CARBON-ZERO

CARBON MANAGEMENT PLAN

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1. Executive Summary

This Carbon Management Plan sets out ambitions for Ethypharm UK (Ethypharm) and acts a roadmap for progress. The emissions from the wider Ethypharm Group are not considered as part of this plan. Reducing carbon emissions is not just about commitment to the environment. The same processes used to identify carbon emissions reduction will also identify and realise financial savings through improved efficiency in the procurement and operation of buildings, transport, manufacturing, and supply processes. The actions outlined within this Carbon Management Plan form part of an efficiency plan to reduce consumption and provide value for money.

Reductions will be achieved through a range of projects including energy initiatives, travel policies and changes to the manufacturing and supply processes. This Carbon Management Plan is viewed as a 'live' document and will be updated annually with project updates.

The 2022 baseline carbon footprint was calculated to be **6,516 tonnes** of carbon dioxide equivalent (tCO_2e).

By 2027, Ethypharm will have reduced their carbon emissions by 10%, saving approximately 650 T/CO_2e, compared to the 2022 baseline.

2. Introduction

Initial Carbon Management Plan

Ethypharm UK
Mecury Park, Woodurn Green, Buckinghamshire, HP10 0HH
Bampton Road, Harold Hill, Romford, Essex, RM3 8UG
Hubert Road, Brentwood, Essex, CM14 4JY
Spilsby Road, Harold Hill, Romford, Essex, RM3 8SB

Ethypharm specialises in the production of injectable pharmaceuticals for clinical and commercial supply. They operate from a fully licensed manufacturing facility in Romford and have three other offices in addition to this facility.

This Carbon Management Plan sets out ambitions for Ethypharm and acts as a roadmap for progress for the next 5 years. The actions outlined within this Carbon Management Plan form part of an efficiency plan to reduce consumption and provide value for money.

While a transition to Net-Zero may take 20-30 years to achieve, Carbon Management Plans typically cover periods between 5–10 years. At the end of each plan's forecasted period, it should be replaced with new version detailing the continued transition to Net-Zero.

3. Background and Context

Purpose of the Carbon Management Plan:

Facilitate Sustainability

Support an organisational culture that embraces being a sustainable business

Reduce Carbon Footprint

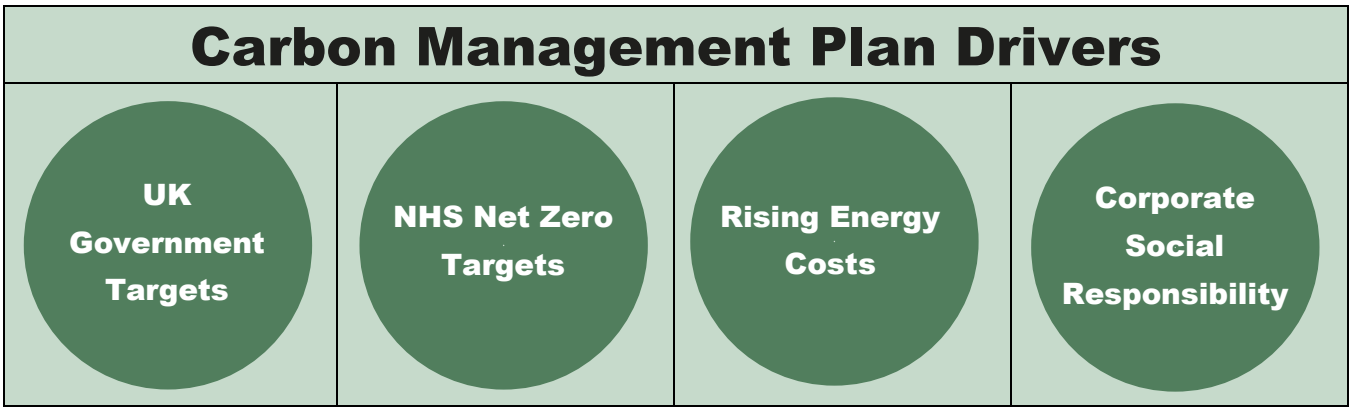
Reduce business carbon emissions and improve cost efficiency

