30% [...]*
> - *reduce waste sent to landfill to less than 10% of overall waste; continue to reduce the amount of waste generated and increase the proportion of waste which is recycled*
> - *reduce paper consumption by 50%*
> - *continue to further reduce water consumption.'*

Regarding sustainable procurement, commitments include:

> *'To embed compliance with the Government Buying Standards in departmental and centralised procurement contracts, within the context of government's overarching priorities of value for money and streamlining procurement processes; and*
>
> *To understand and reduce supply chain impacts and risks.'*

Environmental KPIs

The Sustainability Reporting Guidance (2018) outlines topics for consideration, but does not specifically advise on setting performance measures, commitments or targets. Instead, it refers to a 2006 DEFRA publication that describes environmental key performance indicators (KPIs) relevant to UK organisations. These are listed below.[66]

Emissions to air 	• Greenhouse Gases • Acid Rain, Eutrophication and Smog Precursors • Dust and Particles • Ozone Depleting Substances • Volatile Organic Compounds • Metal emissions to air

[65] For further information, see https://www.globalcovenantofmayors.org/

[66] DEFRA, *'Key Performance Indicators: Reporting Guidelines for UK Businesses'* (2006). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69281/pb11321-envkpi-guidelines-060121.pdf

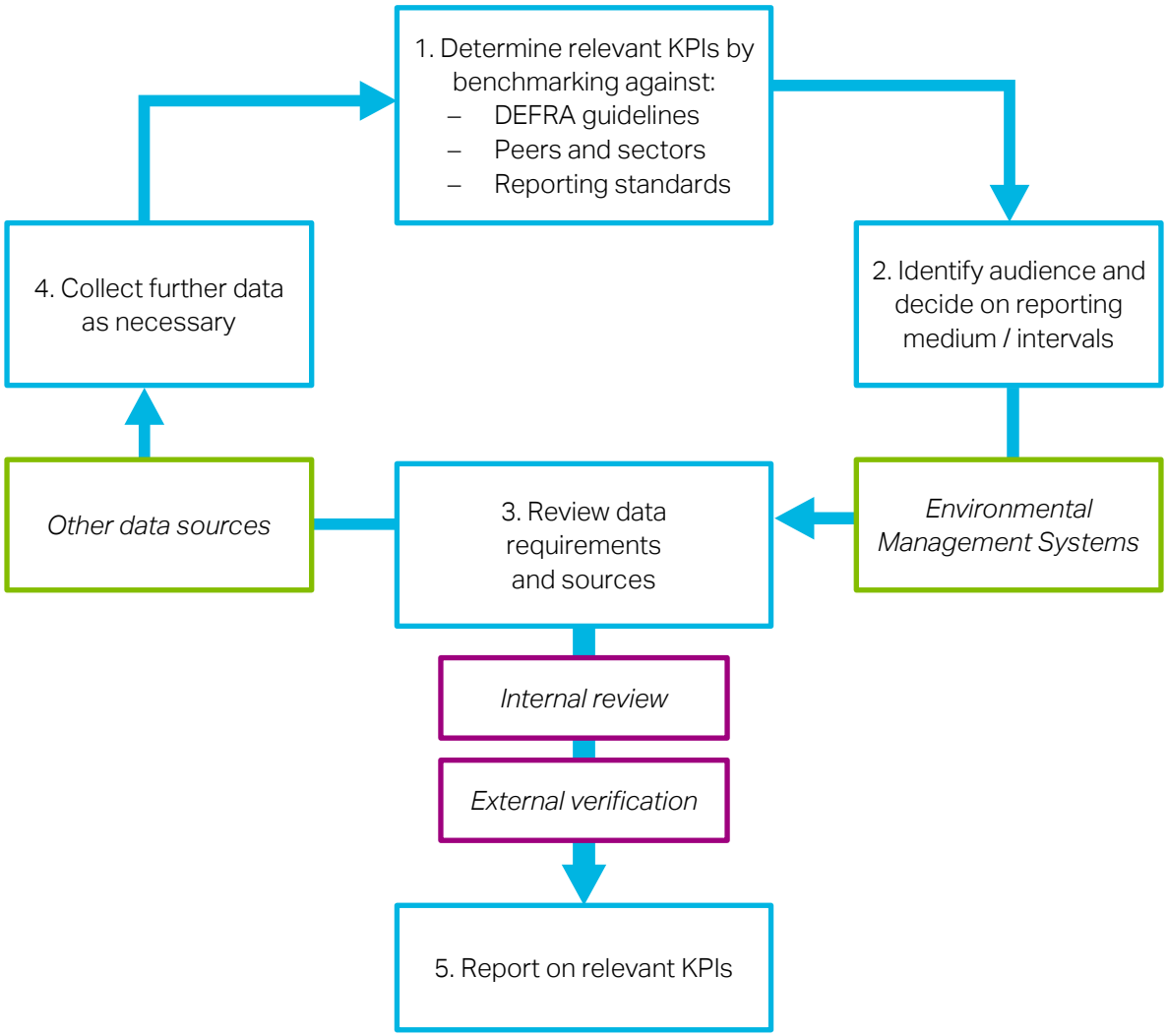
Emissions to water 	• Nutrients and Organic Pollutants • Metal emissions to water
Emissions to land 	• Pesticides and Fertilisers • Metal emissions to land • Acids and Organic Pollutants • Waste (Landfill, Incinerated and Recycled) • Radioactive Waste
Resource use 	• Water Use and Abstraction • Natural Gas • Oil • Metals • Coal • Minerals • Aggregates • Forestry • Agriculture

