Runnymede Climate Change Study: Emission Pathways Report

Runnymede Borough Council

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Contents

Tables

Figures

1 Introduction

1.1 Overview of the study

Aether and LUC were commissioned by Runnymede Borough Council (RBC) to undertake emissions pathway analysis for the borough. This is part of a wider study to inform the Council's actions to reduce its own carbon emissions to net zero by 2030 and across the wider Borough by 2050.

This report aims to provide a robust evidence base on which the council can understand possible emission pathways in Runnymede, considering both a 'business as usual' and emission reduction scenario. It identifies key interventions required for decarbonisation, considers the current ambition reflected in Runnymede's policies and demonstrates the pace of change required to achieve emission reductions for net zero.

1.2 Background

In response to rising global temperatures due to greenhouse gases (GHG) emissions, the Intergovernmental Panel on Climate Change (IPCC) released the *Special Report on Global Warming of 1.5°C*[1]. This made clear that ensuring global temperatures stay well-below 2°C pre-industrial levels is crucial to reduce large risks to human and natural systems, and efforts should be made to pursue warming of only 1.5°C to prevent the largest risks. Following this, global accords such as the Paris Agreement were signed, and national goals such as the Climate Change Act which commits the UK government by law to reducing greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050.

It is widely recognised that achieving the UK target will require cross-government cooperation. Local authorities are well placed to influence emissions in buildings, transport, and waste whilst holding the best knowledge of the needs and opportunities of their area. Local authorities can also drive emissions reductions in their areas through their role as community leaders and major employers, as well as through their regulatory and planning capacities. Through their planning role, local authorities can leverage change by enabling sustainable development and placemaking, establishing building energy efficiency standards, implementing sustainable travel programmes and infrastructure, approving renewable energy projects, pursuing district heating programmes and implementing sustainable waste management programmes. Therefore, local action to reduce carbon emissions is vital for the UK to meet its international commitments to reduce our impact on global warming.

Runnymede Borough Council has set targets for the council estate to reach net zero carbon by 2030 and for the borough to become net zero carbon by 2050. Whilst the Climate Change Strategy[2] focuses on reducing the carbon emissions from the council operations and estate in line with the Council's 2030 Net Zero target, it also recognises the role of the council in influencing emissions across the borough.

The Runnymede Local Plan 2030, as adopted on 16th July 2020, includes climate change-related policies and establishes the objective to "increase resilience to climate change,

[1] https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

[2] https://www.runnymede.gov.uk/downloads/file/1533/climate-change-strategy#:~:text=In%20January%202022%2C%20the%20Council,services%20and%20operations%20by%202030.

including flood risk, to reduce greenhouse gas emissions and promote water efficiency and the use of renewable and low carbon energy"[3]. Relevant policies include:

- Policy SD3: Active & Sustainable Travel
- Policy SD7: Sustainable Design, including sustainable construction and demolition
- Policy SD8: Renewable and Low Carbon Energy
- Policy EE11: Green infrastructure
- Policy EE13: Managing Flood Risk

Beyond this, as part of its spatial vision, Runnymede Borough Council has made a commitment to "be resilient to and mitigate climate change impacts especially by reducing and minimising the risks from flooding, reducing greenhouse gas emissions and improving water quality and efficiency" and has recognised that the local plan is an important mechanism to drive local action. Runnymede Borough Council is also preparing a climate action plan to deliver on these commitments.

1.3 Aims and Objectives

The key aim of this study is to present historic borough-wide emissions and through the development of an emissions pathway, provide an evidence base for the development of Runnymede Borough Council's climate action plan. The new Local Plan (2030) will review all strategic issues affecting the plan area, as well as providing the development management policies required to deliver the strategy (pending the outcome of the proposed national plan-making reforms, currently being consulted on[4]). The contents of the Local Plan will influence climate action across various areas, which in combination with other strategies such as the council's electric vehicle strategy, provide Runnymede Borough Council with the framework to implement and track climate action.

This report provides an illustrative emission reduction trajectory for decarbonisation of the council area by 2050 as an evidence base to support the local plan revision. A 'business as usual' pathway is presented as a point of reference from which to illustrate the impact of modelled carbon reduction interventions in the area, shown in the 'emission reduction trajectory'. Further details of the scenarios are presented in the box on the following page. Moreover, results from a key stakeholder engagement exercise are included, providing existing and potential opportunities for emission reduction in Runnymede, alongside potential challenges.

[3] https://www.runnymede.gov.uk/downloads/file/781/adopted-2030-lp
[4] Levelling-up and Regeneration Bill: consultation on implementation of plan-making reforms - GOV.UK (www.gov.uk)

The **business as usual (BAU)** scenario is a forward trajectory for emissions from each source in the inventory for the borough area. The main assumption for this pathway is that beyond current policy impacts no further action is taken in the authority area to reduce emissions. This scenario is used as a reference point to calculate the effect on emissions of actions within Runnymede. It is based on the national patterns shown in the Committee on Climate Change 6th Carbon Budgets baseline projection for England.

The **emissions reduction trajectory** is an alternative scenario illustrating the potential impacts of actions locally and nationally to reduce emissions, and approximates the level of ambition shown in the Balanced Net Zero Pathway presented by the Committee on Climate Change combined with some data from the renewables assessment undertaken in parallel with this report. This trajectory helps to identify key areas for action/intervention for reducing future emissions in Runnymede.

1.4 Links to other studies

This study builds on evidence presented from other studies conducted as part of the wider Runnymede Climate Change Study. Links to relevant evidence are summarised below.

Emissions modelling presented as part of this study is based on baseline emissions compiled for the borough as presented in the report entitled 'Runnymede Climate Change Study: Council Estate and Area GHG Baseline'.

The emissions pathway presented for residential and commercial energy use is based on some of the estimates made in the assessment of renewable and low carbon energy opportunities as presented in the report entitled 'Renewable Energy Assessment' as prepared by LUC.

1.5 Report structure

In this report, Error! Reference source not found. describes the method used to compile the emissions trajectories; Error! Reference source not found. presents the BAU and emissions reduction pathways; Error! Reference source not found. presents the actions estimated to achieve the emissions reduction pathway and metrics for monitoring progress. Lastly Error! Reference source not found. summaries conclusions and recommendations.

2 Methodology

This GHG emission pathway study for Runnymede Borough Council has been developed using a version of the Carbon Scenario Model (CSM). Originally developed for use by local authorities (funded by Resource Efficient Scotland and Sustainable Scotland Network[5]), this Excel based tool has been adapted by the project team to provide a bespoke modelling solution to generate outputs for Runnymede. The CSM has been used to compile emission reduction pathways up to 2050 for borough-wide emissions, based on a series of carbon reduction actions represented in the model.

Within the model, emissions are disaggregated by sector (e.g. transport, domestic, industrial/commercial) and by energy type (e.g. electricity, gas, road fuels). This allows for the identification of key emission sources, and for the impact of decarbonisation actions on sectors to be displayed in model outputs.

2.1 Baseline emissions

The initial set up of the model required input of the carbon baseline for the borough of Runnymede, which is presented in full in the Stage 1 report, *Runnymede Climate Change Study: Council Estate and Area GHG Baseline* and summarised below.

Runnymede Borough's GHG emissions for 2019 are estimated to be 634 $ktCO_2e$. Emissions by sector are presented in **Figure 1** and **Table 1** and are included in the model on which future emission pathways are based.