Path to Carbon Neutrality

Support the business transition to carbon neutrality in the long term

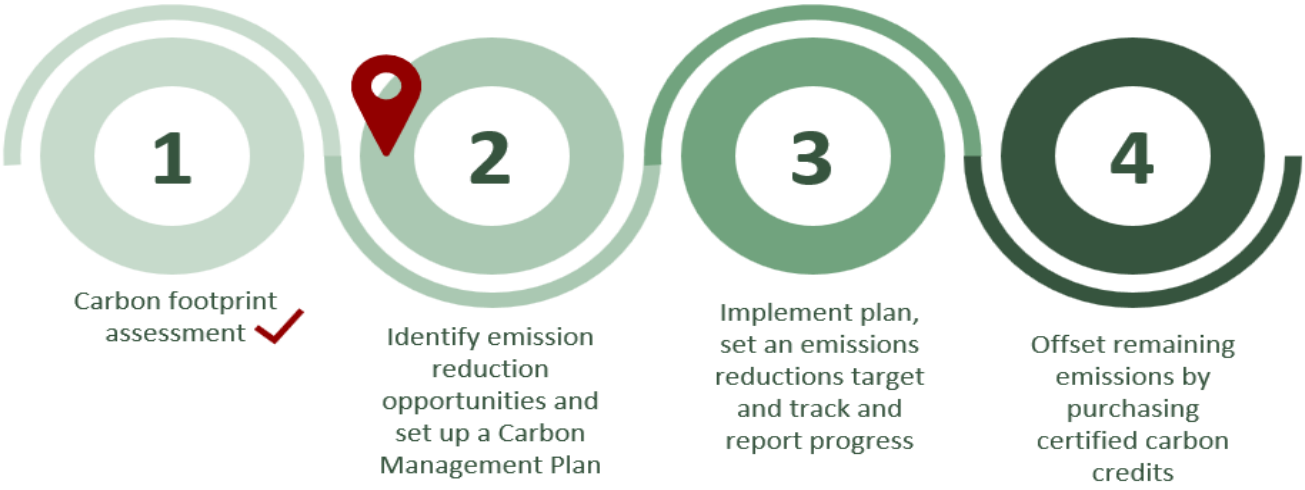
Drivers for Carbon Management:

Organisations and businesses face a complex set of drivers for managing carbon emissions. These drivers should not be considered in isolation and should be considered in reference to the overall goal of minimising environmental impact while contributing to society and the economy.



Becoming a Carbon Neutral Company:

The below summarises the process Ethypharm can undertake to achieve carbon neutrality as part of an overarching Net Zero strategy aligning with broader Government goals.



Scope and Boundaries of the Carbon Footprint:

In keeping with the Greenhouse Gas Protocol (WRI 2004), the operational boundary should include all Scope 1 and Scope 2 emissions. This Carbon Management Plan also covers Scope 3 for a holistic assessment of the business's emissions.

SCOPE 1

Direct emissions from owned or controlled sources

SCOPE 2

Indirect emissions from the generation of purchased energy

SCOPE 3

Other indirect emissions that occur in value chain, upstream & downstream

The scope extends to the emissions associated with materials use, any and all freight requirements necessary to allow for the movement and provision of manufactured goods to client end locations, as well as any staff travel. The baseline assessment covered the calendar year of 2022.

4. Emissions Baseline

Data was collated and converted to a T/CO_2e equivalent. The reporting year ran 01 January 2022 to 31 December 2022, therefore the 2022 factors were used for all baseline calculations.

2022 Annual Emissions		
	Annual Carbon Emissions (Tonnes CO_2e)	Percentage of total Emissions (%)
Romford Facility	2,803	43.0
Brentwood Facility	225	3.4
Jupiter House	164	2.5
Staff Travel	161	2.5
Raw Materials Use	3,111	47.7
Supply Chain	52	0.8
Total	**6,516**	

Table 1. 2022 Annual Carbon Emissions

It is noted that the emissions from their premises account for approximately half of the 2022 business carbon footprint.