Next steps towards identifying and implementing standards

1. WDC should review the above guidance documents and identify the environmental issues most relevant to their organisation, with consideration given to their own activities, assets, investments, and so on.
2. Decide on a reporting format and frequency. There is no set reporting format for many of the topics discussed above, and in many cases, organisations are permitted to devise their own.
3. Review any existing environmental management strategies or certification held by WDC and identify any other datasets available to WDC to assess coverage and identify any gaps. This could include internal data or published regional / national data.
4. Then, assess which areas of environmental reporting can be carried out in the short term. Where further information is required, develop a strategy and timeline for how additional monitoring procedures will be implemented in the medium to long term.
5. Report on sustainability targets where possible. Note that the above steps are likely to be repeated and reassessed on an ongoing basis; the nature of WDC's reporting may change over time.

This process is illustrated in the diagram[67] below. Throughout this process, coordination with internal and external stakeholders will be required to ensure that the development and implementation of sustainability reporting procedures is fully integrated with other strategies, policies, services or external activities.

[67] Adapted from DEFRA (2006), '*Figure 2 – Process for reporting environmental KPIs*'


1. Determine relevant KPIs by benchmarking against:
– DEFRA guidelines
– Peers and sectors
– Reporting standards
2. Identify audience and decide on reporting medium / intervals
Environmental Management Systems
3. Review data requirements and sources
Other data sources
4. Collect further data as necessary
Internal review
External verification
5. Report on relevant KPIs

6. Conclusion

6.1 Recommendations

The measures described in the Action Plan reflect the following overarching recommendations:

- Wealden District Council should take a leadership role by examining its own operations, buildings, vehicle fleet, services and investments and identifying best practice measures that it can implement for areas within its control.
- Wealden District Council should immediately take steps to proactively support other authorities and organisations in delivering the actions required to reach net zero carbon – that is, exerting indirect influence wherever it can in collaboration with relevant stakeholders.
- Wealden District Council should take steps to lobby the Government to achieve more rapid and deeper decarbonisation across key priority areas, including higher energy efficiency standards for new and existing buildings, policies that support uptake of renewable and low carbon technologies, and the development of low carbon transport and infrastructure.
- Wealden District Council should proactively support such measures through its own planning policy and decisions. In particular, the Council should take a proactive and positive attitude towards increasing the amount of LZC energy generation within the District as an important means of 'doing their part' on national electricity grid decarbonisation.
- Although demand reduction, fuel switching and LZC energy generation are top priorities, recognising that some amount of carbon offsetting will inevitably be required to meet the net zero target (and given the pressing timescales involved), Wealden District Council should immediately start carrying out further research to understand the offsetting opportunities that are available, building on previous energy studies carried out for the District.
- Wealden District Council should ensure that the findings from this study are reflected in any future policy or decision making process where relevant, both for the Council and the District more broadly.

