Net Zero Trajectory
Maldon District Council

Report

Report produced in March 2024

APSE (Association for Public Service Excellence) is a not for profit local government body working with over 300 councils throughout the UK. Promoting excellence in public services, APSE is the foremost specialist in local authority front line services, hosting a network for front line service providers in areas such as waste and refuse collection, parks and environmental services, leisure, school meals, cleaning, housing and building maintenance.

APSE Energy is APSE's local authority energy collaboration. The vision for the collaboration is to form an "effective collaboration of a large number of local authorities to enable and facilitate the local municipalisation of energy services. By this we mean the public and community, as well as private, ownership and managerial control of local energy generation, supply networks and delivery of energy efficiency works. Local authorities working together in this way would have great influence and would be able to deliver economies of scale in green energy to promote economic growth and combat fuel poverty.

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Executive Summary

This report shows calculations for the carbon emissions baseline of Maldon District Council and an estimated projection of emissions after interventions are made with a net zero carbon target of 2030.

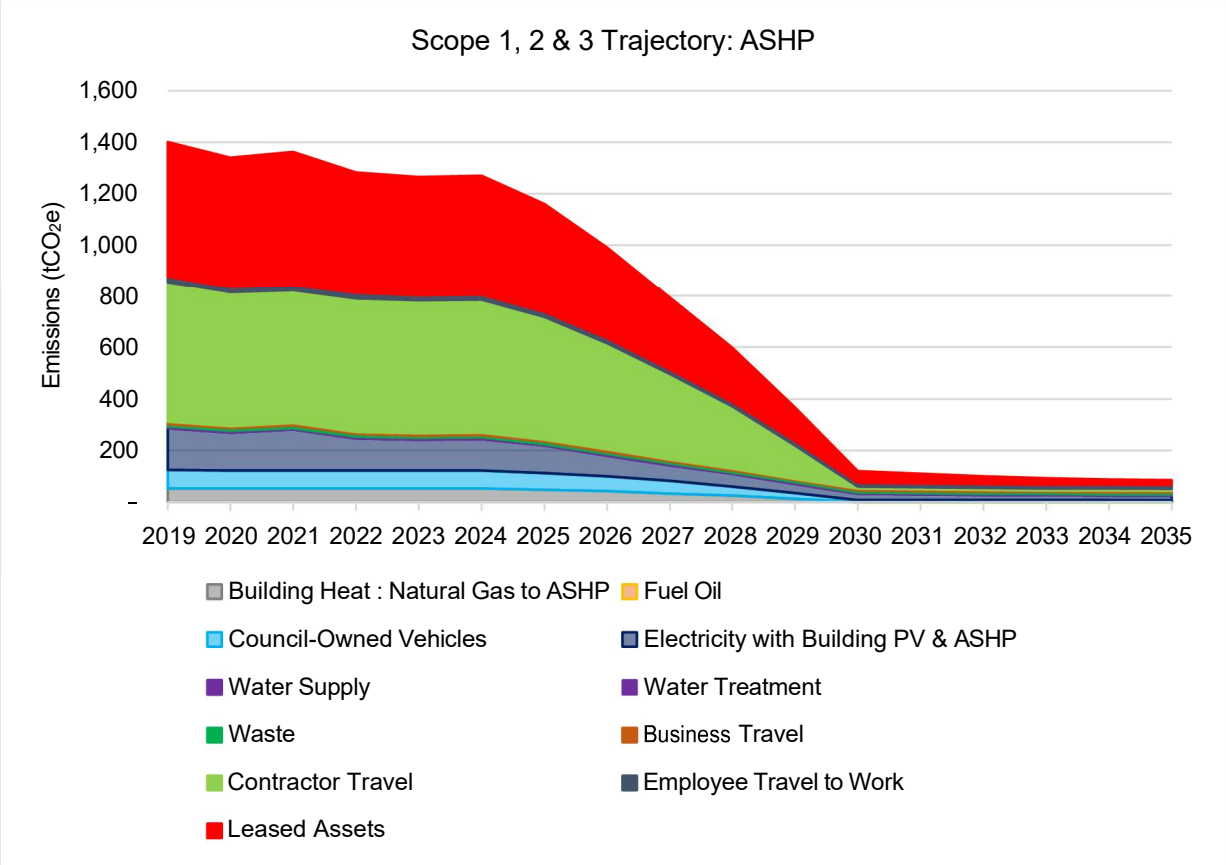
The carbon emissions baseline is for the reporting year of 2022/23, and future savings are compared to this baseline year. Future emissions are then calculated using 2022/23 as the reference point with reductions up to the Net Zero target year of 2030.

***Table 1** Carbon emissions by scope for2022/23*

2022/23			
Emissions Source	**Scope**	**% Split**	**TonnesCO2e**
Natural Gas	1	3.7%	44.5
Oil	1	0.0026%	0.032
Council Vehicles	1	4.6%	54.9
Electricity	2	10%	117.3
Gas – WTT	3	0.6%	7.3
Council Vehicles - WTT	3	1%	13.4
Electricity – Well to Tank (Generation)	3	2.2%	26.0
Electricity – Well to Tank (T&D)	3	0.2%	2.2
Electricity – Transmission & Distribution	3	0.8%	10.1
Business Travel	3	0.7%	8.9
Water Supply	3	0.3%	3.5
Water Treatment	3	0.3%	3.8
Contractor Travel	3	30.3%	363.2
Waste	3	0.7%	8.7
Employee Travel to Work	3	1.76%	21.1
Leased Assets	3	42.86%	514.0
Total		**100%**	**1,199**

The trajectory below shows a projection of the Scope 1, 2 & 3 carbon emissions for the net zero target of 2030. This trajectory includes a number of interventions to reduce the Council's energy usage along with the decarbonisation of heating via the installation of Air Source Heat Pumps (ASHPs) in buildings.

Figure 1 Scope 1, 2 & 3 CO_2e trajectory under ASHP scenario

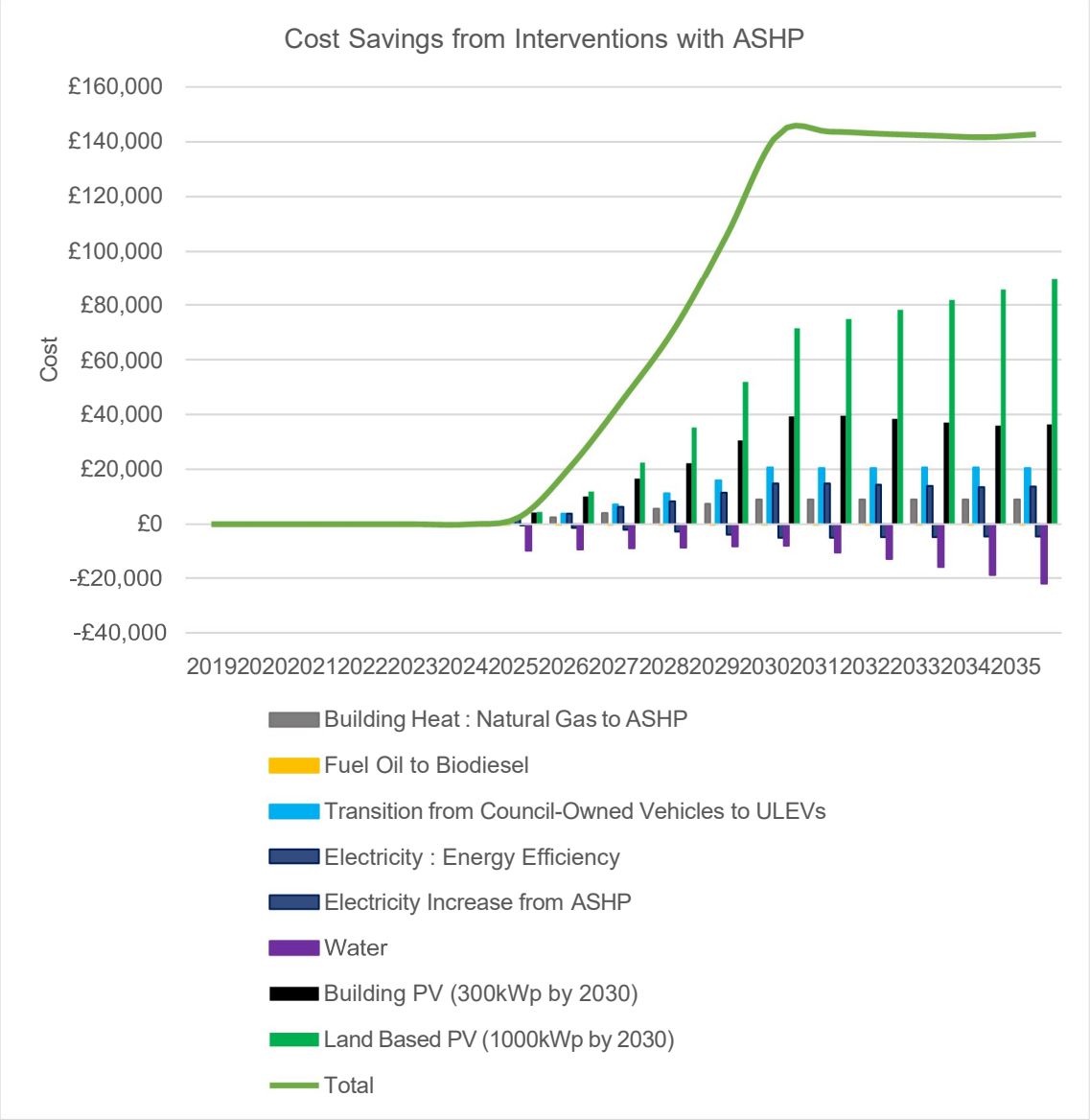


The trajectory shows that there is a 91% reduction in carbon emissions from the baseline year to 2030.

It is estimated that there will be 119 tCO_2e from hard-to-reduce sources that will be unavoidable by 2030 that will need to be offset, and it is assumed that this can be offset through land-based PV and a tree planting scheme.

Carrying out the recommended initiatives will result in financial savings over the term, as shown in the chart below:

Figure 2 Cost savings from interventions under ASHP scenario



An estimated financial budget of approximately £3.9million is required to reach net zero carbon by 2030 for the Council's assets through more energy efficient buildings; installing ASHPs; generating power; replacing council owned vehicles; and developing a tree planting scheme. However, implementing these initiatives will financially benefit the Council with savings of £143k in 2030.