Figure 1 below highlights Ethypharm's baseline emission by source. Emissions from material use had the largest percentage share, accounting for 48% of the total emissions. This does not include the materials used in the production of pharmaceuticals, only packaging. It is likely the materials used in the production of medications are not interchangeable with lower carbon alternatives, therefore emissions savings from pharmaceuticals are unlikely. As such, they have been excluded from the carbon management plan at this point.

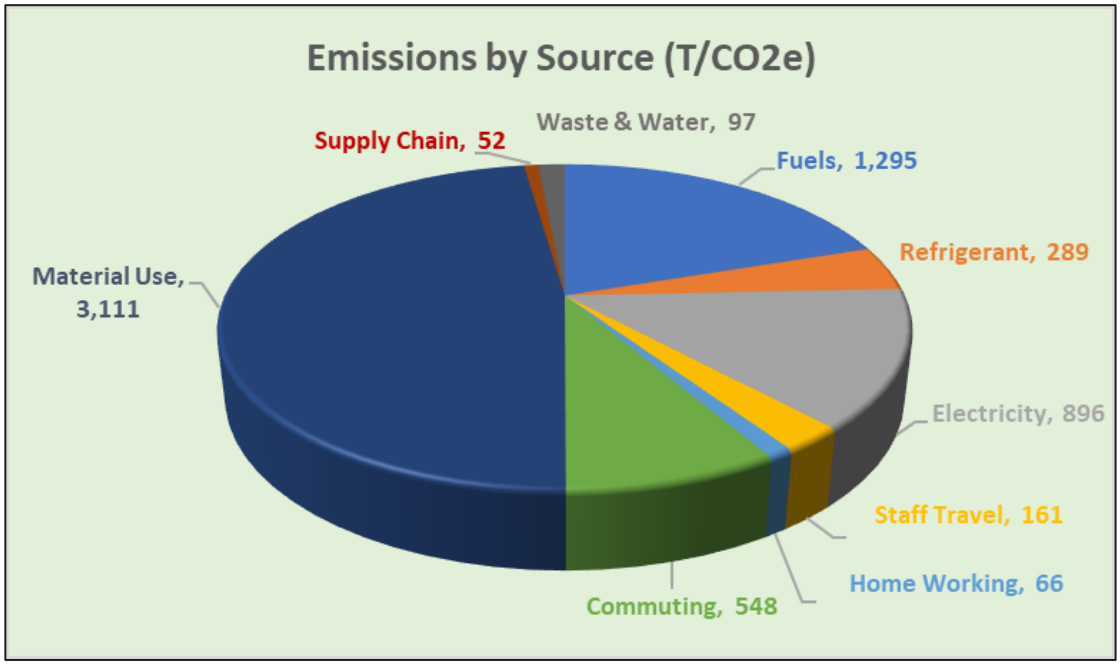


Figure 1. Ethypharm 2022 Carbon Emissions by Source

5. Carbon Footprint Projections

The scenario forecast for Ethypharm shows emissions consistent with steady business growth, assumed to be 3%. Carbon Zero understands there are no immediate plans to drastically scale the business. It is noted that this forecast does not include embodied emissions of the pharmaceuticals. If these are quantified at a later date, this report could be updated to reflect the amended annual emissions value.

The figure below highlights the 2022 baseline emissions and projected emissions with company growth with no interventions over the next 5 years.

Figure 2. Carbon Footprint Projection

6. Carbon Reduction Opportunities

In order to achieve emissions reductions Ethypharm is committed to identifying opportunities for carbon reduction and implementing carbon saving projects. The following sets out some of the opportunities identified through the business carbon assessment as areas to consider for targeting carbon reduction.

As their current premises are leased, any upgrades to the building will likely rely on approval from the building owner. As energy efficiency measures will add value to the property, it is likely the following measures will be approved. If approval for any of the projects listed in this section are not granted by the owner, then this plan should be updated with the project removed. Any changes to forecasted emissions reductions should also be updated if building upgrades are not approved.