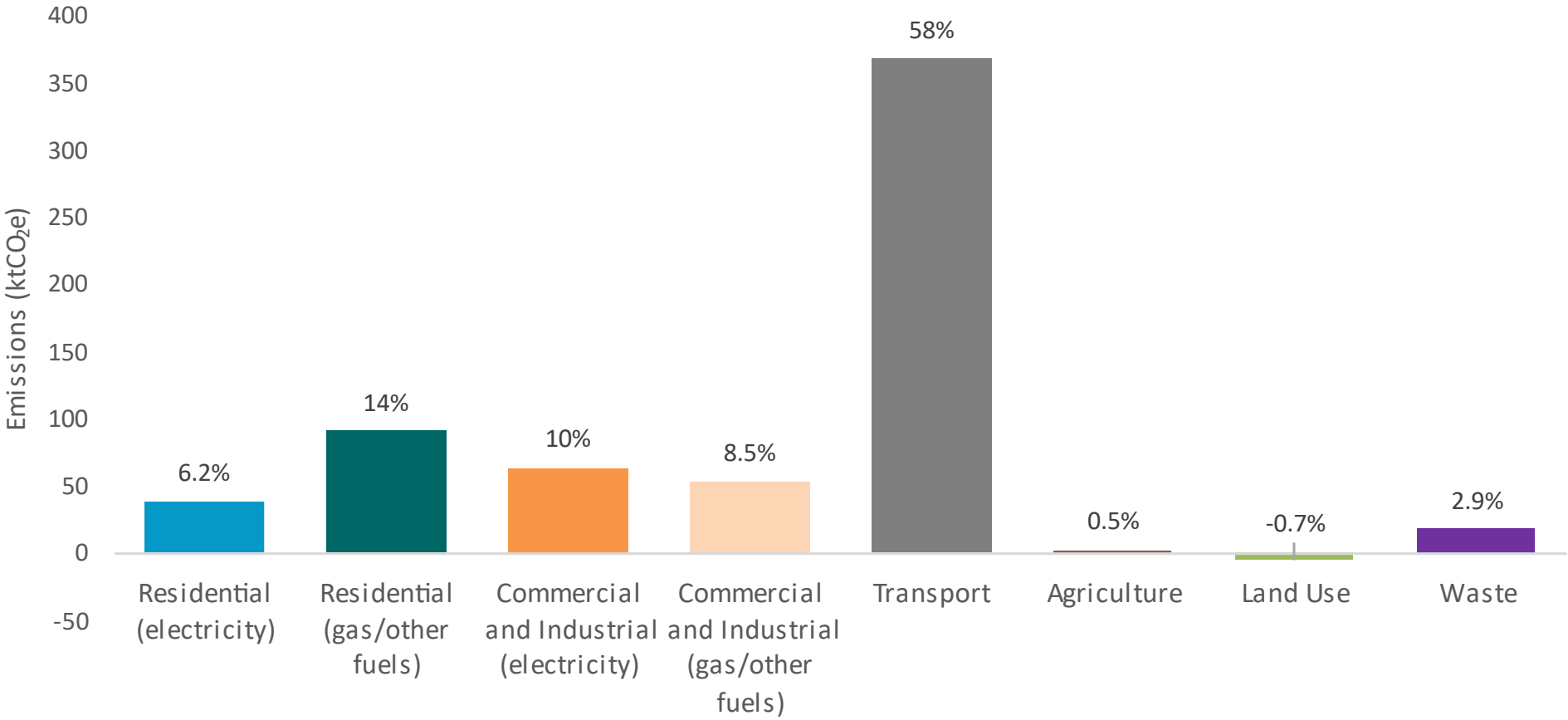
The most significant emissions source is the transport sector, comprising 58% of total emissions. The second largest source, at 21% of total emissions, is from heating of residential homes.

Table 1: Estimated $ktCO_2e$ emissions for Runnymede Borough in 2019

Sector	2019 emissions (kt CO_2e)[10]	% of total emissions[6]
Residential (electricity)	39.3	6.2%
Residential (gas/other fuels)	90.9	14.3%
Commercial and Industrial (electricity)	63.8	10.1%
Commercial and Industrial (gas/other fuels)	53.9	8.5%
Transport (buses and rail)	6.2	1.0%
Transport (cars/LGVs/motorbikes)	298	47.1%
Transport (HGVs)	64	10.1%
Agriculture	3.1	0.5%
Land use	-4.3	-0.68%
Waste	18.3	2.9%
Total	**634**	

[5] https://sustainablescotlandnetwork.org/resources/carbon-footprint-and-project-register-tool
[6] Due to rounding of values, summing values shown in the table may not equal totals shown.

Figure 1: Estimated $ktCO_2e$ emissions for Runnymede Borough in 2019



2.2 Emission Pathway Development

The Committee on Climate Change (CCC) published their 6th Carbon Budget in December 2020[7]. This includes multiple emission pathways for the UK to reach net zero under differing levels of ambition of climate action. Two of these CCC scenarios were used to develop emission pathways for Runnymede:

- **Business as usual (BAU):** Aside from decarbonisation of the national grid, this scenario assumes no new policy interventions which result in additional emissions reductions beyond 2019. This scenario is used as a reference point from which to calculate the effect on emissions of actions within Runnymede. Further information provided in Section 3.1.
- **Balanced Net Zero Pathway:** Represents a feasible approach to what is necessary for the UK to reach net zero by 2050. It assumes a relatively equal balance of widespread behaviour change and technological development, backed by policy intervention.

Carbon reduction actions identified within the pathways were entered into the model and potential savings calculated. These form the potential decarbonisation pathways for the borough. The modelling approach was guided by the following principles:

- Provide transparency of methods and data input. This involves full documentation of assumptions in the tool. The assumptions behind each decarbonisation action are documented in this report in **Table 3** later in this report.
- Incorporate flexibilities in the modelling, allowing carbon mitigation actions to be 'switched on and off' for scenarios as commitments evolve.
- Consider uncertainty and risk which are inherent in any projection scenario. A brief consideration of uncertainty is provided in **Section 3.21**.

The outputs of the modelling are:

- Calculated greenhouse gas emissions for future years to 2050 by sector
- Estimates of emissions reductions expected from a wide variety of potential actions.

The actions have been allocated to differing start dates to indicate when the major actions need to happen, which involved some judgement about how quickly these changes might occur in Runnymede. However, the modelling approach used is a relatively simple one, and has required assumptions and estimations to be made of both current and future carbon emissions and activities related to them. This includes estimates based on expert judgement to fill gaps where no reliable data was available. The model outputs therefore need to be treated as indicative.

[7] https://www.theccc.org.uk/publication/sixth-carbon-budget/

2.3 Stakeholder engagement survey

Emission reductions have been estimated across the timeframe to 2050, which is consistent with the UK net zero strategy planning for net zero by 2050. To inform the applicability of the CCC pathway to Runnymede, Council department senior leaders were asked to identify:

- Opportunities for reducing emissions in Runnymede.
- Whether their department had targets in place for reducing emissions, with further details requested if so.
- Whether their department had any plans or strategies in place for reducing emissions across Runnymede, with further details requested if so.
- Suggestions for ways in which key challenges might be overcome.
- Principal challenges in reducing emissions.