It is estimated that an additional budget of £2.1million is required to decarbonise leased assets.

Disclaimer: Cost estimates provided in this report are approximations and are not guaranteed. The estimates are based on information provided by the Council and assumptions which have been stated, where possible. Financial planning should therefore not be solely based on these estimates as actual costs would vary subject to detailed feasibility studies of all council owned assets.

The calculations included in this report do not consider planned spending by the Council over the time period in question. For example, we have not factored in revenue spending the Council may have already set aside for building refurbishment, new boilers or replacement vehicles over the next few years.

1 Maldon District Council Carbon Emissions

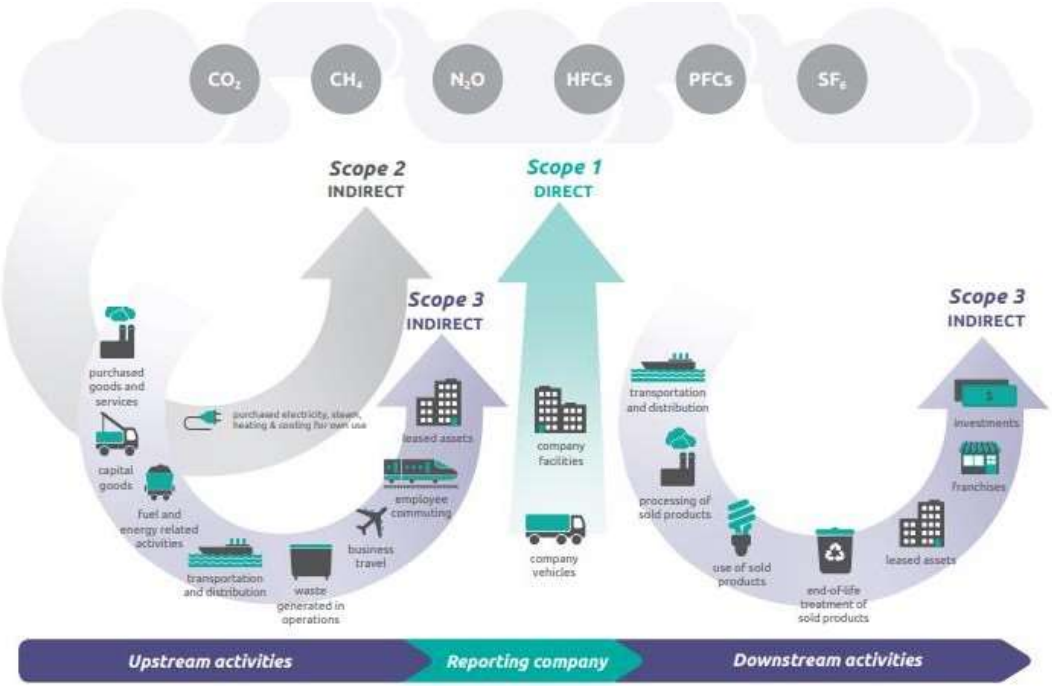
1.1 Introduction to Baseline Carbon Footprint

This section of the report provides the findings of the carbon footprint calculations for Maldon District Council which can be used as a benchmark to record current emissions and to track performance against future emissions. The carbon footprint has been carried out in accordance with best practice guidelines from Greenhouse Gas Protocol[1] standards and calculated using appropriate carbon dioxide equivalent (CO_2e) conversion factors for the various energy sources as published by Department for Energy Security and Net Zero (DESNZ)[2].

Emissions are calculated as carbon dioxide equivalent (CO_2e), which is a term used to combine the seven most threatening gases that have the highest Global Warming Potential. This includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and nitrogen trifluoride.

The image below is referenced from the Greenhouse Gas Protocol and shows an overview of the CO_2e scopes and emissions that are applicable across the supply chain.

Figure 3 *Greenhouse Gas Protocol Scopes*



[1] Guidance | GHG Protocol

[2] Government conversion factors for company reporting of greenhouse gas emissions - GOV.UK (www.gov.uk)

The carbon footprint is categorised into scopes, which cover:

Scope 1 (direct) emissions are from activities owned or controlled by the Council. Examples of Scope 1 emissions include emissions from combustion in council owned or controlled boilers, furnaces and vehicles.

Scope 2 (indirect) emissions are associated with purchased electricity, heat, steam and cooling. These indirect emissions are a consequence of the Council's energy use, but occur at sources that the Council do not own or control. Examples include grid supplied electricity and heat provided through a heat network.

Scope 3 (other indirect) emissions are a consequence of the Council's actions that occur at sources the Council do not own or control and are not classed as Scope 2 emissions. Examples of Scope 3 emissions include business travel by means not owned or controlled by the Council (grey fleet), disposing of the Council's own waste and purchased goods in the supply chain, etc.

1.2 Carbon Reporting Boundaries

The organisational boundaries determine what emissions are the responsibility of the Council or others. This can be based on who owns, operates, or exerts control over certain assets and can be based on financial or operational control. The buildings categorised under Scope 1 & 2 within this reporting are those where energy is purchased and consumed by the Council. The vehicles categorised under Scope 1 are vehicles that the Council own, lease and operate purely for the Council's own operations.

The financial control model is used in this reporting. To put it simply, if the Council pays for the energy bills then it is classified under Scope 1 and 2, but if the Council owns an asset and a third party pays the energy bills then this is classified under Scope 3.

This reporting is just focussed on Scope 1 & 2 emissions and does not include scope 3.

1.2.1 Scope 3 Emissions

Scope 3 emissions can account for 70-80% of a council's total footprint (Carbon Trust), given the use of contractors for waste collection, construction, social services and other services.

Appendix B shows the 15 different categories of Scope 3 emissions and what data should be gathered to report on emissions in future years. As Scope 3 emissions are under the influence of the Council, but not under its direct control, it can be difficult to obtain the necessary data to calculate the associated carbon emissions from some Scope 3 sources. Where applicable, the Council should develop policies/procedures to gather the data from third parties. This should be incorporated into the procurement process and contracts with suppliers.

It is discretionary for an organisation to report on Scope 3 emissions. It should be explained and documented in subsequent carbon reports if the Council is unable to obtain data for carbon sources as it is deemed financially impractical or not significant. The reporting principles should be based on:

- Relevance;

- Completeness;
- Consistency;
- Transparency;
- Accuracy.

Typical Scope 3 sources for a council may include:

- The supply chain of purchased goods and services;
- Supply and waste water;
- Waste from operational buildings;
- Employee commuting;
- Leased assets
- Working from home.

1.3 Well to Tank and Transmission and Distribution

Well-to-tank (WTT) is used to account for the upstream Scope 3 emissions associated with extraction, refining and transportation of the raw fuel sources to an organisation's site (or asset), prior to combustion.

Transmission and distribution (T&D) factors are used to report the Scope 3 emissions associated with grid losses (the energy loss that occurs in getting the electricity from the power plant to the organisations that purchase it).

These emission sources have only been applied to the Scope 1 and Scope 2 sources (electricity, gas and council owned vehicles).

2 Carbon Emissions

Appendix A shows a summary for emissions and separate tabs showing a breakdown for each source in 2022/23.

The carbon footprint has been calculated using the best data that was available to the Council during the reporting year and it is the Council's responsibility to confirm the accuracy.

2.1 Emissions for 2022/23

Table 22 Scope 1, 2 & 3 carbon emissions by source for 2022/23

2022/23			
Emissions Source	**Scope**	**% Split**	**TonnesCO2e**
Natural Gas	1	3.7%	44.5
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Employee Travel to Work	3	1.76%	21.1
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Figure 4 Carbon emissions by source for 2022/23

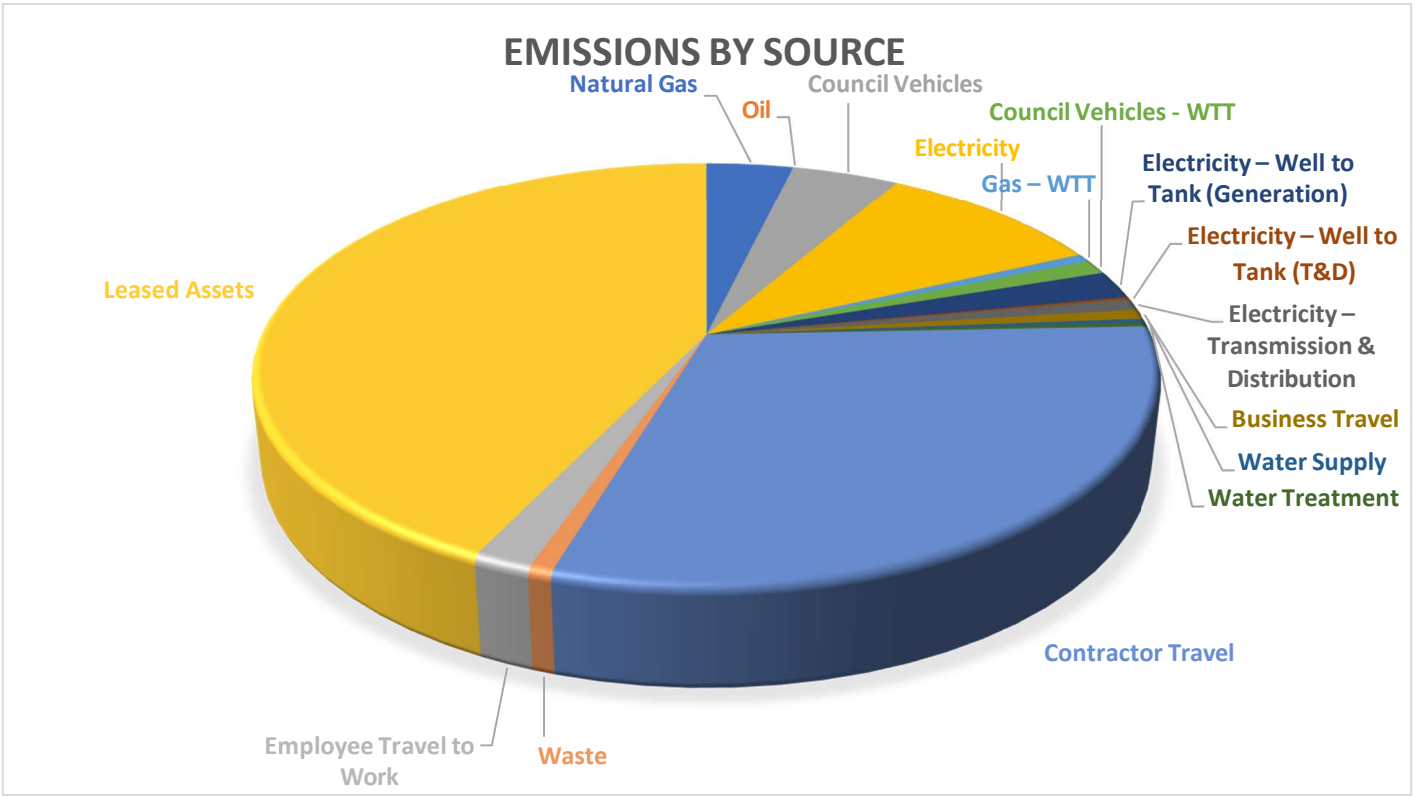
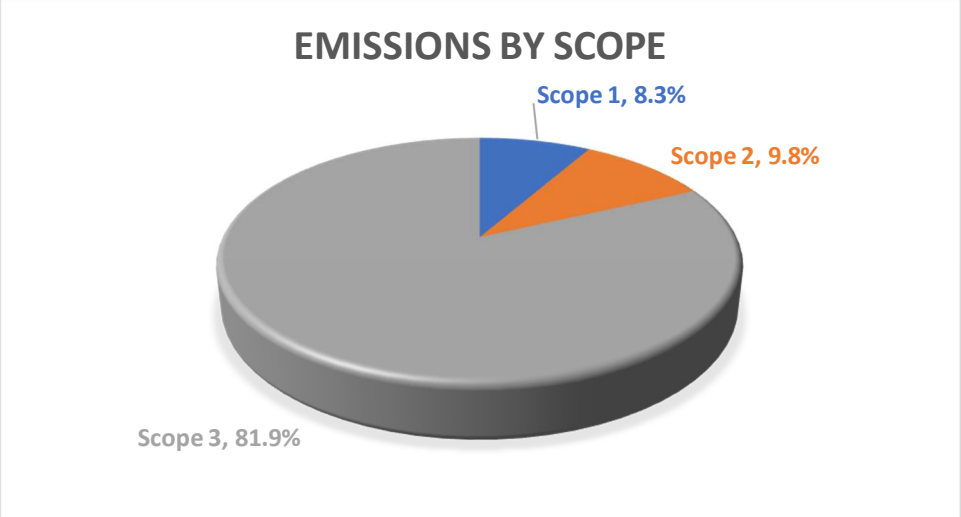