6.2 Next steps

For the climate emergency plan

- Disseminate the findings of this report and carry out further consultation to review and approve the Action Plan.
- Immediately begin the process of reaching out to stakeholders, including local authorities, local enterprise partnerships (LEPs), utility companies (e.g. UKPN, Southern Gas), government departments / agencies (e.g. Department for Transport, Department of Environment, Food and Rural Affairs, and the Forestry Commission), and others (e.g. WRAP) to identify opportunities for collaboration and engagement.
- Review any ongoing or near future projects that are relevant to the measures listed in the Action Plan to ensure that activities are well-coordinated and integrated. This would include, for instance, plans for redeveloping the Hailsham town centre, along with the Council's own plans for building management or fleet replacement.

Other sustainability targets

- Review existing management approaches and sources of data to identify the information available, then consult on suitable metric, targets and reporting formats for sustainability indicators such as biodiversity, waste, water, procurement and climate change adaptation.

Appendix A – Modelling methodology and assumptions

A.1 Approach and calculation method

Wealden District method

The District's baseline emissions are based on the 2017 dataset published by BEIS. It is based on Scope 1 and 2 emissions within the boundary of the local authority area. This includes the emissions associated with electricity if the point of end use is within the boundary. It also includes the modelled emissions from transportation occurring within that geographic area, i.e. if a car drives through the Local Authority area, only the emissions within the Local Authority boundary are counted.

This is a different approach than the one adopted for the Council's own emissions, which consider emissions that result from Council activities regardless of where they take place geographically. See following sections for more detail.

Projections account for new development levels (dwellings and employment floorspace) as outlined in the Council's submission Local Plan (January 2019). In the 'No Action' scenario, aside from the increase in gas and electricity due to new development, emissions from all other sources are assumed to remain constant (i.e. as reported in BEIS dataset for 2017).

Wealden District Council method

The most complete Scope 1 and 2 data provided was for the financial year 2018/19 (April 2018 – March 2019 i.e. 12 months). The table below summarises the data used in establishing the Council's baseline CO_2 emissions.

Category	Description	Data used in this analysis
Scope 1	Direct emissions from sources owned or controlled by the reporting organisation	Metered gas data (for buildings where the Council pays the gas bills) Mileage for the Council-owned vehicle fleet and pool cars, along with vehicle make and model
Scope 2	Indirect emissions from the generation of energy purchased by the reporting organisation	Metered electricity data (for buildings where the Council pays the electricity bills)
Scope 3	Indirect emissions that result from other activities that occur in the value chain of the reporting organisation, either upstream or downstream. Not included in the baselines	Records of business mileage by Council Employees in private vehicles. Insufficient detail to assess public transport CO_2e emissions. Records of leisure centre gas and electricity consumption [Not reported] Metered water use data – incomplete data to fully assess and report total CO_2e emissions from this resource use. [Not reported] Waste – insufficient detail to assess total CO_2e emissions from this activity.

Although a sense-checking exercise was carried out to ensure the completeness and accuracy of this data, AECOM accepts no responsibility for any errors or omissions therein.

The carbon emissions baseline was estimated in compliance with the methodology and conversion factors for greenhouse gas emissions reporting published by BEIS in 2019.[68]

CO_2e figures for different fuel types and activities were taken from the BEIS *'Green Book Supplementary Guidance: Toolkit for valuing changes in greenhouse gas emissions, Table 1'* (2019). These include figures for CO_2e emissions from:

- Use of natural gas ($kgCO_2e$ / kWh)
- Use of UK grid electricity ($kgCO_2e$ / kWh)
- Distance travelled (figures are provided for various different vehicles) ($kgCO_2e$ / mile)

Figures for electricity and gas consumption (kWh) and vehicle mileage (miles) were multiplied by these CO_2e figures to obtain an estimate of the total emissions from each category.