3 Potential Emission pathways for Runnymede Borough

The outputs of the emission pathway analysis are presented in **Table 2** and **Table 2**.

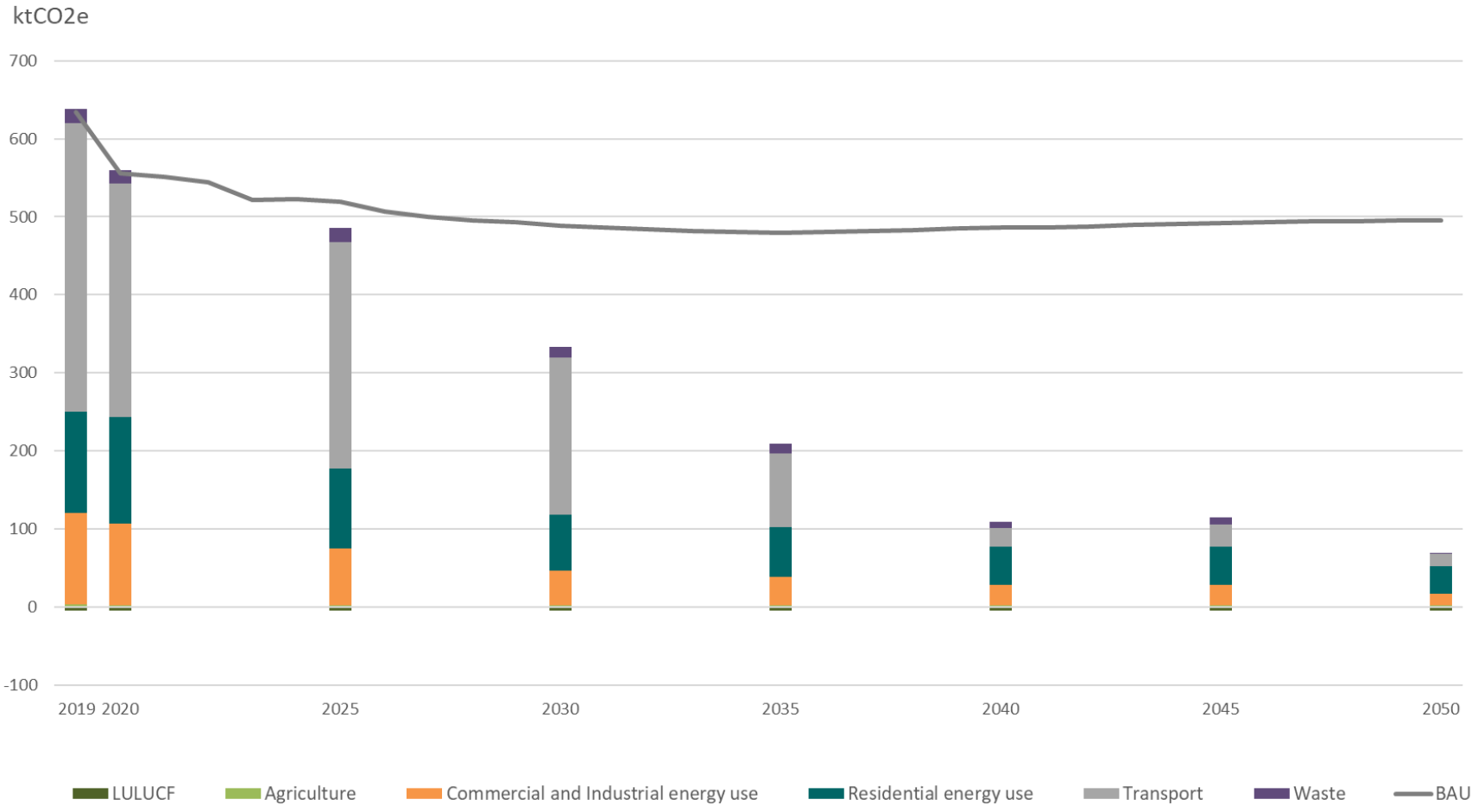
The business-as-usual scenario shows a 22% decrease in total emissions between 2019 and 2050 for Runnymede Borough. The largest observed reductions are in energy use in the commercial, industrial and residential sector. This is driven by the decarbonisation of the national electricity grid through the deployment of more renewable electricity.

Under the emission reduction scenario, Runnymede is projected to have residual emissions of approximately 70 $ktCO_2e$ by 2050. This is an 87% reduction compared to the BAU. Additional actions or offsetting will still be needed to reach net zero, particularly in the residential sector.

Table 2 Emission Pathway Summaries – BAU and Emission Reduction Scenario

Emissions Sector	Historical emissions estimates (ktCO2e)		Future projection estimates (ktCO2e) = BAU Scenario = Emission Reduction Scenario						% change 2019-2050
	2019	2020	2025	2030	2035	2040	2045	2050	
Agriculture	3	3	3	3	3	3	3	3	-2
			3	2	2	2	2	2	-36
Commercial and Industrial energy use	118	105	84	67	59	60	60	60	-49
			73	44	37	26	26	16	-74
Land Use, Land Use change and Forestry (LULUCF)	-4	-4	-4	-4	-4	-4	-4	-4	0
			-4	-4	-4	-4	-4	-4	0
Residential energy use	130	136	117	102	94	95	96	97	-26
			103	72	63	49	50	35	-64
Transport	369	299	302	304	309	314	320	322	-13
			280	192	94	23	28	15	-95
Waste	18	18	18	18	18	18	18	18	1
			18	14	13	9	9	1	-93
Total - BAU	**634**	**556**	**519**	**489**	**479**	**486**	**492**	**496**	**-22**
Total – Reduction Scenario			**481**	**329**	**204**	**105**	**110**	**65**	**-87**

Figure 2 Emission pathways for the borough of Runnymede



3.1 Business as usual pathway

The 2019 carbon baseline has been projected to 2050 to create the 'business as usual' (BAU) emission pathway. The main assumption for this pathway is that beyond decarbonisation of the national grid (see **section 3.1.5** below), there are no new policy interventions which result in additional carbon reduction beyond 2019. This scenario is used as a reference point to calculate the effect on emissions of actions within Runnymede. The BAU pathway is based on data accompanying the CCC's Sixth Carbon Budget, which presents multiple trajectories to reach net zero by 2050. The changes represented in the CCC Baseline emission profile are a response to pressures and actions from outside the area such as the national process of decarbonising electricity generation, expected changes in population, growth forecasts for traffic, changes in technology etc. Currently funded low-carbon policies are incorporated, whilst unfunded policies, proposals, or significant future uptake in low-carbon technology are not included[8]. There are no technological innovations or societal changes regarding climate change in this scenario. This can be viewed as the 'worst-case' at both the national and local level.

Outlined below are the main elements of the BAU emission pathway by sector.

3.1.1 Building energy use

Baseline energy demand is primarily based on BEIS Energy and Emission Projections[9]. These are do not take account of any potential changes in trends associated with increased home-working resulting from the COVID-19 pandemic but do take account of existing policy to improve energy efficiency of buildings in the relatively short term, both for existing and new-build. It does not include the impact of proposed changes such as the Future Homes standard.