Table 3 Carbon emissions by scope for 2022/23

2022/23		
Emissions Source	% Split	TonnesCO2e
Scope 1	8.3%	99
Scope 2	9.8%	117
Scope 3	81.9%	982
Total	100%	1,199

Figure 5 Carbon emissions by scope for 2022/23



3 Notes and Observations

Scope 1

Gas

The Council has stated that the Maldon District Council Offices is the only asset owned and operated by the Council that has a gas supply. This would suggest that all other buildings in the estate that are heated, are electrically heated.

Council Owned Vehicles

The Council operated a total of 63 vehicles and machinery requiring fuel in 2022/23. Fuel consumption (litres) data has been provided for all vehicles and machinery and this was used to calculate emissions.

Carbon emissions from vehicles can be calculated using the mileage or the volume of fuel (in litres). Calculating the emissions is more accurate when using the volume of fuel as a refuse truck, for example, will spend a lot of the time stationary but will be consuming energy from lifting and crushing waste.

Scope 2

Electricity

The data provided for electricity consumption covers a total of 31 assets.

Further Notes and Observations

Data from the Council shows that they are responsible for 31 electricity meters, which provides a reasonable representation of how many assets the Council operate. A review should be carried out of each asset to determine if the Council are responsible for paying the electricity and fuel usage and taking ownership for the associated carbon emissions. It is not uncommon for assets to be sold, leased or decommissioned yet the Council continue to pay for the utilities. Likewise, the Council should check to confirm if they are responsible for more than 31 assets.

Scope 3

Water

Data was provided for the supply of water, but no data was provided for wastewater (water that typically goes down the sink). Wastewater is normally calculated by assuming that 95% of the water that is supplied is 'returned to the sewer'. Therefore, the wastewater in this case has been calculated based on 95% of the supply water.

Contractor Travel

The Council provided data for the mileage and volume of fuel used in vehicles operated by third party contractors. In some cases, the volume of fuel was not proportionate to the mileage travelled. The Council investigated and determined that there were inconsistencies with fuel cards used and decided that the mileage travelled was the most useful metric to calculate emissions. However, it should be noted that that the mileage for some vehicles is very high with one vehicle recorded as travelling 40,674 miles in the reporting year.

In future it is advisable for the contractor to record the volume of fuel used as this is much more accurate to calculate emissions compared to distance travelled. This is particularly prominent for refuse vehicles that use energy to lift and crash the waste but spends a lot of time stationary or travelling at low speeds.

Leased Assets

Leased assets is categorised under Scope 3 as these are buildings that the Council own, but they are occupied by a third party who pays the energy bills. This will comprise of the third party's Scope 1 and 2 emissions (electricity and gas).

Leased assets is the largest contributor to the emissions with 514tCO_2e, of which 426tCO_2e is attributed to Blackwater Leisure Centre alone.

Employee Travel to Work

The Council carried out a staff survey in January 2024 to ask staff how they travel to work. There were 132 responses to the survey out of approximately 200 staff in total. The results of the survey were used to calculate emissions by determining the vehicle sizes, fuel type and annual mileage travelled to work.

This staff survey will need to be repeated in subsequent years to track performance.

Waste

A breakdown of the different waste streams has been provided which split different recyclables and how much residual refuse is sent to an Energy from Waste facility or landfill. A breakdown is shown in Appendix A. The landfill waste makes up 7% of the total waste mass, but this accounts for 65% of the total carbon emissions from all waste sources. This is because the carbon factor of commercial waste to landfill is significantly higher than recycling or combustion.

4 Recommendations for gathering data going forward

4.1 Scope 1 and 2 Emissions

The Council should develop a procedure for gathering and storing its own data as it is made available. The benefit of this is that the carbon reporting process is streamlined and progress towards targets can be tracked.

4.2 Metering and Energy Management Software

A half hourly meter (also known as HH or 00) is a non-domestic electricity meter that sends consumption data to the energy supplier every half hour via telecommunications. They are compulsory for non-domestic premises that have a maximum demand of 100kW or higher during any half hour period of the day. They are not compulsory in smaller buildings which are billed on the Non-Half Hourly (NHH) basis.

NHH meters can be voluntarily upgraded to Automatic Meter Readers (AMR) or Smart Meters which are similar to HH meters. The benefit is that the supplier bills on the actual usage and the end user can monitor its energy usage on a half hourly basis rather than a monthly basis.

Sub-meters can also be installed to distribution boards and larger consuming equipment to monitor usage and performance. For example, installing a gas submeter, electricity generation meter and a heat meter to a CHP will support in calculating the performance and efficiency of the system and installing an electricity submeter to lighting circuits will help identify if lights are left on out of hours.

The cost to install AMR to the main billing meter ranges depending on the provider but could cost in the region of £200 per meter and will vary depending on the type and age of the existing meter. There is also an annual charge of around £50 to access the data. Some energy suppliers offer 'free' AMR but the cost of the energy bill standing charge is normally increased by around £80 to cover the cost and allow access to the data.

Using energy management software will provide several benefits such as:

- The ability to electronically upload all invoice data, HH/AMR data and manual meter readings;
- Provide the ability to setup energy excess alarms to identify when energy is being used beyond expected parameters;
- Validate energy bills to identify billing errors;
- Instantaneous access to energy data for:
    - Trend analysis and comparison with previous performance;
    - Comparison with targets or benchmarks;
    - Ranking of sites according to performance;
    - Carbon reports;
    - Monitor usage against weather.

The cost for energy management software can vary significantly but a standard energy management software used by councils is in the region of £4,000 per year. As Maldon District Council has a small number of buildings, software may be an expensive way of storing data and a well-managed Excel spreadsheet would likely suffice.

5 Pathway Methodology

5.1 Energy Efficiency

Appendix A shows measures that could be taken to reduce energy usage using 2022/23 as the baseline year. The carbon emissions have been included from 2018/19 onwards where the consumption between 2019-2023 is the same and the programme to start reducing emissions starts from 2025. Emissions thereafter are calculated based on the methodology described below.

This is a desktop assessment based on the consumption data and typical saving initiatives and is not based on site survey information. Estimated energy savings and forecast capital costs shown are for representative purposes to give an illustrative outcome and should not be used for budgeting purposes.

The trajectory and savings detailed in Appendix A can be used to track performance of reducing emissions against the 2022/23 baseline year and should be treated as a live document and updated when better information is available following site surveys, or after projects have been delivered.

The Council should be able to achieve significant carbon and cost savings by reviewing its maintenance policies to specify highly efficient plant and services and low-emission vehicles, rather than replacing like-for-like. Changing policies to specify materials with low embodied carbon should also reduce Scope 3 emissions by considering the carbon life cycle cost in terms of the supply chain, operation and decommissioning.

It is recommended that a detailed audit and feasibility study is carried out for all assets to determine the site-specific initiatives. This will provide an indication of the realistic interventions that could be provided and the likely cost savings, capital cost and carbon savings. The trajectory should be treated as a live document and updated once more accurate information is available following site surveys.

For buildings it is recommended that the principles of the energy hierarchy are followed. The aim is to reduce operational carbon emissions by as much as financially and technologically possible, and offset the emissions that are difficult to reduce. These are the principles of the energy saving hierarchy:

Lean – first use less energy, reduce end user energy use;

Clean – then be energy efficient;

Green – and then use renewable energy systems and carbon offsetting.

An example of this is to insulate a building so that the heat demand is reduced. This will have a knock-on effect on the size of the heating plant meaning that it may be possible to reduce the size of the heating plant which would reduce the capital cost for equipment. Solar panels would then be considered to generate renewable power. The principles are that the cleanest and cheapest unit of energy is the one that is not used. It is not necessarily the right approach to install solar panels on an old building first when the priority should be to reducing the heat loss of the building, installing a low carbon heating source and improving the controls. However, the approach for each building is bespoke and it may not be cost effective to insulate buildings for several reasons such as:

- The building is listed;
- There are architectural features that would be impacted if insulating externally;
- The costs are high and there is a lengthy payback. The Chartered Institute of Building Services Engineers (CIBSE) suggested that a measure should be considered if the simple payback does not exceed 15 years;
- The building was constructed with good levels of insulation that is in good condition.