6.1 Purchase of Renewable Electricity

Should mains electricity requirements be sourced from a guaranteed renewable source under the Renewable Energy Guarantees Origin (REGO) scheme with their issued REGO certificate, all of the emissions on that supply contract would carry zero carbon emissions.

- Reducing future emissions by around 895.7 tonnes CO_2e (this year's value for electricity use)
- This would result in a 14% reduction in total emissions.

In addition to switching to a renewable energy tariff, electricity energy use savings should also be pursued.

6.2 General Energy Efficiency Improvements:

In the light of the current high energy prices improving energy efficiency would help reduce both costs and emissions. Renewable options that reduce usage, such as heat pumps, might also provide good payback in the current high prices. Below are some high-level considerations for Ethypharm moving forward:

- Energy audits can typically identify opportunities to save between 5 and 20% of energy.
- Replace old incandescent light bulbs with LED lighting which lasts longer and use up to 75% less energy.
- Sensor-based lighting which turns off when rooms and corridors are not being used could also be explored.
- Adjusting pre-set temperatures on things like HVAC systems, heating systems and fridge freezers. For example, increasing the temperature in a fridge by just one degree Celsius could represent an energy saving of 3-4%. Or reducing the thermostat temperature in buildings by just one degree can potentially save thousands of kilowatt-hours of electricity each year.

Carbon Zero recognise that due to the nature of the business some opportunities might be more suitable than others and this would need to be determined as part of an energy audit. As the building is leased the following improvements will likely require permissions and/or investment from the owner. As a result, they may not be practical at the current facility.

- Half hourly meter data can be helpful in assessing how energy is used at different times. Analysis of the data can help to identify areas of energy wastage.
- Ensuring that all buildings are effectively insulated to prevent heat loss.

6.3 Solar PV System- Romford

6.3.1 Project Description

The Romford facility has a large, exposed roof space that could be ideal to support a Solar PV system. The building's two south facing roofs were estimated to have a total area of approximately 2,500m^2. The roof angle was assumed to be 10 degrees. At this low angle a frame may be able to be fitted to the roof which would increase the angle to around 30-40 degrees, increasing the system output. For conservatism the calculation has been based on fitting the panels directly to the roof.

The system has been based on using 345 W panels with an area of 1.68m. The south facing aspect of the norther building could host a 308-kW system with the southern building hosting a 205 kW system. The location of the Solar PV installation within the site and its generation potential is shown in the figure below.

Solar PV System Location

System Output

Northern Building

Provided inputs:	
Location [Lat/Lon]:	51.597,0.224
Horizon:	Calculated
Database used:	PVGIS-SARAH2
PV technology:	Crystalline silicon
PV installed [kWp]:	308
System loss [%]:	14

Simulation outputs:	
Slope angle [°]:	10
Azimuth angle [°]:	0
Yearly PV energy production [kWh]:	290370.5
Yearly in-plane irradiation [kWh/m^2]:	1178.99
Year-to-year variability [kWh]:	10363.41
Changes in output due to:	
Angle of incidence [%]:	-4
Spectral effects [%]:	1.7
Temperature and low irradiance [%]:	-4.77
Total loss [%]:	-20.04

Southern Building

Provided inputs:	
Location [Lat/Lon]:	51.597,0.224
Horizon:	Calculated
Database used:	PVGIS-SARAH2
PV technology:	Crystalline silicon
PV installed [kWp]:	205
System loss [%]:	14

Simulation outputs:	
Slope angle [°]:	10
Azimuth angle [°]:	0
Yearly PV energy production [kWh]:	193266.08
Yearly in-plane irradiation [kWh/m^2]:	1178.99
Year-to-year variability [kWh]:	6897.72
Changes in output due to:	
Angle of incidence [%]:	-4
Spectral effects [%]:	1.7
Temperature and low irradiance [%]:	-4.77
Total loss [%]:	-20.04

Figure 3. Solar PV Location and Inputs/Outputs

Based on the 513 kW of panels proposed PVGIS-5[1] estimates an annual expected generation of around 483,636 kWh.