3.1.2 Transport forecasts

The CCC projections for the baseline scenario use the Department for Transport's National Transport Model, which forecasts the total number of vehicle-kilometres and expected emissions in the absence of abatement policy or action. Baseline rail emissions use the Rail Delivery Group's forecasts of the number of passenger trains operating out to 2047 and the National Infrastructure Commission's expectations for freight demand out to 2050. No additional electrification or efficiency improvement are assumed in either case.

3.1.3 Waste forecasts

The baseline assumes that waste generation rises in-line with population, estimates of which were obtained from the Office for National Statistics. Estimates were available until 2043, thereafter population change is assumed to be 0%.

3.1.4 Agriculture and LULUCF forecasts

Agriculture baseline emissions were obtained from the CCC, which assume that agricultural emissions remain largely unchanged. It was assumed that land use within

[8] CCC (2020) The Sixth Carbon Budget Methodology Report. [online] Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-Methodology-Report.pdf

[9] BEIS (2019) 2018 Updated Energy and Emission Projections.

Runnymede would remain unchanged, matching the 0% change in emissions from land use by 2050 stated in the CCC.

3.1.5 Decarbonisation of electricity

Due to the structure of the Carbon Scenario Model, the same emission factors are applied for both future scenarios. The emission factor for grid electricity is based on the Balanced Net Zero Pathway in the Sixth Carbon Budget and predicts significant decarbonisation of electricity generation. Therefore, the BAU scenario includes reductions in emissions from grid electricity that goes further than currently funded climate policies. This means there will be an overestimate of emission reductions in the BAU scenario.

The pathway assumes that the carbon intensity of UK electricity will decrease from 255 gCO_2e/kWh in 2019 to around 45 gCO_2e/kWh by 2030. The following assumptions underpin this change:

- Phasing out unabated fossil fuel generation by 2035. Unabated generation refers to electricity generation that does not use carbon capture and storage to prevent emissions.
- Increasing variable renewables to 80% of generation by 2050. Variable renewables are generation methods that provide a fluctuating energy supply, such as wind or solar.
- Dispatchable low-carbon generation including hydrogen and bioenergy with carbon, capture and storage (CCS). Dispatchable generation refers to generation methods that can be turned on according to demand.

3.2 Emission Reduction pathway

The emission reduction pathway has been developed through the estimation of the impacts of decarbonisation interventions across multiple sectors. The stakeholder engagement undertaken for this project supports the assumption that emission reductions in Runnymede will most likely track UK national ambitions rather than aiming for significantly more ambitious earlier targets. If the council wishes to consider an earlier target (or reduce its estimated residual emissions at 2050), then the pace of change will need to significantly increase and it will require more local innovation to overcome technical challenges that may not have yet have mainstream solutions.

The CCC has produced several emissions pathways outlining how the UK could reach net zero by 2050. One of these is the Balanced Net Zero Pathway (BNZ), which represents balanced implementation of technological development and behaviour change. The BNZ pathway represents a feasible approach for the UK to reach net zero by 2050, and has been adapted for this study to produce a similar emissions pathway at a local level. The resulting pathway therefore shows the interventions and actions that are required in Runnymede which align with the CCC's modelled policy interventions. Emission reductions associated with each of these interventions were calculated, using the phasing and magnitude of reduction outlined by the CCC, with some adjustments made based on local plans. The interventions for which emissions reductions have been estimated are listed in **section 4.** It should be noted that there are significant uncertainties related to the estimates presented here – because of broad assumptions made about the deployment and effectiveness of actions across the borough.

The resultant emission reduction scenario shows what emission reduction may look like for Runnymede if action were to be in line with reductions described by the CCC. As outlined in the interventions table, these are based on ambitious changes covering behaviour change, technological interventions and efficiency improvements. These interventions must be translated into local strategies which must be individually assessed to determine if they will support Runnymede in keeping pace with the scale of ambition required. These illustrative savings account for interventions that may be linked to each other, such as reducing vehicle commuting traffic and increasing the amount of active travel within the area. Double counting of impacts has been avoided as far as possible in the estimates of emission savings. Furthermore, the carbon savings listed account for interventions which may result in an increase in emissions elsewhere, for example electrification of the vehicle fleet results in an increase in emissions from electricity consumption.

Many of these interventions will require a combination of different types of actions to bring about changes: technical, behavioural change, financial mechanisms and enabling policies and investments. Further information is provided in **Section 4** on the interventions required at local level in order to realise the emission reductions demonstrated in the reduction scenario**.**

In relation to building energy use predictions, the modelled reduction scenario incorporates analysis conducted by LUC into the technical potential of renewable energy which could be deployed in buildings in Runnymede. The modelling accounts for the increase in electricity use resulting from the deployment of air source heat pumps, and therefore the associated emissions reductions are not directly comparable with those presented in the LUC 'renewable assessment report'. The predictions based on this data result in an emission trajectory for the residential sector that is less ambitious than the CCC BNZ predictions.

Overall the 'shortfall', i.e. the residual emissions remaining in 2050, indicates where further actions are likely to be needed by Runnymede to go beyond the actions outlined above, such as further expanding the use of renewable generation, further energy efficiency and/or use of novel technologies to further reduce emissions. The residual emissions are expected to be predominantly from existing buildings.

3.2.1 Uncertainty of emission pathways

As documented in **section 3.1**, the baseline pathway and the associated impact of interventions included in the emission reduction pathway include a number of assumptions. There is therefore inherent uncertainty in the emission pathways presented in this report. Some of the key uncertainties are listed below:

- The level and **rate of societal behaviour change** can be guided by policy, but will ultimately depend on how quickly attitudes and public acceptance change over time. This will be particularly important for the uptake of low-carbon technologies in people's homes.
- The **future potential of technologies** is still unknown in some regard. The modelled scenarios do not assume innovation produces unspecified breakthroughs to reduce emissions.

4 Key Interventions

4.1 Actions included in the Emission Reduction pathway

This section presents the actions required across Runnymede to achieve the emission reductions as estimated in the 'emission reduction pathway'. The estimates of emissions reductions associated with the interventions are shown in **Figure 3.** The interventions are further detailed in **Table 3** together with identified enabling actions. Many of these interventions are not directly related to planning policy development but some do have links Runnymede Borough Council's following planning policies:

- Runnymede Borough Council Ultra-Low Emission Vehicle Strategy [DRAFT]
- Support to delivery of Local Transport Plan (Surrey County Council)
- Surrey Greener Future (SCC's Climate Change Strategy)
- Surrey Environment Partnership Strategy (SEP 2025)

Specific planning priorities required to bring enable successful climate change mitigation are considered in **section 4.2**.

The key decarbonisation challenges where interventions are required are:

- Rapid decarbonisation of the **existing building stock** (improving energy efficiency and replacing fossil fuel heating with zero carbon sources), both for commercial and domestic buildings.
- Ensuring that any **new buildings do not add to emissions** in the area.
- Local generation of **renewable electricity directly connected to individual buildings**, to reduce demand from the electricity grid.
- Encouraging a **shift away from car use** towards low carbon public transport and active travel.
- Provision of widespread electric vehicle charging infrastructure to enable a **large-scale shift to EVs in the car and van fleet**.
- **Vehicle efficiency** improvements or use of **alternative transport fuels** where electrification is not yet feasible.
- Increase in **freight transport by rail**.
- **Reduction in waste generated** in the council area, to all waste streams.
- **Diversion of waste from landfill** to an Energy from Waste (EfW) facility, which becomes retrofitted for Carbon Capture and storage (CCS).
- **Changing agricultural practices** to improve waste management, reduce fertiliser use and reduce soil carbon losses.