The following assumptions have been made which can be updated once more information is available:

- Future CO_2e factors and tariff rates have been adopted from the Treasury's Green Book supplementary guidance on valuation of energy use and greenhouse gas emissions published by DESNZ[3]. These emissions factors include transmission and distribution losses, including significant losses due to power station inefficiency meaning that the emissions factors differ slightly to those calculated in Section 2;
- For fuel types not listed in the Treasury's Green Book, CO_2e factors have been adopted from the 2023 greenhouse gas reporting conversion factors and remains constant for future forecasting which includes natural gas and fuel. Although it is likely that the carbon emissions factor of gas will decrease as non-fossil fuel gases are injected into the grid, such as hydrogen, the applied emissions factor of gas in this pathway was constant for each year;
- Where future tariff rates are not published in the Green Book, these have been based on current market rates and an annual inflation rate of 3.4%[4];
- The energy costs are calculated using the forecast retail fuel price which includes the Climate Change Levy but excludes standing charges that are not directly impacted by consumption fluctuations;
- The future emission factors and energy cost rates were published in November 2023;
- The intervention capital cost is calculated by multiplying the typical payback of the intervention by the annual energy cost savings, with the exception of heat pumps which is explained later;
- The cost of a project and energy savings for selected sites has been taken from site specific energy audits, where available;
- Not all interventions are applicable to each site, e.g., replacement lighting is the only intervention assumed for car parks and street lighting;
- The pathway is based on current technology available today and assumes that all interventions could be delivered by 2030.

[3] Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal - GOV.UK (www.gov.uk)

[4] Inflation - Office for Budget Responsibility (obr.uk)

5.2 Interventions for Reducing Building Heating Energy

Generic interventions for heating include:

Table 4 Heat-based interventions

Intervention	Saving on Heat Demand	Payback in Years	Detail
More efficient plant	20%	15	Could include more efficient boilers
Controls	15%	10	Could include a new or optimised BMS for larger sites, and controllers and Thermostatic Radiator Valves (TRVs) for smaller sites
Insulation	15%	30	Could include building fabric insulation, draught proofing, pool cover and pipework insulation
Other	15%	5	Could include more efficient heat emitters, heat recovery and distribution improvements

It should be noted that savings from these interventions have been calculated concurrently rather than independently, i.e., each intervention reduces the heat demand following on from the previous intervention. For example:

- 100kWh less 20% saving from more efficient plant = 80kWh >
- 80kWh less 15% saving from controls = 68kWh >
- 68kWh less 15% saving from insulation = 58kWh >
- 58kWh less 15% saving from 'other' = 49kWh
- Total reduction = 51%.

No interventions have been applied for the buildings where the energy usage is zero or negative.

5.2.1 Heat Pumps

Using heat pumps is a good initiative for heating because the carbon factor of electricity will reduce as the grid is decarbonised, in addition to their efficiency and Coefficient of Performance

(COP). For a heat pump, a COP value of 3.2 means that 1 kW of electric energy would generate 3.2 kW of heat. Effectively producing an increase in energy output of 220%.

Replacing gas boilers with heat pumps can be very expensive. This is because the existing boilers distribute heat at around 80°C and heat pumps distribute heat at around 50°C. It is most likely that a heat pump installation would require detailed design, high levels of insulation, low levels of air infiltration, controls, an external location for plant and possible upgrade of emitters and pipework. In most cases, it is assumed that the cost to retrofit an existing site with a heat pump and the associated infrastructure would be disproportionate compared to the benefits unless financial incentives are used such as the Renewable Heat Incentive or grant funding as with the Public Sector Decarbonisation Scheme.

It is very difficult to estimate the capital cost for heat pumps. A Ground Source Heat Pump (GSHP) is more efficient than an Air Source Heat Pump (ASHP) but is generally much more expensive as it involves significant ground works to bury the slinkies. The costs are also heavily affected by the heat emitters as it is likely that the radiators and pipework will need to be replaced at a high cost, plus the cost to increase the electrical supply can be very high, but these elements are not normally known without a detailed investigation. Water Source Heat Pumps (WSHP) are also an alternative if there is a body of water nearby. The trajectory is based on an ASHP, although GSHP or WSHP may be possible following a detailed feasibility study.

It is likely that changes in technology will mean that options for more low carbon heating systems will be available by 2030.

The capital cost for the installation of an ASHP in each building has been estimated based on industry experience of delivering similar sized projects and the existing energy usage to heat the building.

A detailed feasibility study is required for each building to review the viability of low-carbon heating.

5.2.2 Distribution Network Operator and Electrical Capacity

Heat pumps will also increase the building's electricity demand. This could be offset by reducing the electricity usage through other methods, such as LED lighting, but in most cases the overall electricity consumption is likely to increase. An investigation is required to review the buildings Maximum Demand, Maximum Import Capacity, and new electrical load to determine if a larger electrical incoming supply is required. The Distribution Network Operator (DNO) should also be contacted to understand any restrictions on the grid in the local area.

Detailed calculations are required to determine if the size of the electricity cables entering the building need to be increased. The DNO is responsible for the local electricity network and an application will need to be made if the electrical capacity needs to be increased. Following the application, the DNO will then inform the Council of the works involved and the cost. The cost will depend on the amount of work required, the size that the incoming supply is being increased by and the distance that new cables need to be laid. If there is enough spare capacity then the works will not be needed.

It is very difficult to estimate the cost of the DNO works as this is not known until the application has been assessed. A cost estimate has been provided to increase the electrical capacity of each site based on experience of previous projects.

5.3 Interventions for Reducing Electricity Usage

Generic interventions for electricity include:

Table 5 Energy saving interventions

Intervention	Saving on Electricity Usage	Payback in Years	Proportion of building services	Apportioned saving across whole building	Detail
LED Lighting and Control	60%	6	15%	9%	Replace existing luminaires with LED & automatic control
Controls and HVAC	15%	5	31%	5%	Controlling building services with a BMS
Office Equipment	15%	5	37%	6%	Replacing aging equipment with more efficient equipment
Other	15%	5	16%	2%	Could include variable speed drives, motors, hand dryers

The proportion of building services which each intervention applies to has been determined based on the electrical energy end use breakdown for office buildings as provided in the Building Energy Efficiency Survey (BEES)[5].

Savings from these interventions have been calculated independently from the total electricity usage and their estimated proportion to building services, e.g., lighting is assumed to account for 15% of all electricity usage in a building and a potential saving of 60% could be achieved from installing LED lighting and controls which leads to an apportioned whole building saving of 9%.

A change in policies to upgrade existing building services to the most efficient option through planned maintenance, and upgrading fossil fuel vehicles to low emission vehicles when they are due to be replaced, will impact the action plan significantly.

[5] Building Energy Efficiency Survey (BEES) - GOV.UK (www.gov.uk)

5.4 Project Phasing

Projects have been programmed to start in 2025 and end by 2030, with the delivery of projects ramping up each year. This is shown in the table below:

Table 6 Proposed project completion schedule

	2025	2026	2027	2028	2029	2030
Percentage of Projects Delivered Per Year	8.0%	12.0%	16.0%	18.0%	22.0%	24.0%

6 Achieving Net Zero Target of Council Emissions

A “net zero” target refers to reaching net zero carbon emissions by the nominated year of 2030, as provisionally chosen by the Council, but differs from zero carbon, which requires no carbon to be emitted at all.

Net-zero refers to balancing the amount of emitted greenhouse gases with the equivalent emissions that are either offset or sequestered through rewilding, tree planting or carbon capture and storage. It is much more beneficial to reduce carbon emissions before offsetting techniques are adopted for hard-to-reduce emissions.

This trajectory includes all known Scope 1, 2 and selected Cope 3 emissions and is modelled so that emissions are reduced as much as technically and financially possible while the resultant hard to reduce emissions are then offset. Therefore, being ‘net zero carbon’.

6.1 Power Generation

6.1.1 Solar Panels on Buildings

The model assumes that 300 kWp of solar photovoltaic (PV) could be installed by 2030 on buildings. However, a detailed feasibility study across the estate is required to review each building’s suitability and determine each site’s specific system size.

6.1.2 Solar Panels on Land

The trajectory assumes that 1MWp (1,000 kWp) land-based PV could be installed which would count towards carbon offsetting, this could be done in an open space such as grassland or a car park canopy. This is considered a carbon offset as it is assumed that the system will connect directly to the electricity grid rather than connect directly to Council owned buildings through a private wire.

The amount of available land for PV is unknown at this stage. It is recommended to carry out a detailed feasibility study to determine the amount of generation that could be possible via land-based PV.

6.2 Fuel Usage in Vehicles

Ultra-Low Emission Vehicles (ULEV) are already commercially available to replace most vehicles in the Council’s fleet. The trajectory is modelled so that such vehicles will be upgraded to low

emission alternatives by 2030. This can be achieved by changing policies so that ULEV vehicles are purchased/leased instead of replacing vehicles like-for-like. As electric vehicles are more efficient compared to fossil-fuelled options, a multiplication factor was calculated by comparing the fuel efficiency of fossil-fuelled vehicles to the energy efficiency of a comparative electric vehicle (EV) on a case-by-case basis. This factor was then applied to estimate the resultant reduction in energy usage when such vehicles are replaced by EVs. The trajectory is based on replacing fossil fuel vehicles for an EV equivalent and travelling the same annual miles from the baseline year.

6.3 Trajectory to 2035

Future emissions data was taken from the Treasury Green Book supplementary appraisal guidance on valuing energy use and greenhouse gas (GHG) emissions.

A breakdown of the year-on-year carbon savings can be found in Appendix A.