6.3.2 Benefits

Installing a 513 kW Solar PV system with a generation capacity of 483,636 kWh would reduce their existing electricity requirements. With an annual consumption of 3,417,196 kWh there would still be a generation/usage deficit of 2,933,560 kWh. This deficit is increased slightly due to the return of energy to the grid in summer months.

PVGIS-5 calculates that 96% of the total energy generated (466,135 kWh) could be utilised on site. The remaining 17,501 kWh would be exported back to the grid. Reducing grid requirement by 466,135 kWh, would save in the order of 90,141 kgCO_2e annually.

The 37,501 kWh of unused electricity can be exported to the grid. The Smart Export Guarantee (SEG) makes sure that small-scale low-carbon generators receive payment for any electricity they export to the grid. It requires licensed electricity suppliers to offer export tariffs to anaerobic digestion (AD), hydro, onshore wind, and solar photovoltaic (PV) generators. The PV installation and installer must be suitably certified to qualify, with an export meter installed. The level of payment and length of contract varies depending on the purchaser of the electricity. Different suppliers' contracts may have different specifications and requirements. The market rate for feed in tariffs is currently 5 pence per kWh. Returning 17,501 kWh to the grid would earn £875 in income.

With an annual consumption of 3,417,196 kWh and onsite generation of 466,135 kWh, the 2,951,061-kWh deficit would be purchased from the grid. Based on the current energy cap rate of 34p per kWh, the purchase of energy will cost £1,003,361 per year. When income is considered, the total cost would be £1,002,486. This would generate an annual saving of £159,361 compared to the baseline.

Installation costs for such a system would likely be in the region £520,000, so at an annual cost saving of £159,361 the system would have a simple payback period of 3.25 years.

System Size	Solar Generation (kWh)	Onsite Consumption (%)	Onsite Consumption (kWh)	Annual Carbon Emissions Savings (kgCO2e)	Annual Cost Savings Estimate
513 kWh	483,636	96%	466,135	90,141	£159,361

Table 2. Solar PV System Summary

It should be noted this estimation is based on current rates and any changes to the energy supply or feed in tariffs in the coming years would impact the payback period.

Reducing energy use emissions with a PV system by 90.1 tCO_2e is a 1.4% reduction in total emissions.

6.3.3 Risks and Considerations

Using indicative industry costing of £1,000 per kW the system cost would be £513,000 and would generate enough savings to achieve a payback in 3.2 years. As solar PV systems are expected to operate for 25 years,

[1] https://re.jrc.ec.europa.eu/pvg_tools/en/tools.html#PVP

at this costing Ethypharm would have 20+ years of savings post payback. This would generate savings in the order of £3.2 million over this period.

Installation costs of Solar PV systems tend to be broad ranging and specific to each site, and therefore the above costing and payback should be used for indicative purposes only. An installation contractor will be able to provide more accurate system sizes and output once a roof inspection has been completed. Carbon and financial savings should be recalculated based on the proposal provided by the installer.

As the building is leased it will require permission from the owner and this measure should not be implemented until this has been obtained. If installation permission is denied by the owner this measure should be removed from the carbon management plan.

The lease length should also be considered prior to investing in solar PV. If the remaining lease term is less than the payback of the system, then Ethypharm would not benefit financially from the install.

Further detailed work may be required to assess if the structural integrity of the roof is able to take the weight of more solar PV panels. A detailed assessment would be required to establish how the proposed solar PV system could be integrated with the existing electrical system and if there is space on the site to install an inverter, PV distribution board and total generation meter. This work is out with the scope of this assessment.

A solar PV array will accumulate dirt over the course of its operation. This reduces the light input to the panels and the power output of the modules. The majority of accumulated dirt will be washed away by rainfall; however, bird activity may be an issue at the site as rain will not remove bird droppings easily. We have assumed there will be no shading on the solar PV array, further investigation is required to confirm this.