Whilst Runnymede Borough Council may not be able to implement all interventions individually, the council is able to influence and enable interventions on a wider scale. Some of the interventions identified are dependent on interventions actioned at a national level. There are also interventions which will need to be led by, or in partnership with, Surrey County Council. The extent to which the council can influence climate action against services such as purchased goods, leased assets, and business travel will vary, as will the associated greenhouse gas emissions. This should be identified in the climate action plan being prepared by Runnymede Borough Council.

Figure 3 Potential emissions savings for the identified potential actions for Runnymede, 2030 – 2050, $ktCO_2e$

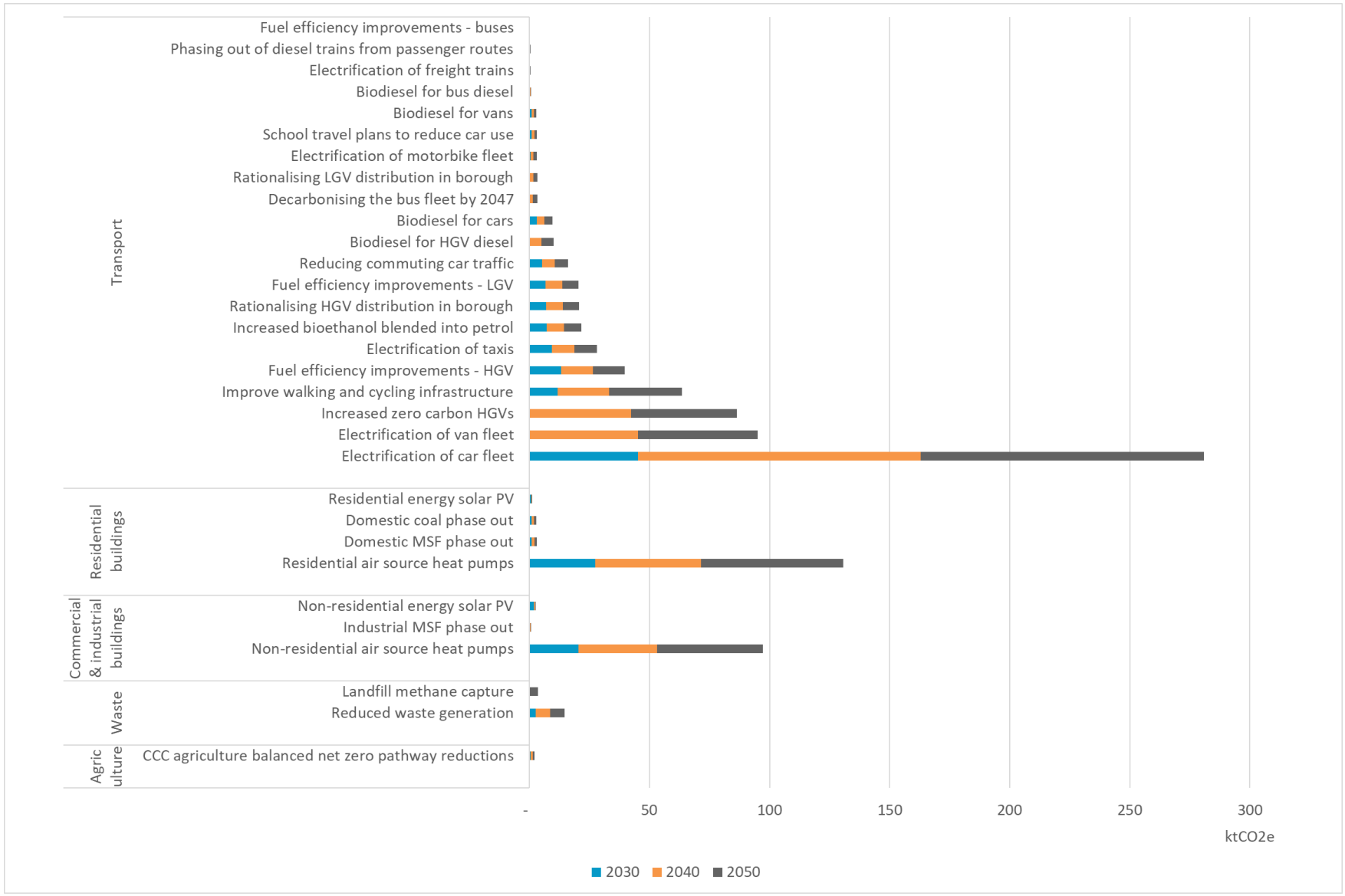


Table 3: Potential interventions included within emission reduction pathway

Project Name	Description of intervention	Enabling Actions/ Potential planning policy links
Transport		
Electrification of car fleet	Assumes battery electric vehicles (BEVs) will comprise 35% of the car fleet in 2030, rising to 65% by 2035, and 87% by 2040	Require increased levels of EV charging infrastructure in development[10] Support for upgrades to grid infrastructure Adopt a borough-wide EV Strategy
Increased zero carbon HGVs	33% of fleet will be zero-emission by 2035, 67% by 2040, and 87% by 2050	Require increased levels of EV charging infrastructure in development Support for upgrades to grid infrastructure. Support for development of hydrogen storage and distribution infrastructure
Rationalising HGV distribution	11% reduction in HGV kms by 2030 through measures such as expanded use of consolidation centres, extended delivery windows, higher loading and reduced empty running	Support for development of freight consolidation centres. Requirement for use of construction consolidation centre in large developments. Consider linking support for development of new freight distribution centres to requirements for zero carbon or highly fuel-efficient HGVs.
Electrification of van fleet	BEVs make up 68% of all vans on the road by 2032. Assumed this will be 80% by 2040 and 88% by 2050	Require increased levels of EV charging infrastructure in development. Support for upgrades to grid infrastructure Adopt a borough-wide EV Strategy
Improve walking and cycling infrastructure	Reductions in car kms by 6% (2030), 12% (2040), and 17% (2050)	Locate residential development close to employment and key services (enabling more journeys to be made by active modes travel; 20-minute neighbourhood concept), or where this is not possible, close to public transport. Require secure cycle storage (with charging for e-bikes) and good connection to safe, attractive foot and cycle paths in new development Identify where policy will seek to constrain private car use through measures such as road design, reduced private parking provision, car club provision, e.g. in town centres, large residential schemes Support delivery of SCC's Local Transport Plan 4 and Support for sustainable transport infrastructure schemes e.g. Local Cycling and Walking Infrastructure Plan (LCWIP) projects

[10] References to 'development' throughout this table should be taken to include redevelopment, changes of use etc where these require planning permission