For comparative purposes the carbon trajectory and financial metrics were estimated under the following scenarios:

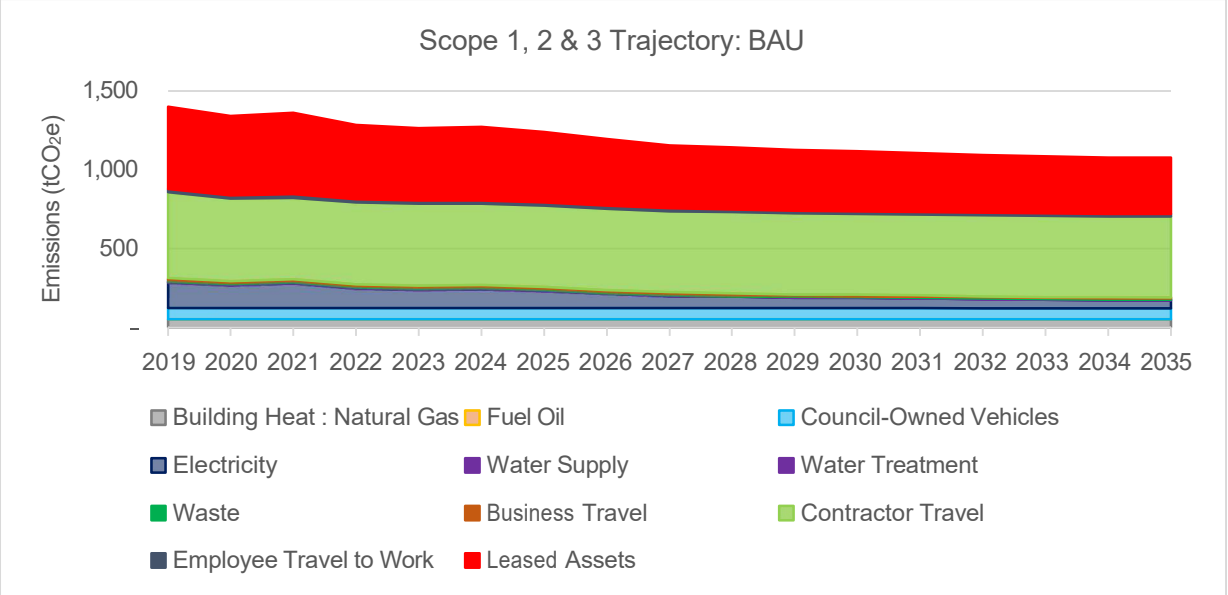
- 'Business as Usual' - Do nothing. This scenario assumes that the energy usage is the same in each year, but the carbon emissions reduce mostly as a result of decarbonisation of the electricity grid;
- 'Boilers' – Improve efficiencies by delivering all interventions across Scope 1, 2 & 3 but retain boilers (this includes replacing existing fossil-fuelled boilers older than 10 years with new fossil-fuelled boilers);
- 'Transition to ASHP' – Improve efficiencies by delivering all interventions across Scope 1, 2 & 3 and replace boilers with ASHPs.

Note: Carbon emission factors include Transmission and Distribution (T&D) losses, where applicable (i.e., electricity) and Well-To-Tank (WTT).

In the projections below, the following should be noted:

- All emissions are calculated based on the energy usage from the baseline of 2022/23;
- The consumption is the same between 2019 and 2024;
- The proposed carbon savings are programmed to start from 2025 to take into account the time it will take to design, procure and deliver projects.

Figure 6 Scope 1, 2 & 3 CO_2e trajectory under BAU scenario



The data visualisation above shows the trajectory if no interventions were delivered and the consumption levels remain the same as the 2022/23 baseline point. For future emissions, there is a decrease in electricity carbon emissions as the grid decarbonises, but emissions from other sources barely change. This BAU scenario shows that the carbon emissions in 2030 will be 1,117 tCO_2e which is a reduction of 13% from the 2022/23 baseline.

Figure 7 Scope 1, 2 & 3 CO_2e trajectory under Boilers scenario

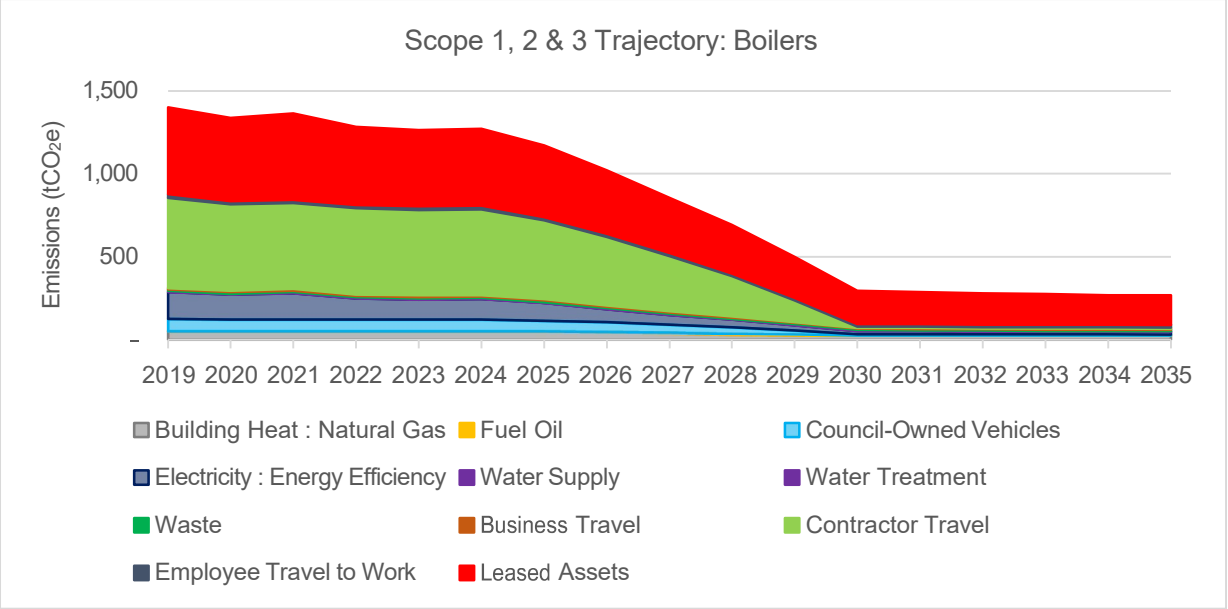


Figure 8 Scope 1, 2 & 3 CO_2e trajectory under ASHP scenario

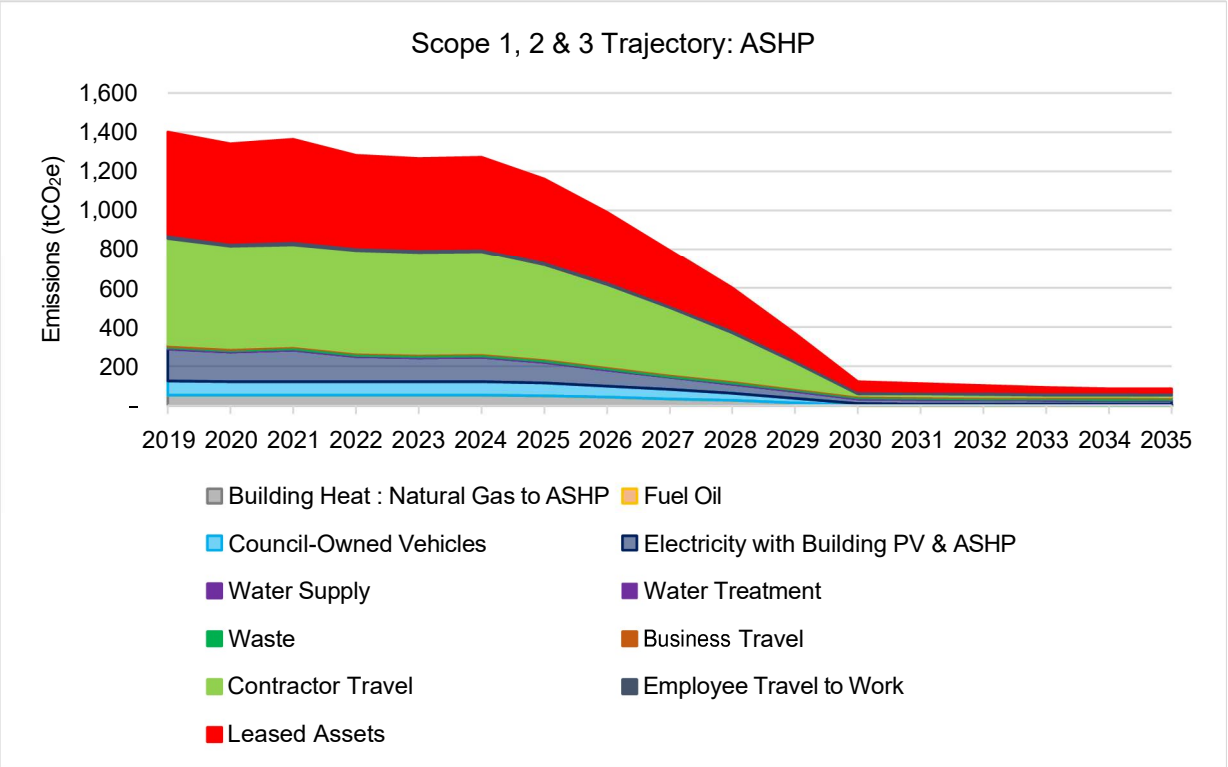
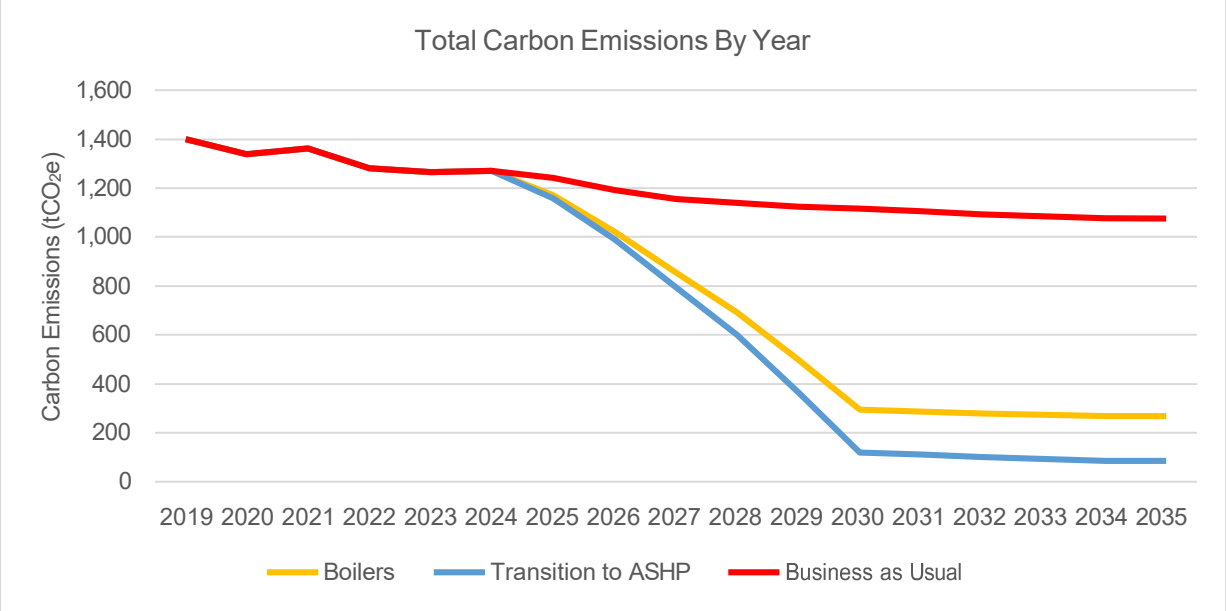


Figure 7 and **Figure 8** show the projected carbon emissions if all efficiency projects are delivered, but compares the difference to retaining the gas boilers or replacing all boilers with ASHPs. The graphs show that there is a greater carbon savings, when replacing the existing heating systems with ASHPs by 2030. A 77% carbon savings is realised under the boiler scenario compared to the baseline year with 294 tCO_2e hard-to-reduce emissions by 2030. Meanwhile, when replacing the existing heating systems with ASHPs, there is 119 tCO_2e hard-to-reduce emissions by 2030 and a 91% reduction in carbon emissions from the baseline year.