Vehicle Mileage

Wealden Council provided AECOM with a dataset of vehicles which included the total mileage, the fuel type, the year of manufacture and the registration number and make/model of each vehicle.

The emissions were estimated based on the fuel type, trip distances, the engine size (obtained from the gov.uk MOT database[69]) and the corresponding CO_2e figures provided by the BEIS under Scope 3 ('business travel'); Emissions from the Council's own vehicle fleet are included in Scope 1 in this report because the Council controls the operation these vehicles while emissions arising from staff business mileage are included in Scope 3 because this is undertaken in private vehicles.

A.2 Carbon emission projection

The following assumptions have been applied to the projection modelling scenarios considered to 2050 for both District and Council baselines. The model inputs and limitations for each are summarised in A.3 and A.4.

Built environment

Existing buildings

The modelling assumes that existing buildings will continue to have the same gas and electricity consumption in a 'No Action' scenario. Reductions to fuel consumption are then applied to test the relative impact of different intervention measures (described below) as part of the carbon projection modelling.

This is particularly important for understanding the impact of potential intervention measures in the Council's own buildings, because any change in the Council's ownership or operation of buildings or provision of services could have a significant impact on the Council's carbon emissions.

New buildings

The amount of proposed new development (number of dwellings and m^2 of employment floorspace) is multiplied by benchmarks to provide an estimate of energy demand.

In order to estimate the impact of new construction / development within the District as a whole, benchmarks were used to estimate the fuel consumption of new buildings. For domestic buildings, benchmarks were derived from median consumption figures for Wealden as reported in NEED. For non-domestic buildings, CIBSE Guide F benchmarks were used to estimate gas and electricity demand. In both cases, the heat / gas demand figures were reduced by 75% to reflect higher fabric performance standards. The level of heating demand reduction was informed by the recently published consultation

[68] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019
[69] https://vehicleenquiry.service.gov.uk/ViewVehicle

documents related to Parts L and F of the Building Regulations, and the introduction of a Future Homes Standard.

For the Council-only projections, it was assumed that there would be no change in the Council's building portfolio and therefore, in a 'No Action' scenario, emissions from buildings would remain constant.

Grid decarbonisation pathway

Carbon emission factors (CEFs) for electricity were taken from HM Treasury/BEIS *'Green Book Supplementary Guidance: Toolkit for valuing changes in greenhouse gas emissions, Table 1'* (2019) which is intended for use by organisations reporting on their greenhouse gas emissions. Note that this trajectory reflects the level of decarbonisation that would be necessary for the UK to meet its current decarbonisation targets. It is not a projection of the likely emissions from grid electricity.

Electricity demand reduction

Evidence suggests that reductions of around 5% can be achieved through measures such as behavioural changes, smart metering, and zone lighting. Case studies suggest that greater reductions are possible for some organisations. However, in recognition of the fact that electricity use has increased in the past decade due to factors such as increasing use of electronic appliances, 5% has been used as a conservative estimate.

The model assumes that total electricity consumption will decrease linearly through to the year 2050, at which point this reduction will be achieved.

Heating demand reduction from energy efficiency measures

Evidence from NEED indicates that installing multiple energy saving measures (such as cavity wall or loft insulation) can reduce heating bills by around 5-12%. From a technical standpoint, higher savings (over 75% in some properties) could be achieved with more ambitious retrofitting strategies,[70] but 10% has been used as a conservative estimate.

This would not necessarily require all buildings to undergo a retrofit – it represents an average across the entire stock. In other words, some buildings could be retrofitted to a higher standard, while others (such as Listed buildings) receive no upgrades.

The model assumes that total gas consumption will decrease linearly through to the year 2050, at which point this reduction will be achieved.

Impact of fuel switching

This calculation assumes that the metered gas consumption is delivered by individual gas boilers (80% efficiency). The total metered gas consumption data is used to provide a rough estimate of the amount of electricity that would be required if this level of demand was instead met using direct electric heating (DEH) with 100% efficiency or heat pumps with COP of 2.5 (this is intended as a conservative estimate that reflects the performance of air source heat pumps (ASHPs) in situ).