Project Name	Description of intervention	Enabling Actions/ Potential planning policy links
Fuel efficiency improvements - HGV	Assumes that new HGVs continue to be fitted with cost-effective technologies and design improvements to improve fuel efficiency, leading to reductions in CO2 intensity of 21% by 2030	-
Biodiesel for HGV diesel	Starting from the mid-2020s, biodiesel to meet 9% of HGV diesel demand by 2040	Support for development of biomass/ bioenergy agriculture, forestry and energy generation infrastructure
Electrification of taxis	Assumes that 8% of car kms is in taxis, which are 100% electric vehicles by 2030	Require increased levels of EV charging infrastructure in development Support for upgrades to grid infrastructure Adopt a borough-wide EV Strategy Provision of EV charging infrastructure at public transport interchanges
Fuel efficiency improvements - LGV	Assumes that new petrol and diesel vans continue to be fitted with cost-effective technologies and design improvements to improve fuel efficiency, leading to reductions in CO_2 intensity of 12% by 2030	-
Decarbonising the bus fleet by 2047	Assumed 15% reduction in emissions by 2032, 50% by 2037, 45% by 2042, 60% by 2047, based on a similar but slower implementation of TfL policy for buses.	Support operators in purchasing zero emission buses and infrastructure
Increased bioethanol blended into petrol	After the 2021 increase of bioethanol blended into petrol (to 10% by volume, 7% by energy), supplies stay at this % of road petrol use.	-
Phasing out of diesel trains from passenger routes	Assumes government ambition to phase out diesel trains by 2040 is met for passenger rail via electrification where cost effective, with hydrogen and battery-electric trains replacing existing diesel trains where it is not.	Local planning authority has limited ability to influence rail infrastructure improvements by Network Rail but can encourage use of public transport vs. private car via measures discussed under ‘reducing commuting car traffic’.

Project Name	Description of intervention	Enabling Actions/ Potential planning policy links
Reducing commuting car traffic	Incentives to reduce commuting traffic, assumed to impact 7% of car travel	Locate residential development close to employment and key services (enabling more journeys to be made by active modes travel - 20-minute neighbourhood concept), or where this is not possible, close to public transport. Require secure cycle storage (with charging for e-bikes) and good connection to safe, attractive foot and cycle paths in new development Identify where policy will seek to constrain private car use through measures such as road design, reduced private parking provision, car club provision, e.g. in town centres, large residential schemes. Support for development of rapid transit network (rail, light rail, guided busway as appropriate) and for information promoting/facilitating use of this (e.g. smart signage; district app). Minimum development density requirements close to rail stations and other rapid transit facilities. Parking restriction in developments well served by public and active transport. Support delivery of SCC's Local Transport Plan 4 and support for sustainable transport infrastructure schemes e.g. Local Cycling and Walking Infrastructure Plan (LCWIP) projects and Southern Access to Heathrow
Biodiesel for cars	Starting from the mid-2020s, assumes biodiesel meets 3% of car diesel demand by 2040	-
Rationalising LGV distribution in borough	3% reduction in van miles by 2035 through measures such as last-mile deliveries by portering /e-cargo bikes, micro-consolidation centres in urban areas, reduction in delivery failures, use of experienced driver and routing technologies and encouragement of 'green' delivery choices	Support for development of freight micro-consolidation centres. Support for charging infrastructure for e-cargo bikes.
Electrification of freight trains	44% of the freight fleet to be electrified by 2035, 50% by 2040	-

Project Name	Description of intervention	Enabling Actions/ Potential planning policy links
Biodiesel for vans	Starting from the mid-2020s, this route increases production to meet 2% of van diesel demand by 2040	Support for development of biomass/ bioenergy agriculture, forestry and energy generation infrastructure.
Electrification of motorbike fleet	Assumes the rate of electrification of the motorbike fleet will match that of cars (above)	Require increased levels of EV charging infrastructure in new development Support for upgrades to grid infrastructure.
School travel plans to reduce car use	Assumes that school travel is 3% of total car miles, and that school travel plans will lead to a 10% decrease in consumption by 2025 and 15% by 2030	Locate residential development close to employment and key services (enabling more journeys to be made by active modes travel; 20-minute neighbourhood concept), or where this is not possible, close to public transport. Require secure cycle storage and good connection to safe, attractive foot and cycle paths in new development. Identify where policy will seek to constrain private car use through measures such as road design, reduced private parking provision, car club provision, e.g. in town centres, large residential schemes. Support for provision of car drop-off areas at key points on school bus networks. Support the production of School Travel Plans.
Fuel efficiency improvements - buses	11% efficiency improvements by 2030, driven by uptake of measures such as hybridisation, heat recovery and low rolling resistance tyres, as well as the use of lighter materials.	-
Biodiesel for bus diesel	Starting in the mid-2020s, biodiesel to meet 10% of bus diesel demand by 2040	Support for development of biomass/ bioenergy agriculture, forestry and energy generation infrastructure.

Project Name	Description of intervention	Enabling Actions/ Potential planning policy links
Residential Buildings		
Solar PV	Estimated 40 MW capacity of solar PV on housing stock by 2050. Estimates based on LUC Renewable Energy Assessment.	Standard roof-mounted solar installations are considered 'permitted development' and do not therefore normally require planning permission. However, installations on properties within designated areas, such as Conservation Areas, or within the curtilage of listed buildings may require planning consent – policy could provide criteria for such installations to be acceptable. Require on-site renewable energy in new dwellings, where appropriate.
Residential energy efficiency and fuel switch - net zero projects	Transition to low carbon heating (air source heat pumps), including significant upgrades in insulation in most houses. Estimated 309 MW technical potential in domestic buildings, taken from LUC's Renewable Energy Assessment.	Require higher than national standards of sustainable design and construction in new development and refurbishment requiring planning permission, e.g. via stronger Local Plan policy requirements backed by financial viability evidence. Balanced policy approach to heritage conservation and carbon reduction for development in conservation areas and listed buildings. Require on-site renewable energy, where appropriate. Support for development of energy distribution infrastructure to serve existing buildings. Support for heat networks.
Domestic coal phase out	Commercial manufactured coal use replaced by electricity	-
Domestic MSF phase out	Commercial manufactured solid fuel use replaced by electricity	-
Commercial & industrial buildings		
Residential energy efficiency and fuel switch - net zero projects	Transition to low carbon heating (air source heat pumps), including significant upgrades in insulation in most houses. Estimated 276 MW technical potential in non-domestic buildings, taken from LUC's Renewable Energy Assessment.	Require higher than national standards of sustainable design and construction in new development and refurbishment requiring planning permission, e.g. via stronger Local Plan policy requirements backed by financial viability evidence. Balanced policy approach to heritage conservation and carbon reduction for development in conservation areas and listed buildings. Require on-site renewable energy, where appropriate. Support for development of energy distribution infrastructure to serve existing buildings. Support for heat networks

Project Name	Description of intervention	Enabling Actions/ Potential planning policy links
Solar PV	Estimated 95 MW capacity of solar PV on non-domestic buildings by 2050. Estimates based on LUC Renewable Energy Assessment.	Standard roof-mounted solar installations are considered 'permitted development' and do not therefore normally require planning permission. However, installations on properties within designated areas, such as Conservation Areas, or within the curtilage of listed buildings may require planning consent – policy could provide criteria for such installations to be acceptable. Require on-site renewable energy in new non-domestic buildings, where appropriate.
Industrial coal phase out	Industrial manufactured coal use replaced by electricity	-
Industrial MSF phase out	Industrial manufactured solid fuel use replaced by electricity	-
Waste		
Reduced waste generation	35% waste reduction by 2030	Development decisions regarding waste processing – in line with the waste hierarchy. Stronger Local Plan policies to require suitable waste facilities in new development; and to reduce/reuse/recycling waste in construction; to promote circular economy principles; and to promote e.g. local food growth (to reduce food waste).
Waste to EfW instead of landfill	40% of waste is diverted from landfill to an EfW by 2035. Emissions from the 40% of waste diverted are halved.	
Installation of CCS on EfW	Implementation of carbon capture and storage on the EfW in 2050 reduces emissions by 15%	
Landfill methane capture	Combined with reducing waste generation inputs as outlined above, landfill methane capture contributes to an overall reduction in landfill emissions of 80% by 2050	-