Hard-to-reduce emissions is the amount of carbon that will need to be offset to balance the emissions that cannot directly be removed based on current technology and within a reasonable budget.

6.4 Boiler vs Heat Pumps

Figure 9 Comparing carbon emissions under the different scenarios



The 'Boilers' scenario includes making all of the efficiency savings but retaining boilers.

The graph shows a notable reduction in emissions if energy efficiency recommendations and all interventions are implemented with even further savings if existing heating systems are replaced with ASHPs.

Therefore, it is recommended that all existing heating systems be replaced with heat pumps, where feasible.

6.5 Offsetting when Installing ASHP

A carbon offset is a reduction in emissions of CO_2e made to compensate for emissions produced elsewhere. There are several ways of offsetting carbon emissions, such as carbon capture and storage; however, this is not currently deemed financially or technically feasible for the Council. More typical options available to the Council to directly offset emissions include renewable energy generation projects and rewilding/tree planting. However, the effectiveness of tree

planting to quickly offset emissions can be questioned as it can take many decades for trees to reach maturity.

It is assumed that solar PV could be placed on land with a generation capacity of approximately 1 MW (1,000 kWp) generating 950 MWh of electricity that feeds directly into the electricity grid. This could be installed in open spaces or as a canopy over car parks. If the PV system is connected directly to a building it is not considered an offset as the generated electricity would be consumed by the building.

A 1 MWp system would have a capital cost of approximately £900k, offset 110 tCO_2e in 2030 and an additional 454 tCO_2e in the five years (2031-2035) following the net-zero target year. However, the amount of carbon offset in 2035 is 83 tCO_2e, demonstrating that the carbon offset benefits of a 'solar farm' decrease as the grid decarbonises.

The installation of 1 MWp PV would leave 9 tCO_2e of unavoidable emissions by 2030 that the Council needs to offset to attain net-zero status. Carbon offsetting through tree planting schemes could allow the Council to be net zero by the target year following recommendations to reduce environmental impacts. The Council can enter into agreements to purchase carbon units (credits) from a number of verified Woodland Carbon Unit (WCU) or Pending Issuance Unit (PIU) providers/project developers listed on the UK Land Carbon Registry[6], which could then be used to compensate for unavoidable emissions in carbon reporting.

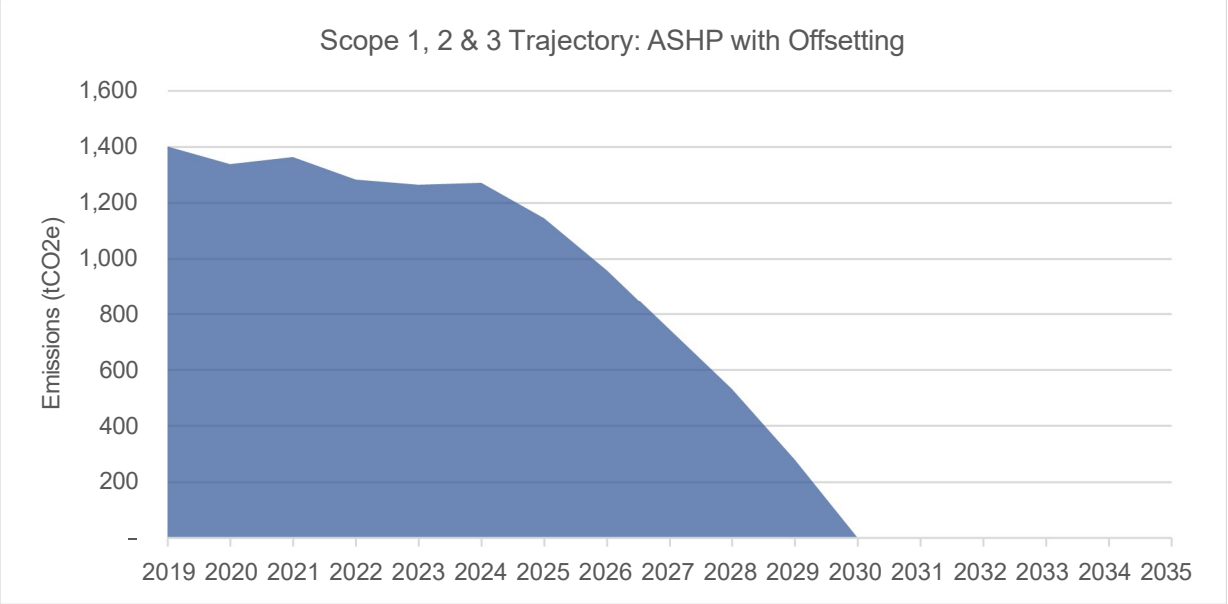
The cost of offsetting 1 tonne of CO_2 in British woodlands was referenced from The Woodland Trust – a verified carbon offsetter. Based on this pricing information (£25/tCO_2), it would cost the Council £225 to balance the remainder of its emissions and be net zero carbon by the 2030 reporting year. Despite this, carbon emissions would also need to be offset in years following the Council's net-zero target year of 2030, which would incur additional charges. Conversely, the Council could opt to grow its own trees on its estate and have the project validated in accordance with the Woodland Carbon Code (WCC) standards. The PIUs from the scheme are then converted to WCUs as the trees grow and sequester carbon. The Council could be eligible to obtain grants to support its tree planting scheme from available agroforestry schemes.

A detailed feasibility study is required to identify the most suitable WCU/PIU project developers to suit the Council's needs; and a detailed feasibility is required if the Council opts to grow its carbon units to understand the land requirement, tree species, availability of grants, and potential for carbon sequestration by the programme.

The following graph shows the pathway for net zero carbon which includes reducing carbon initiatives and installing ASHP combined with offsetting measures. The graph shows that the Council will be net zero in 2030 if it offsets the unavoidable 119 tCO_2e via the suggested pathways. The amount of carbon to be offset in subsequent years continues to fall as the carbon factor of the electricity grid decreases with grid decarbonisation (refer to Appendix A).

[6] UK Land Carbon Registry - UK Woodland Carbon Code

Figure 10 CO_2e emissions with offsetting measures under the ASHP scenario



6.6 Forecast Capital Cost with ASHP

This section reviews calculated capital costs and operational costs of emissions sources.

Investing in energy efficiency projects and power generation will, in most cases, have a positive financial benefit with a good return on investment (ROI). The Council should set its own guidelines on a cap for ROI to measure the viability of projects.

Fuel and electricity rates are taken from DESNZ modelling published in November 2023[7] which is the best available source for forecasting at the time of writing.

The future grid export rates for solar generation are based on a current market price of 5.5 p/kWh and increased by 4.6% annually[8].

[7] Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal - GOV.UK (www.gov.uk)
[8] Inflation - Office for Budget Responsibility (obr.uk)

Table 7 Forecast capital cost and financial savings from initiatives under ASHP scenario

Intervention	Capital cost of all interventions	Accumulative cost saving up to 2030	Total annual saving of all interventions in the year 2030	Accumulative CO_2e Savings by 2030	Accumulative £/CO2e Savings by 2030
Building Heat : Natural Gas to ASHP and heat-based interventions	£623,300	£29,800	£9,000	52	£12,028
Fuel Oil to Biodiesel	NA	-£70	-£30	0	NA
Transition from Council-Owned Vehicles to ULEVs	£1,978,800	£60,700	£20,800	65	£30,459
Electricity : Energy Efficiency	£96,900	£46,400	£14,900	109	£892
Electricity Increase from ASHP	£0	-£15,400	-£5,000	-4	NA
Water	Unknown	-£52,000	-£7,800	2	Unknown
Building PV (300kWp by 2030)	£270,000	£123,500	£39,500	33	£8,145
Land Based PV (1000kWp by 2030)	£900,000	£198,000	£71,600	110	£8,145
Tree Planting	£225	N/A	N/A	9	£25
Total	**£3,869,225**	**£390,930**	**£142,970**	**376**	**£10,294**

This shows that the forecast capital cost to achieve the 2030 net zero goal is approximately £3.9million and the total net annual savings achieved in the year 2030 would be the equivalent of £143k.

In addition, it estimated that £2.09 million is required to decarbonise the leased assets but this has not been included in the table it may not entirely be the responsibility of the Council to pay for this.

Inflation on the capital cost has not been considered in the forecast cost. It is difficult to estimate future costs of interventions as prices will increase with inflation, but the cost could also come down due to government subsidies and supply and demand, particularly with heat pumps.