It is assumed that the Crematorium will also switch to an electric system offering similar performance levels in 2040. The cremator is relatively new in 2019 and therefore it makes sense to make the change to an electric system at the end of the existing system's working life.

The model assumes that 90% of existing buildings will switch to an electric heating system by 2050. This would require an ambitious programme of heating system replacement with significant cost implications. Therefore, the calculation also assumes that 50% of the new heating systems will be DEH and 50% will be ASHP as an illustrative scenario, in recognition of the fact that DEH may be cheaper and

[70] See https://passipedia.org/certification/enerphit

more practical to install. Additional carbon reductions could potentially be achieved if more systems were replaced with ASHPs.

The model assumes that gas heating systems will be replaced with electric heating systems at a consistent rate (i.e. linearly) to 2050.

Vehicle mileage reduction

In the baseline scenario, it is assumed that demand for transport remains stable. This will likely tend to increase over time due to factors such as population growth. A stable trajectory would imply that measures are being implemented to mitigate this demand through encouraging other forms of travel such as walking, cycling or public transport.

According to the 'Road to Zero' report: *'Evidence from 60,000 fleet drivers receiving training through the Energy Saving Trust (EST), a key partner supporting the efficient motoring agenda, gave an average 15% saving of fuel and CO_2 [...] Organisations that have incorporated a wider package of behavioural and procedural measures in managing their fleets (see the case study below) have delivered typical emission savings of between 10-30%.'*

The model assumes that a 10% reduction in either journeys, vehicles, or miles travelled will result in a 10% reduction in CO_2e emissions from those vehicles. A travel strategy aimed at reducing emissions would likely seek to target certain types of trips, vehicles, or users, so this approach should be understood as an estimate. However, for the purpose of this analysis, it is considered enough to show a simple proportional reduction to highlight the relative scale of impact such a measure could have, relative to other interventions.

For the Council it is assumed that it is possible to introduce initiatives to reduce mileage whilst maintaining the same level of service through smart routing and encouraging a switch to public transport.

The model assumes that total mileage will decrease linearly through to the year 2050, at which point this reduction will be achieved.

Impact of switching to Ultra Low Emission Vehicles (ULEVs)

Based on the estimated mileage for each vehicle type, we have re-calculated CO_2e emissions using BEIS Green Guide figures for electric vehicles.

Electric vehicle sales are gaining market share and are a feature of the Government's strategy to achieve net zero carbon by 2050. It is assumed it will be more challenging to change the HGV market but overall it is anticipated that there will be a significant uptake of zero emission vehicles by 2050.

Omitting HGVs but assuming all other vehicles switch to electric alternatives the wider District model assumes a 92% switch by 2050.

There is potential to switch Council vehicles to zero emissions options sooner, as they are replaced. The future trend projection therefore anticipates all vehicles are replaced with electric models within 5 years.

Carbon savings from Low or Zero Carbon (LZC) technology energy generation

Carbon savings from Low or Zero Carbon (LZC) energy generation are based on the amount of National Grid electricity that would be offset by renewable electricity.

A total figure for the amount of LZC capacity that will be installed by 2050 is inputted into the model, and the model assumes that the total savings will increase linearly up to that point.

An estimate is then made of the potential amount of renewable electricity that could be generated by those technologies (large-scale PV or wind). The electricity generation figure is multiplied by the CEF for a given year to provide an estimate of the total CO_2e savings in a given year.

- *Large-scale PV:* Assumed output of 827 kWh/kWp based on typical performance in the UK
- *Large-scale onshore wind:* Capacity factor of 2,081kWh/kWp

Note that, as the electricity grid decarbonises, more LZC energy generation is required to offset any residual emissions. Therefore, although the amount of LZC capacity is assumed to increase linearly, the savings per MW decrease as the grid decarbonises over time.