Project Name	Description of intervention	Enabling Actions/ Potential planning policy links
Agriculture		
CCC agriculture balanced net zero pathway reductions	22% reduction in agricultural emissions by 2030, 29% by 2040, and 35% by 2050	Link policy requirements for net zero development with offsetting provided by farmland carbon storage, e.g. tree and woodland planting, hedgerow restoration, peatland and wetland restoration. Develop evidence to provide locational guidance on priorities for woodland expansion. Where biodiversity net gain is to be achieved off-site, on agricultural land, prioritise solutions that are also carbon-negative. Support for development of agricultural and forestry infrastructure associated with bioenergy crops Support for on-farm renewable energy development e.g. anaerobic digestion; solar PV. Support for development associated with local food production, e.g. farm shops. Support for rural broadband infrastructure development as an enabler of precision farming techniques. Support for development of rural tourism development as an enabler of reduced travel associated with foreign holidays

4.2 Planning policy priorities

While many of the key decarbonisation interventions require changes to national policies to support local change, they will also require local action and can be supported by local planning policy. Key existing and potential planning policy links are considered in this section. This draws on guidance from the 2021 TCPA/RTPI publication "The Climate Crisis: A Guide for Local Authorities on Planning for Climate Change". As appropriate the linkages have also been indicated in **Table 3** above.

The planning policy priorities identified are listed below and **case study examples** are identified within the boxes.

Locate new development to minimise emissions: Particularly emissions associated with transport, including journeys to work, retail and community facilities. Place greatest emphasis on good walking and cycling connections, and public transport links.

The recently adopted **Lake District Design Code** states that new development should:

- Open up desire lines and create more direct and convenient routes for those travelling by foot, mobility aid or bike;
- Create good sightlines and a sense of natural surveillance for users;
- Link with existing pedestrian and cycle crossings;
- Ensure appropriate space is given to those walking or cycling (at least two abreast), without needing to unduly navigate parked cars or street furniture; and
- Ensure pedestrian and cycle infrastructure is pleasant to use.

All developments of 5 – 25 dwellings are also encouraged to deliver:

- Off-road alternatives for those travelling by foot or bike; and
- Landmark features, such as trees or public art, that help users navigate the hierarchy of movement

Where sites adjoin or host a public right of way, it must be respected or incorporated as part of the scheme's design.

Electrification of vehicles: Including by support for related charging and grid infrastructure.

Leeds City Council has created policy so that all new developments that include parking spaces must meet the minimum standard of electric vehicle charging points. This is outlined in detail below.

Policy EN8: Electric Vehicle Charging Infrastructure

"All applications for new development which include provision of parking spaces will be required to meet the minimum standard of provision of electric vehicle charging points. This requires:

i) Residential: 1 charging point per parking space and 1 charging point per 10 visitor spaces

ii) Office/Retail/Industrial/Education: charging points for 10% of parking spaces ensuring that electricity infrastructure is sufficient to enable further points to be added at a later stage

iii) Motorway Service Stations: charging points for 10% of parking spaces ensuring that electricity infrastructure is sufficient to enable further points to be added at a later stage.

iv) Petrol Filling Stations: provision of fast charge facilities."

Encourage more journeys to be made by active modes (walking and cycling): Including by locating homes close to employment and key services; supporting provision of high quality walking and cycling routes and related infrastructure; and appropriate parking restriction.

Encourage more journeys to be made by public transport: Including by locating homes close to public transport hubs; supporting provision of convenient and affordable public transport; and appropriate parking restriction.

Brighton & Hove City Council. Local plan policy DM33 states the council's intention to prioritise active travel in the city. This includes supporting the objectives in its Local Transport Plan and ensuring that new development is designed to be accessible and promote active travel. Specific policy wording can be found below.

"The council will promote and provide for the use of sustainable transport and active travel by prioritising walking, cycling and public transport in the city. This will support the objectives, projects and programmes set out in the Local Transport Plan and other strategy and policy documents. New developments should be designed in a way that is safe and accessible for all users, and encourages the greatest possible use of sustainable and active forms of travel."

Energy efficiency and use of renewable or low carbon energy in new buildings in line with the energy hierarchy: Including by sustainable design standards, assessing the energy/carbon implications of demolition versus retention of buildings, requirements for on-site renewable energy generation, and support for heat networks.

Bath & North East Somerset Local Plan Partial Update (LPPU) – adopted 2023

Policy SCR6 Sustainable Construction Policy for New Build Residential Development

New build residential development will aim to achieve zero operational emissions by reducing heat and power demand, then supplying all energy demand through onsite renewables. Through the submission of an appropriate energy assessment, having regard to the Sustainable Construction Checklist SPD, proposed new residential developments will demonstrate the following.

- Space heating demand less than 30kWh/m2/annum
- Total energy use less than 40kWh/m2/annum; and
- On site renewable energy generation to match the total energy use, with a preference for roof mounted
- Solar PV
- Connection to a low- or zero-carbon District heating network where available

Major residential development

In the case of major developments where the use of onsite renewables to match total energy consumption is demonstrated to be not technically feasible (for example with apartments) or economically viable, renewable energy generation should be maximised and the residual on site renewable energy generation (calculated as the equivalent carbon emissions) must be offset by a financial contribution paid into the Council's carbon offset fund where the legal tests set out in the Community Infrastructure Regulations are met.

Policy SCR7 Sustainable Construction Policy for New Build Non-Residential Buildings

New build non-residential major development will maximise carbon reduction through sustainable construction measures. Through the submission of an appropriate energy assessment having regard to the Sustainable Construction Checklist SPD, all planning applications will provide evidence that the standards below are met.

Major development is to achieve a 100% regulated operational carbon emissions reduction from Building Regulations Part L 2013 (or future equivalent legislation), following the hierarchy set out below.

- Minimise energy use through the use of energy efficient fabric and services
- Residual energy use should be met through connection to a low- or zero-carbon heat network if available
- Maximise opportunities for renewable energy to mitigate all regulated operational emissions
- Residual carbon emissions that cannot be mitigated on site should be offset through a financial contribution to the council's carbon offset fund.

Islington Council's Policy CS10 (G) requires that all development is to be designed and managed to promote sustainability during their operation. Its Sustainable Design SPD further sets out that to meet this Policy, buildings will need to be 'long life, loose fit'. This concept requires that buildings will be operable and habitable for many years but also, importantly, that they are adaptable to new uses other than those planned for at the start of their life. The SPD goes on to explain how a development can show and achieve 'long life, loose fit'.

Decarbonisation of grid electricity: By support for renewable and low-carbon energy generation and storage infrastructure.

The **Redcar and Cleveland Local Plan**, adopted in May 2018 includes Renewable and Low Carbon Energy Policy SD 6 which identifies areas with potential for wind and solar technologies in the Proposal Map accompanying the Local Plan. These areas were identified by undertaking a technical assessment of wind and solar potential overlaid with the findings of a landscape sensitivity assessment.