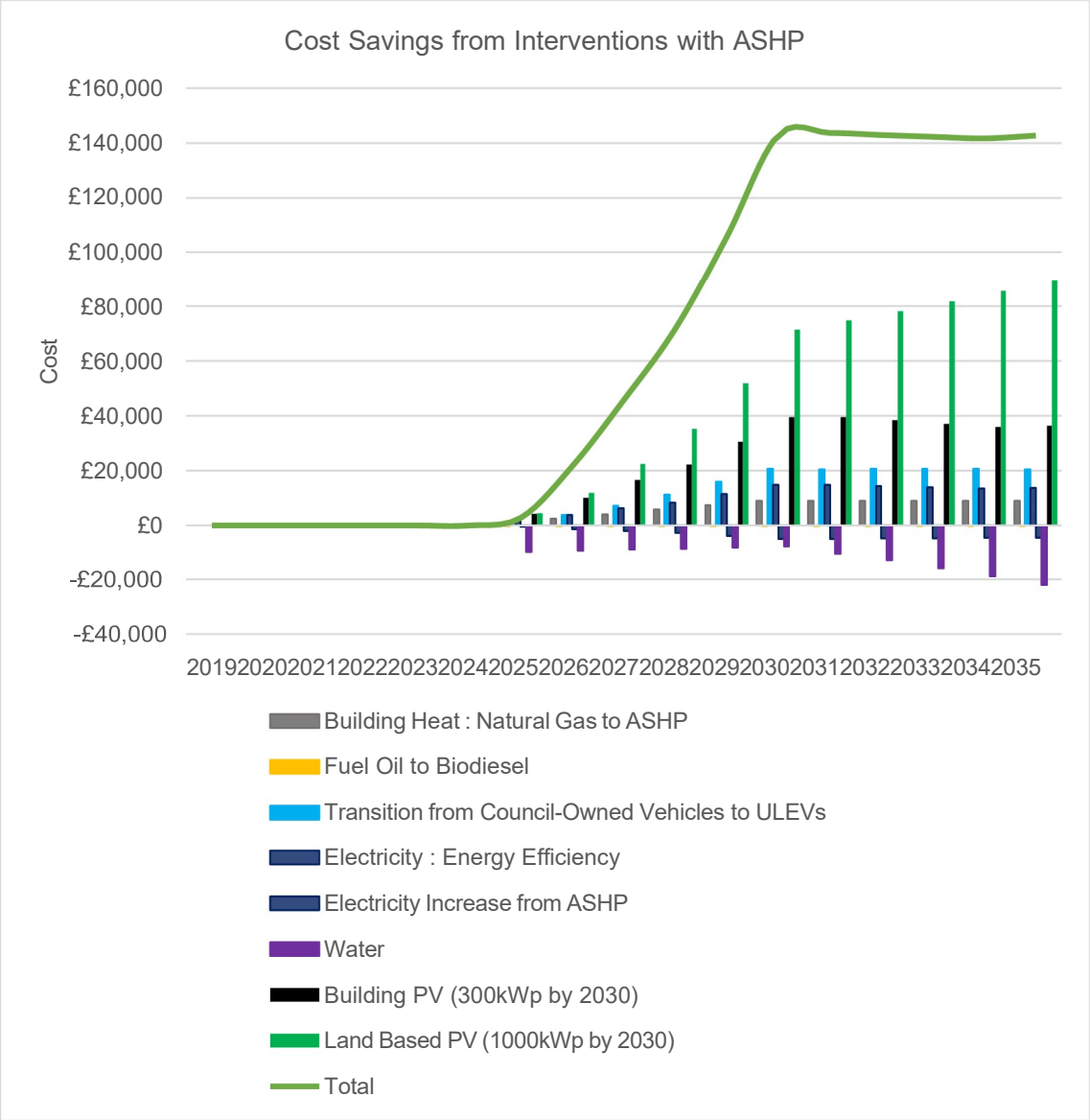
The calculations included in this report do not consider planned spending by the Council over the time period in question. For example, we have not factored in revenue spending the Council may have already set aside for building refurbishment, new boilers or replacement vehicles over the next few years.

The table above only include sources that the Council are directly financially responsible for and does not include staff travel and third party vehicles.

6.7 Cost Savings with ASHP

The graph below shows the total savings if all initiatives are implemented by 2030.

Figure 11: Year-to-year cost savings from interventions under ASHP scenario



The graph considers savings made through efficiency savings (insulation, controls, etc.) and installing heat pumps. It should be noted that it will generally be more expensive to run a heat pump compared to a gas boiler if no other interventions are included as the cost of electricity is typically 4 times more expensive than gas up to 2030. However, the price difference between electricity and gas is expected to close as gas is made more expensive as an incentive to move away from gas boilers.

Savings from leased assets and third party vehicles have not been shown as the Council does not pay for the energy/fuel.

Although the 1 MWp solar farm is larger than the 300 kWp system on buildings, the financial savings are not proportional as the [current] export rate for a solar farm is much less than the

savings achieved by having PV on a building (and using the generated electricity within that building) which reduces the amount of electricity purchased from the grid.

The savings peak in 2030 as all of the initiatives have been delivered, but savings fall thereafter as consumption remains static, but the cost of energy/fuel/water continues to increase.

7 Practicalities, affordability and comparison

7.1 Practicalities

The technologies noted in this plan are all existing, tried and test technologies. This type of equipment is currently installed and operating in many buildings and it is no longer considered 'new' technology so the risk of investing in it is minimal.

There may of course be barriers to installing it within specific buildings. This is a desk top study and there is a requirement to carry out onsite detailed surveys for each building to identify any barriers and plan a solution as a next step.

Equally the estimates made for carbon savings, electricity loads and other matters are based on data provided by the Council and surveys will help to provide more accurate estimates.

Technologies such as heat pumps and solar panels are in high demand and supply chains are impacted as a result. Equally there are issues with the number of companies and skilled operatives to install and maintain some of the technologies and there could be time and cost barriers if the electrical capacity of the building needs to be upgraded. This is out of the control of the Council and might have an impact on scheduling of work and the duration of projects, and a high risk item is an electrical upgrade which could cost £100,000s.

These factors reinforce the benefits of having a plan in place to address the whole issue of decarbonising the Council's assets as part of a wider asset management plan. The Council will realise the importance of such plans – both as an internal policy requirement but more importantly in the context of this report, as a tool for accessing external funds such as the Public Sector Decarbonisation Scheme (PSDS).

7.2 Affordability

Allocating a budget to invest to decarbonise the Council's assets is a political decision and this report is one way of ensuring that the decision is an informed one.

The cost of solar panels has dropped substantially over the past decade as rollout has increased dramatically. There is an expectation that the cost of heat pumps will follow suit but estimating by how much is impossible.

No doubt new technologies will be developed over the coming years but again it is impossible to second guess the details. These are likely to be expensive as they are introduced so may not be readily affordable for the foreseeable future. This is exactly the position for some new technologies now. Over time prices should fall.

This report has not taken account of future planned spending on the Council's assets. A figure of £3.9m has been estimated as the cost but there will have been significant funds spent over the time period in these assets anyway. For example, replacement vehicles will have been planned for over the coming decade and those budgets could be used to take forward this agenda such as purchasing low emission vehicles. We suggest the appendices to his report are updated with such budgets.

As noted above, government is focussed on heat pumps as a preferred technology and there may be financial support available in future (in addition to PSDS) but this cannot be relied upon. This focus should help to prompt a market reaction to produce more heat pumps and lead to a reduction in prices.

All of the above points highlight the importance of maintaining an accurate and up to date action plan alongside detailed asset data.

7.3 Comparison

Just over three quarters of local authorities have declared a climate emergency and the vast majority of them have identified a date by which they want to be net zero carbon. This applies to their own council operations. A smaller number have identified a date by which they want their wider district to net zero carbon. Often the declaration was made and a date identified prior to work being carried out to inform the decision to declare an emergency or date.

It is difficult to compare other than generically one authority's approach with others due to differences in scale, historic investment, asset ownership and condition, political views, geography and other factors. Nottingham are considered to be at the vanguard and have a significant team in place and many years of treating the agenda as a political priority. On the other hand, Clackmannanshire Council is one of the smallest in the UK and is taking forward a partnership project with a neighbouring council and university to address climate change. In other words, there is a wide range of activity taking place. Although in our experience, smaller local authorities have less resources to allocate to this agenda and fewer assets to consider, size is not an excuse for inaction.

However, the Council has only provided a record of one building (Scope 1) that is heated by gas and two leased assets (Scope 3). So the net zero challenge may be smaller for Maldon compared to other councils as one of the largest difficulties is to transition away from gas boilers to a low carbon heating option.

Factors to consider when looking at the Council's approach are as follows:

- Informing/training all in the authority (officers and members) about the importance of this agenda in their daily delivery of services, project work and investment decisions;
- Avoiding the position where a single person or team is considered the sole area of responsibility/knowledge for this agenda;
- Establishing an appropriate process for collating, analysing and reporting relevant data on performance and assets;
- Prioritising activity to address decarbonisation – address the biggest emitters and where most benefit can be gained first;

- Understanding which actions should be funded by revenue funding, reserves, borrowing (Public Works Loan Board) (PWLB)) or other funding (such as PSDS);
- Planning well in advance for external funding.

8 Conclusion

It is recommended to report annually on the progress of reducing carbon emissions for Scope 1, 2 & 3.

Emissions from the Council's own operations should be calculated using the methodology in this report and policies and procedures should be put in place to record the raw data needed to calculate emissions as it is made available rather than trying to retrieve the data in bulk retrospectively.

Further investigations are recommended to calculate Scope 3 emissions such as purchased goods and services and what initiatives could be applied to reduce emissions. Overall emissions will increase when adding in additional sources as data quality improves.

The trajectory and savings detailed in Appendix A and the wider programme can be used as a benchmark to track the performance of reducing emissions against the 2022/23 baseline year.

The Paris Climate Agreement aims to keep global temperature increases well below 2°C and pursuing 1.5°C. This calls for organisations to set a 'carbon budget' which is a term used to indicate the maximum amount of carbon an organisation can produce over a period of time to stay within the Paris Agreement. This often requires setting a science-based target and carbon budget.

The minimum reduction required for setting science-based targets in line with limiting global warming to the 2°C scenario is a 2.5% annual linear reduction from 2020 - 2035. However, organisations are strongly encouraged to adopt targets with a 4.2% annual linear reduction between 2020 – 2035 to be aligned with limiting warming to 1.5°C. The current carbon trajectory under the ASHP scenario achieves a 93% reduction between 2022 - 2035.

The buildings in this carbon trajectory report were not subject to an energy audit as this report is a desktop study performed without detailed knowledge of the building estate and is based on rule of thumb and engineering and industry experience. A detailed energy audit should be provided for each building to provide a clear action plan of what interventions can be provided, their capital cost, funding opportunities and the cost/carbon savings.