Carbon reductions from woodland creation and tree planting

Based on nation-wide statistics from the Woodland Carbon Code[3], new woodlands created from low-grade agricultural land have the potential to sequester around 356 tCO_2e per hectare over 100 years, or 3.56 tCO_2e per hectare per year on average. In practice, this depends heavily on the type of woodland and its maturity level.

It is assumed that the amount of new woodland increases linearly to 2050. Based on user inputs for the number of hectares planted, the model calculates the total potential carbon reduction potential. This is subtracted from the total estimated carbon emissions following adoption of all intervention measures, after accounting for renewable energy generation.

The scale of offsetting has been input in order to target net zero carbon by 2050 assuming all previous measures and changes in market come to pass. This allows the Council to understand the approximate scale of investment in offsetting required to overcome the likely gap shown by our projection modelling. Proposals would need to be backed up with detailed modelling / evidence and supported by a long-term management plan. Therefore, these figures are intended only to provide a rough sense of scale.

A.3 Wealden District emissions

Specific details relevant to the Wealden District emission modelling methods, assumptions and limitations are provided below.

Scope of analysis

The BEIS District wide dataset was used to determine the baseline emissions. The baseline is then projected forward to 2050 based on the range of possible trends described in Section A.2.

The table below shows the categories of emissions reported in the BEIS dataset. In this report, some of the categories representing a small proportion (<1%) of total emissions have been consolidated in order to align the emissions baseline with the fuel consumption figures as much as possible.

Category	Sub-categories as listed by BEIS	Sub-categories as listed in this report
Industrial & commercial (Note: This includes public sector and agricultural fuel consumption and is referred to as 'Non-domestic' in this report)	• Electricity • Gas • Large industrial installations (Note: none reported for Wealden District) • Other fuels • Agriculture (Note: Fuel not specified)	• Electricity • Gas • Other fuels • Agriculture (all fuels)
Domestic	• Gas • Electricity • Other fuels	• Gas • Electricity • Other fuels
Transport	• Road transport (A roads, motorways and minor roads) • Diesel railways • Other	• Transport (all fuels)

The methodology used by BEIS to estimate carbon emissions varies depending on the source of emissions under consideration. For example, for gas and electricity, a carbon emission factor is developed for each fuel and applied to the sub-national fuel consumption data to provide an estimate of the CO_2e emissions associated with the use of that fuel. In the case of transport, emissions are estimated based on the types of vehicles and vehicle movements that take place on each stretch of road within the UK, and these are allocated to a Local Authority dataset based on geographic boundaries. Total emissions may also include point-source estimates for certain consumers, and therefore it is not possible to directly align the fuel consumption data with the emissions data.

It should also be noted that the BEIS dataset *excludes* various potential sources of other GHG emissions. For example, it does not include methane emissions from livestock digestion.[71] This study has only considered sources listed within the BEIS dataset because at present there is no published information on total GHG emissions for Local Authorities within the UK.

For further information, see the *'Technical Report: Local and Regional Carbon Dioxide Emissions Estimates for 2005-2017 for the UK'* (BEIS, 2019).

Summary of assumptions and inputs

The following assumptions have been applied to the projection modelling scenarios considered to 2050.

Topic	Model input	Data source
Demand Reduction		
Potential reduction in gas use in existing buildings over time to 2050	10%	NEED 2019 Report, *'Table 3: Typical savings following multiple energy efficiency measures'* suggests 12% reduction in heating is possible; 10% has been used as a conservative estimate.
Potential reduction in demand for heating in new buildings over time to 2050	75%	This reduction is in line with the levels indicated by the Future Homes Standard consultation.
Potential reduction in demand for electricity for appliances and lighting over time to 2050	5%	Assumes that appliance use will increase but a small reduction could be achieved through behaviour change. Research indicates up to 10% possible – low / conservative estimate used.
Fuel Switching		
Existing buildings switch to electric heating over time to 2050	90%	Assumes that, in the next 10 years, it will become a requirement to switch when otherwise replacing boilers. Based on a 15-year replacement cycle, this means that the majority of boilers would be replaced by 2050. 90% is used as a conservative estimate assuming that some heating systems cannot be replaced
New buildings that are built with electric heating	100%	Assumes all new builds will be required to use electric heating.
Proportion of existing building electric heating systems that are heat pumps	50%	Estimate. The remainder are assumed to be direct electric systems where it is not feasible to install heat pumps.
Proportion of new building electric heating systems that are heat pumps	90%	Estimate. The remainder are assumed to be direct electric systems where it is not feasible to install heat pumps.