Decarbonisation of agriculture: Including by support for on-farm renewable energy generation, rural broadband infrastructure, local food production and support for provision of carbon and biodiversity offsets.

The **London Plan** includes a net zero-carbon target for major development and they have published detailed guidance on carbon offset funds for LPAs (recently updated) including on how to calculate the amount of carbon to be offset. The aim of the net zero-carbon standard is to achieve significant carbon reductions on site and to get as close to zero-carbon as possible. Only then should offsetting be considered i.e. as a last resort measure. LUC concurs with this approach and would recommend RBC take a similar position as it ensures on-site carbon savings – which are more certain – are locked in before resorting to offsetting.

Carbon offsetting involves a cash in-lieu contribution (via Section 106 agreement) to the relevant LPA's carbon offsetting fund. Alternatively, the development can make up the shortfall off-site by funding a carbon reduction project directly, provided the LPA has approved this approach.

Offsetting funds can then be used for other important projects such as:

- Local renewable energy projects; and
- Tree planting and other forms of land management to promote carbon sequestration

The London Plan requires LPAs to:

- Set up a carbon offset fund to collect carbon offset payments from developers to meet any carbon shortfall from new development and ring fence these funds to secure delivery of carbon savings within the relevant LPA

- Set a price for carbon, i.e. price per annual tonne of carbon, that developers pay to make up any shortfall in on-site carbon savings, securing contributions through Section 106 agreements
- Identify a suitable range of projects that can be funded through the carbon offsetting fund

Put in place suitable monitoring procedures to enable reporting to the GLA.

4.3 Indicators of Climate Action Implementation

As Runnymede Borough Council and its partners implement the action plan to deliver on net zero across the borough, specific metrics may be identified as key indicators, which may be based on some of the following data sets.

For buildings and energy, the key units of change in this section of the action plan relate to the electricity and gas consumption of buildings. Energy efficiency improvements and behaviour change actions aim to reduce energy consumption. Fuel switching, such as gas to electricity for heating purposes, moves to a lower-carbon intensive fuel. This relies on the national electricity grid heavily decarbonising across the next few decades.

For transport, the actions primarily relate to reducing fossil fuel consumption in vehicles (particularly private vehicles), through switching to electric vehicles and increasing modal share of active travel and public transport.

Table 4: Potential indicators to track progress

Indicator	Frequency of publication	Potential data source
Headline measure		
Greenhouse gas emissions by LA area	Annual	DESNeZ Local Authority emissions statistics https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021
Domestic buildings		
Electricity consumption in residential buildings	Annual	DESNeZ statistics - LSOA domestic electricity consumption https://www.gov.uk/government/statistics/lower-and-middle-super-output-areas-electricity-consumption
Gas consumption in residential buildings	Annual	DESNeZ statistics - LSOA domestic gas consumption https://www.gov.uk/government/statistics/lower-and-middlesuper-output-areas-gas-consumption
Energy efficiency in non-council buildings	Monthly	Improvements in DEC classifications for public buildings. https://epc.opendatacommunities.org/
Number of houses retrofitted with measures to reduce energy consumption		Through monitoring plans of incentive schemes implemented to encourage uptake/installation of measures
Non-domestic buildings		
Gas consumption in non-domestic buildings	Annual	DESNeZ statistics - MSOA data on gas consumption https://www.gov.uk/government/statistics/lower-and-middlesuper-output-areas-gas-consumption

Indicator	Frequency of publication	Potential data source
Electricity consumption in non-domestic buildings	Annual	DESNZ statistics - MSOA data on electricity consumption https://www.gov.uk/government/statistics/lower-and-middlesuper-output-areas-electricity-consumption
Renewable electricity: number of installations, capacity & generation	Annual	DESNZ statistics https://www.gov.uk/government/statistics/regional-renewable-statistics
Transport		
Local Authority fuel consumption	Annual	DESNZ statistics https://www.gov.uk/government/statistics/uk-road-transport-energy-consumption-at-regional-and-local-authority-level-2005-to-2021
Number of electric vehicles registered	Annual	DfT transport statistics – Table VEH0132 https://www.gov.uk/government/statistical-data-sets/vehicle-licensing-statistics-data-tables
Number of electric vehicle charging points installed	Quarterly	DfT transport statistics https://www.gov.uk/government/statistics/electric-vehicle-charging-device-statistics-july-2023
Number of licensed vehicles by vehicle type	Quarterly	DfT transport statistics - Tables VEH0105 & VEH0142 https://www.gov.uk/government/statistical-data-sets/vehicle-licensing-statistics-data-tables
Investments in active travel infrastructure		Surrey County Council and Runnymede Borough Council finance reports / project monitoring outcomes
Investments in public transport infrastructure		Surrey County Council and Runnymede Borough Council finance reports / project monitoring outcomes
Number of electric taxis registered		Data on registered taxis in the borough collected by the council
Number of schools that have monitored travel plans		School surveys
Number of active travel trips		Local surveys and/or automatic monitoring of cyclists (in partnership with Surrey County Council)
Agriculture		
Greenhouse gas emissions for the agriculture sector	Annual	DESNZ Local Authority emissions statistics https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021
Waste		
Recycling rate	Quarterly	Surrey Environment Partnership performance reports https://www.surreyep.org.uk/about-us/our-performance/
Residual waste per household	Quarterly	Surrey Environment Partnership performance reports https://www.surreyep.org.uk/about-us/our-performance/

5 Conclusions and Recommendations

Runnymede Borough Council is committed to support the transition to net zero in Runnymede Borough by 2050. To determine the extent of additional policies and actions required to meet this target, an evidence base of emission pathways was required.

This evidence base report has been designed for Runnymede Borough Council to understand possible emission pathways in Runnymede, considering a 'business as usual' for comparison with an emission reduction pathway. Key interventions have been identified which will lead to decarbonisation. The pathways demonstrate the pace of change required to achieve net zero emissions by 2050 in line with the council and national ambition.

Whilst there is significant uncertainty in the pathways analysed, the evidence suggests that additional actions will still be required to meet net zero, most notably in the transport sector and residential energy use sectors. Early engagement with these sectors will be key in order to develop, fund and implement large-scale emission reduction projects.

Our key recommendations on how Runnymede Borough Council may utilise this evidence base in its next steps in climate action planning are summarised below.

1. Use the evidence base **to work with key council departments to identify and develop further emission reduction projects** across the Borough and enabling actions to support the key interventions required for Net Zero. This work can feed into the Council's Climate Change Action Plan.
2. Undertake further **stakeholder engagement across the Borough** with local organisations, including Surrey County Council, to engage on climate change issues, build relationships, identify common goals and develop partnerships for action to reduce emissions to enable Runnymede to be net zero by 2050, and to maximise the co-benefits of climate action.
3. **Embed clear and ambitious carbon reduction requirements in the revised Local Plan** to ensure that prospective developers are aware from an early stage of the level of carbon mitigation required. Ideally this would include involvement of development management colleagues, to ensure good understanding of new requirements.
4. Following setting a robust policy framework in a revised Local Plan, it is important to **recalibrate the development management process to reflect the priority** of reducing emissions. This could include provision of training to development management officers and elected members on the intent and application of these policies so that carbon reduction is prioritised in the planning balance, for all relevant planning decisions. Provision of guidance and decision-aiding tools to officers and developers may also be helpful in practical application of this priority.

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