Cleaning agents should be used which do not damage solar PV panels, seals, or electrical connections. The wiring should also be inspected for arcing and corrosion. A maintenance cost (e.g., visual checks, inspections, and occasional cleaning) has not been factored into the business case.

6.3.4 Funding Opportunities

Bodies such as the Energy Saving Trust can offer grant funding and interest free loans for suitable energy efficiency measures. It is recommended they are contacted prior to agreeing terms with an installation contractor to obtain information on the assistance available to Ethypharm.

6.4 Air Sourced Heat Pump

6.4.1 Project Description

Air Source heat pumps (ASHPs) absorb heat from air and transfer it to a fluid, which is compressed to increase its temperature. The heat is then transferred to a central heating system from the fluid, for both heating and hot water.

The use of an Air Source heat pump would replace the requirement for a gas boiler. Air source heat pumps typical have an energy output ratio of 3:1 or 4:1, meaning they only require 1 kWh of electricity to produce 3 or 4 kWh of heat. A COP for an ASHP unit has been assumed to be 3.2, with the existing boilers having an efficiency rating of 85%. This is inline with boilers aged around 10-15 years.

6.4.2 Benefits

There are both financial and environmental benefits of this proposal, with financial and carbon savings due to reduction in gas consumption due to the heating system using electricity to operate. The table below

summaries the benefits generated by installing an ASHP at each of Ethypharm's locations. Spilsby Road's gas consumption was included with the Romford facility therefore the savings below covers both sites.

Location	With Boiler		With ASHP		Annual Savings		
	Energy Requirement (kWh)	Emissions ($kgCO_2e$)	Energy Requirement (kWh)	Emissions ($kgCO_2e$)	Energy Saving (kWh)	Emissions Savings ($kgCO_2e$)	Financial Savings (£)
Romford	6,407,844	1,169,688	1,702,084	329,149	4,705,760	840,539	£81,300
Brentwood	521,215	95,143	138,448	26,773	382,767	68,370	£6,613
Jupiter House	157,650	28,777	41,876	8,098	115,774	20,679	£2,000

Table 3 ASHP System

If Ethypharm were to install ASHPs at all locations, there would be an annual emission saving of 929.6 Tonnes CO_2e. This reduction in energy usage would generate a financial saving of £89,913 per year, based on the current energy price cap rates.

It is noted that a Solar PV would decrease both the associated emissions and running cost of an ASHP.

6.4.3 Risks and Considerations

The cost of the units should be considered prior to upgrading, so that payback periods can be calculated. A detailed assessment would be required to establish how the air sourced heat pump could best be installed, and if there is appropriate space in the building to install the heat pump unit. This work is out with the scope of this assessment.

Heat pumps and thermal store need to be correctly sized for the site in question by a suitably qualified Building Services Engineer.

The actual COP/SPF of the overall heating system is lower than the COP/SPF of the heat pump itself and may differ to that mentioned in the report, and other external variables can influence the efficiency of the ASHP, such as unit installed and technical setup.

It is important that building users understand how to operate heat pump system efficiently and effectively to avoid it costing more to run than alternative systems. The users must understand that low-temperature heat will be delivered and if increase temperature of heat delivered it will be very costly.

Any adaptations to mechanical and electrical installations should be designed and confirmed by a suitably qualified Engineer and undertaken by a suitably qualified contractor, and all relevant health and Safety regulations and legislative requirements observed. This work should be completed by a competent and suitably qualified contractor.

If a heat pump is not suitable for the space, an HVAC system may be able to provide the same improved COP value compared to gas heating therefore energy savings would remain the same as the heat pump scenario.

6.5 Staff Travel

6.5.1 Project Description

In 2022 air travel accounted for 46% of all staff travel emissions and domestic and short haul flights were responsible for 43% of air travel emissions. Introducing a travel management policy could help reduce

company emissions. The following points cover potential inclusions within this policy that would help to reduce travel emissions.