[71] For context, methane accounts for roughly 11% of total GHG emissions in the UK compared with 81% that is attributed to CO_2. See BEIS, *'2018 UK Greenhouse Gas Emissions, Provisional Figures'* (March 2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/790626/2018-provisional-emissions-statistics-report.pdf

Topic	Model input	Data source
System Efficiencies		
Typical gas boiler	80%	Low / conservative estimate
Heat pump	250%	Low / conservative estimate
Direct electric heating	100%	1:1 conversion is normal
Transport		
Reduction in mileage over time to 2050	10%	Estimate.
Vehicles that switch to zero emission over time to 2050	92%	Assumes that HGVs do not switch.
Renewables and offsetting to target net zero carbon (if all previous measures included)		
Solar PV installed over time to 2050	500MW	Input
Wind turbine installed over time to 2050	450MW	Input
Increase in carbon sequestration over time to 2050	20%	Input

Limitations

As stated previously, this study has only considered sources of CO_2e emissions that are listed for Wealden District within the published BEIS dataset. Due to lack of information about other GHG emissions at a Local Authority level, therefore, the baseline presented in this report is likely to be an underestimate of the total.

A key overarching limitation of this approach is that any changes modelled would need to be backed up by policies, funding, changes in technology, and user / consumer behaviour which are uncertain.

The analysis does not account for other changes e.g. population growth, energy prices, weather, economic growth, and the many other trends that would impact energy demand – it is primarily focused on built environment measures with consideration given to changes in transportation technology.

Average fuel savings from efficiency measures – not all buildings would need to achieve this reduction, but it has been used to provide a sense of scale that could reasonably be expected to occur as an average reduction. Targets set in policy and guidance may need to be higher than the average in order to offset buildings not able to achieve notable improvements.

BEIS is currently consulting on how best to address where to allocate boundaries / how to scope transportation emissions. This will be particularly relevant when more transport energy will be supplied by building's electricity supply used to charge electric vehicles. Any changes proposed by BEIS will need to be considered in context of the figures reported in this Climate Emergency Plan.

A.4 Wealden District Council's own emissions

Specific details relevant to the Wealden District Council emission modelling methods, assumptions and limitations.

Scope of analysis

Energy use records have been provided by the Council to allow a baseline for Scope 1 and 2 emissions to be determined and, where complete Scope 3 information is provided, record these emissions separately. The baseline is then projected forward to 2050 based on a range of possible trends, many of

which have been applied to the Wealden District's data and described in Section A.2.

Summary of assumptions and inputs

The following assumptions have been applied to the projection modelling scenarios considered to 2050.

Topic	Model input	Data source
Demand Reduction		
Potential reduction in gas use in existing buildings over time to 2050	12%	NEED 2019 Report, Table 3. Typical savings following multiple energy efficiency measures suggests 12% reduction in heating is possible
Electricity for appliances and lighting over time to 2050	5%	Assumes that appliance use will increase but a small reduction could be achieved through behaviour change. Research indicates up to 10% possible – low / conservative estimate used.
Fuel Switching		
Existing buildings switch to electric heating over time to 2050	90%	Assumes that, in the next 10 years, it will become a requirement to switch when otherwise replacing boilers
Proportion of existing building electric heating systems that are heat pumps	50%	Estimate. The remainder are assumed to be direct electric systems where it is not feasible to install heat pumps.
System Efficiencies		
Typical gas boiler	80%	Low / conservative estimate.
Heat pump	250%	Low / conservative estimate.
Direct electric heating	100%	1:1 conversion is normal
Transport		
Reduction in mileage over time to 2030	10%	Estimate
Vehicles that switch to zero emission over time to 2025	100%	Assumes that all vehicles switch to electric models upon replacement.
Renewables and offsetting to target net zero carbon (if all previous measures included)		
Solar PV installed over time to 2050	28.5MW	Input

Limitations

Overarching limitation: changes modelled would need to be backed up by policies, funding, changes in technology, and user / consumer behaviour which are uncertain.