Glossary

Term	Definition
Carbon dioxide equivalent (CO_2e)	The carbon dioxide equivalent (CO_2e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO_2 and includes the seven greenhouse gases with the greatest global warming potential (GWP).
Carbon footprint	A carbon footprint measures the total greenhouse gas emissions caused directly and indirectly by a person, organisation, event or product. A carbon footprint is measured in tonnes of carbon dioxide equivalent (tCO_2e).
Council Vehicles	Vehicles that are owned or controlled by the Council. This does not include employee-owned vehicles that are used for business purposes.
Electricity	Electricity used at sites owned/controlled by the Council. This is reported as a Scope 2, indirect emission. The conversion factors used are for the electricity supplied by the grid that the Council purchase - they do not include the emissions associated with the transmission and distribution of electricity.
Employee Vehicles	Travel for business purposes in assets not owned or directly operated by the Council. This includes mileage for business purposes in cars owned by employees, public transport, hire cars etc.
Energy carrier	Energy carriers are transmitters of energy including electricity, solid, liquid, and gaseous fuels. They occupy intermediate steps in the energy-supply chain between primary sources and end-use applications.
[Natural] Gas	Primary fuel sources combusted at a site or in an asset owned or controlled by the Council.
Pending Issuance Unit	A Pending Issuance Unit (PIU) is effectively a 'promise to deliver' a WCU in future based on predicted sequestration. It is not 'guaranteed', and cannot be used to report against UK-based emissions until verified. However, it allows companies to plan to compensate for future UK-based emissions or make credible CSR statements supporting woodland creation. 1 PIU = 1 tonne of Carbon Dioxide equivalent that will be sequestered in future
Transmission and Distribution	Transmission and distribution (T&D) factors are used to report the Scope 3 emissions associated with grid losses (the energy loss that occurs in getting the electricity from the power plant to the premises).
Wastewater	Water returned into the sewage system through mains drains.
Water Supply	Water delivered through the mains supply network.
Well-to-tank	Well-to-tank (WTT) conversion factors are used to account for the upstream Scope 3 emissions associated with extraction, refining and

	transportation of the raw fuel sources to an organisation's site (or asset), prior to combustion.
Woodland Carbon Code	Woodland Carbon Code (WCC), a trademark of Scottish Forestry, is the standard that ensures projects are independently validated/verified and represented on the UK Land Carbon Registry.
Woodland Carbon Unit	A Woodland Carbon Unit (WCU) is a tonne of CO_2e which has been sequestered in a WCC-verified woodland. It has been independently verified, is guaranteed to be there, and can be used by companies to report against UK-based emissions or to use in claims of Net Zero emissions. $$1\,WCU = 1\,tonne\,of\,carbon\,dioxide\,sequestered$$

Appendix A – Carbon Trajectory Report

(Separate Spreadsheet)

Appendix B – Data that should be gathered to report on Scope 3 emissions

The reporting of Scope 3 emissions is discretionary. The table below provides further guidance on the information required to calculate emissions from Scope 3.

Item	Category	Details Required
1	Purchased goods and services	This category includes all upstream (i.e. cradle-to-gate) emissions from the production of products purchased or acquired by the Council in the reporting year. Products include both goods (tangible products) and services (intangible products). This category includes emissions from all purchased goods and services not otherwise included in the other categories of upstream scope 3 emissions (i.e. category 2 through category 8 below). Cradle-to-gate emissions include all emissions that occur in the life cycle of purchased products, up to the point of receipt by the Council. Cradle-to-gate emissions may include: • Extraction of raw materials • Agricultural activities • Manufacturing, production, and processing • Generation of electricity consumed by upstream activities • Disposal/treatment of waste generated by upstream activities • Land use and land-use change • Transportation of materials and products between suppliers • Any other activities prior to acquisition by the reporting company Relevant purchases to the Council may include capital goods, such as office supplies, office furniture, computers, telephones, travel services, IT support, outsourced administrative functions, consulting services, janitorial, landscaping services, maintenance, repairs and operations. For accurate carbon reporting emissions, the Council should request cradle-to-gate emission factors for materials used by suppliers to produce purchased goods such as Environmental

		Product Declarations (EPDs). It is likely that many suppliers will not be able to provide all the emission data. If an EPD cannot be provided, supplementary information required includes the volume of product (kg) and the carbon emission factor (kg CO_2e). A policy should be developed so that suppliers in the supply chain are required to provide this data as part of the contract, where the volume of goods is noteworthy.
2	Capital goods	Capital goods are final products that have an extended life and are used by the Council to manufacture a product, provide a service, or sell, store, and deliver merchandise. Capital goods are treated as fixed assets or as plant, property, and equipment (PP&E). Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles. The required information is the same as Category 1 above. A policy should be developed so that suppliers in the supply chain are required to provide this data as part of the contract.
3	Fuel- and energy related activities (not included in Scope 1 or Scope 2)	Transmission and distribution (T&D) losses have been included and calculated from the data provided in Scope 2.
4	Upstream transportation and distribution	Category 4 includes emissions from: • Transportation and distribution of products purchased in the reporting year, between suppliers and its own operations in vehicles not owned or operated by the Council. • Third-party transportation and distribution services purchased by the Council in the reporting year (either directly or through an intermediary), including inbound logistics, outbound logistics (e.g. of sold products), and third-party transportation and distribution between the Council's own facilities. The Council requires data on: • Quantities of fuel (e.g., diesel, petrol, jet fuel, biofuels) consumed • Amount spent on fuels • Distance travelled • Vehicle type

		This may include managed assets - Vehicles that are used by the Council but are not owned by the organisation and generally do not appear on the organisation's balance sheet, for example, maintenance contractor vehicles, outsourced refuse and recycling trucks, road sweepers, grounds maintenance mowers etc. A policy should be developed so that suppliers using their own vehicles are required to provide this data as part of the contract.
5	Waste generated in operations	This includes emissions from third-party disposal and treatment of waste generated in the Councils owned or controlled operations in the reporting year. This category includes emissions from disposal of both solid waste and wastewater. The Council should request volume and emissions data from the waste treatment company applicable to **its own waste stream**. If this cannot be provided, the emissions can be calculated by requesting the volume of waste, type and disposal method: Example of data required: Total weight (kg) of waste type and disposal method e.g. • 5,000kg municipal waste to landfill • 500kg organic garden waste to composting • 1,000kg metal recycled • 1,000kg plastic recycled • 1,000kg paper recycled Data is required for the volume of supply and wastewater in cubic metres (m^3) from water bills. Local authorities have an important role in waste prevention and sustainable waste management through awareness-raising campaigns, providing separate collection for recycling and food waste, and implementing waste-to-energy schemes. It is therefore voluntary on whether the Council choose to include the emissions from waste associated with the whole borough, or just the Council's own operation.
6	Business travel	Travel for assets not owned or directly operated by the Council. This includes mileage for business purposes in cars owned by employees, public transport, hire cars etc. Require details for:

		<u>Vehicle</u> Fuel type, size of vehicle and distance for: • Car • Motorbike • Taxis • Bus • Rail <u>Flights</u> • Airport travelled to/from • Number of passengers • Class type • Distance <u>Ferry</u> • Foot or car passenger • Distance
7	Employee commuting	This category includes emissions from the transportation of employees between their homes and their worksites. Emissions from employee commuting may arise from: • Car • Bus • Rail • Other modes of transportation Staff would be required to provide method of transport and distance travelled. It may be difficult and time consuming to collect accurate data.
8	Upstream leased assets	This category is applicable from the operation of assets that are leased by the Council. If the Council procures the energy then this should be considered as Scope 1 and 2. If the landlord is responsible for the Scope 1 and 2 emissions, the Council should include the reporting under Scope 3. An example may include an office that the Council lease from a private landlord. All energy bills may be included as part of the lease and the energy contract is under the name of the landlord. The Council should therefore request the energy data from the landlord and include this under Scope 3.

		Data required include the Scope 1 and 2 data from the leased asset.
9	Downstream transportation and distribution	This category includes emissions that occur in the reporting year from transportation and distribution of sold products in vehicles and facilities not owned or controlled by the Council in the reporting year. It is assumed that this category is not applicable to the Council as it does not manufacture and sell products.
10	Processing of sold products	It is assumed that this category is not applicable to the Council as it does not manufacture and sell products.
11	Use of sold products	It is assumed that this category is not applicable to the Council as it does not manufacture and sell products.
12	End-of-life treatment of sold products	It is assumed that this category is not applicable to the Council as it does not manufacture and sell products.
13	Downstream leased assets	This category is applicable where the Council is the landlord to a lessee. If the Council procures the energy on behalf of a lessee then this should be considered as Scope 1 and 2. An example of this is where the Council may lease a premises to a lessee and include all energy costs as part of the lease. The energy contract is under the name of the Council and is therefore reported under Scope 1 and 2. If the lessee is responsible for the Scope 1 and 2 emissions, the council should include the reporting under Scope 3. An example of this is a shop that the Council own and the occupant pays for the energy bills and the contract is under their name. The Council should request the energy data from the shop occupier and report this under Scope 3. Data required include the Scope 1 and 2 data from the leased asset.
14	Franchises	It is assumed that this category is not applicable to the Council as it does not operate any franchises.
15	Investments	This category includes scope 3 emissions associated with the Council's investments in the reporting year, not already included in scope 1 or scope 2. This category is applicable to investors (i.e.

		organisations that make an investment with the objective of making a profit) and organisations that provide financial services. This category also applies to investors that are not profit driven (e.g. multilateral development banks). Investments are categorised as a downstream scope 3 category because providing capital or financing is a service provided by the organisation. Category 15 is designed primarily for private financial institutions (e.g., commercial banks), but is also relevant to public financial institutions (e.g., multilateral development banks, export credit agencies) and other entities with investments not included in scope 1 and scope 2. The Councils scope 3 emissions from investments are the scope 1 and scope 2 emissions of investees. For purposes of greenhouse gas accounting, this standard divides financial investments into four types: • Equity investments • Debt investments • Project finance • Managed investments and client services An example of the information required is the Scope 1 and 2 emissions from the bank where an investment is in place. This is based on the Council's proportional share of investment in the investee. If the Council has £1million invested in the bank and the banks total investments amount to £100million, the Council should report on 1% of the banks Scope 1 and 2 emissions. It is assumed that this information will be difficult to collate from third parties and that the total emissions will be proportionally small compared to other emission sources and these emissions could be excluded from the reporting.