The analysis does not account for other changes e.g. population growth, energy prices, weather, economic growth, and the many other trends that would impact energy demand – it is primarily focused on built environment measures with consideration given to changes in transportation technology.

Average fuel savings from efficiency measures – not all buildings would need to achieve this reduction, but it has been used to provide a sense of scale that could reasonably be expected to occur as an average reduction. Targets set in policy and guidance may need to be higher than the average in order to offset buildings not able to achieve notable improvements.

There is a known issue with the Wealden Council Office and Hailsham Leisure Centre electricity supply data. The Council have confirmed that part of the Leisure Centre's electricity is supplied by the office,

paid for by the Council and recharged to the Leisure provider. The Council's Scope 2 emissions are therefore greater than they should be. To reassign these emissions to the Leisure Centre (under Scope 3 Council emissions) existing and potentially additional sub-metering will need to be investigated in order to establish accurate consumption data.

Solar PV on Council assets are metered for their monthly energy yield. The modelling accounts for the yield that contributes to reduced electrical energy demand, however, the energy exported is not quantified and represents a potential carbon offset not included in the reporting. To include this offset the data collected should be improved by metering the energy exported by each system.

The Scope 3 emissions are based on less complete data and therefore where it is available it has been reported for information. The notable emissions excluded that could be included if data collection is improved, as suggested in the action plan (Section 4), are: waste collection and street cleansing services provided by the Council's contractor, processing of waste, water consumption, and other business transport (such as public transport rail and buses).

A.5 References

BEIS, *'Emissions reduction pledge 2020: Emissions reporting in public and higher education sectors'* (2018). Available at: https://www.gov.uk/government/publications/emissions-reduction-pledge-2020-emissions-reporting-in-public-and-higher-education-sectors

BEIS, *'Green Book Supplementary Guidance: Toolkit for valuing changes in greenhouse gas emissions, Table 1'* (2019). Available at: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

Forestry Commission, *'Woodland Carbon Code Projects in the UK at 31 March 2019'* (published June 2019). Available at: https://data.gov.uk/dataset/058df59a-bb57-4959-8a39-2dc35b0d894f/forestry-statistics-woodland-carbon-code-statistics

NEED, *'Summary of Analysis, Great Britain'* (2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812561/National_Energy_Efficiency_Data_Framework__NEED__report_summary_of_analysis_2019.pdf

Appendix B – Building energy audits

To understand the current carbon emission levels and potential for carbon reduction measures for Wealden District Council's estate, several council assets were selected for a visual energy audit and desktop study. The aim was to identify the significant energy usage areas for the selected assets and understand the systems that serve these areas.

The buildings selected by WDC for this energy audit work are listed below.

Asset Name	Site Address
Cherry Tree Court	Hillside Drive, Horam TN21 0HL
Wealden Crematorium	Horam Road, Horam TN21 0FX
Crowborough Leisure Centre	Eridge Road Crowborough TN6 2TN
Helen Court	49-55 London Road, Hailsham BN27 3FU
Wealden DC Offices and Civic Hall	Vicarage Lane, Hailsham BN27 2AX

Full details and recommendations have been provided to the Council in a separate report.

Appendix C – Stakeholder engagement

In order to ensure that this Climate Emergency Plan reflects the unique priorities and circumstances of Wealden District Council and its constituents, a stakeholder engagement meeting was held on 23rd October 2019. The meeting was attended by members of the WDC Cabinet Advisory Group, policy officers and local councillors.

The aims of the meeting were to:

- Present interim results of the analysis undertaken;
- Describe potential intervention measures;
- Highlight the range of scenarios / outcomes, explaining key opportunities and risks to achieving the decarbonisation target; and
- Solicit feedback regarding the preferred interventions.