- Design a criteria for undertaking an assessment to identify if travel is necessary or could be conducted by video call.
- If travel is required, consider what travel options are available and evaluate practicality vs carbon implications.
- Create no-fly zones, for example all travel within the UK or short haul routes such as London to Paris must be conducted by means other than flight.
- When flights are required, consider class type - as business class can increase emissions by 400% when compared to economy class.
- Consider purchasing carbon credits with airline ticket purchase or annual offset for unavoidable travel.

6.5.2 Benefits

A travel management policy is designed to eliminate unnecessary travel and reduce the emissions of any essential travel. In 2022 Ethypharm recorded 185,236 air kms for domestic or short haul flights. The total emissions associated with this travel were 31.7 t/CO_2e. Had all of these journeys been taken via rail the emissions would have been 0.8 t/CO_2e.

Going forward, if 50% of these journeys could be conducted by train, Ethypharm would reduce their annual emissions by 15.5 t/CO_2e.

6.5.3 Risks and considerations

Some domestic flights may be from transfers prior to/after international travel. Any time and practical implications should be considered before including these journeys within a no-fly zone.

Journey times between London and Europe can differ significantly depending on the location therefore it is recommended a location-based approach considering alternative travel methods transport times is adopted. For example, France has banned domestic flights where the same journey could be made in less than 2.5 hours by train or bus.

6.6 Passenger Vehicles

During the reporting period Ethypharm's staff claimed 221,305 miles as part of business travel. This does not include fuel receipts from hire cars which was estimated to be a further 72,000 miles. The mileage claimed is likely from staff using personal vehicles for business purposes. As the make and model of each car is not known this mileage was classed as an 'average petrol car'.

Having staff swap out their cars for more efficient alternatives such as electric vehicles (EVs) or hybrids is difficult due to the upfront investment required and personal preferences. Instead Ethypharm could purchase electric vehicles to be used as a pool car fleet, available to all staff that need access to a car for business travel.

6.6.1 Benefits

Introducing electric pool cars would generate financial and carbon savings. It has been assumed each pool car purchased would do around 12,000 miles per year, reducing the need to use personal cars by the same

amount. This equates to 50 miles per working day. Switching this mileage from petrol to electric would save 2.3 T/CO_2e per car, per year. If Ethypharm were to purchase 4 pool cars this would save 9.2 T/CO_2e. This would require only 48,000 miles of the 293,409 miles currently undertaken to be done so via the new electric pool cars.

Ethypharm currently pays mileage at 45p per mile. By purchasing four pool EVs and reducing personal car mileage by 48,000 miles, expenses costs would be reduced by £21,600 per year. The cost for charging these vehicles could be £0 if they are charged at Romford after a solar PV system was installed. If using public chargers, the cost is estimated to be £12,480. Depending on charging locations the total saving would be between £9,120-£21,600 per year.

6.6.2 Risks and considerations

The savings calculation, based on 4 cars, would require 16% of existing annual car journeys to be made by an EV. The purchasing of EVs does not guarantee savings as staff would have to use them when available for savings to be generated. If the cars are not used for the estimated 12,000 miles, the financial and carbon savings would be reduced.

To ensure the suitability of an EV for each journey staff would have to consider total mileage and available charging locations. This may be better suited for shorter day trips so the car can be returned to the office overnight to be charged.

When considering total financial savings, the lease cost of each vehicle should be considered. With lease agreements available from around £5,000, Ethypharm should be able to make financial savings even if all vehicles were charged via public chargers.

6.7 Distribution of Goods

6.7.1 Project Description

The internal distribution of materials between Ethypharm locations accounted for about 60% of the supply chain emissions. Ethypharm currently owns two heavy goods vehicles (HGVs), with capacity of approximately 21 tonnes and 7.5 tonnes. Due to the low daily mileage (approximately 43 miles) these journeys could be undertaken by electric alternatives.

Swapping out these vehicles for electric alternatives may be viable solutions once they have reached the end of their lease or working life span.

6.7.2 Benefits

While electric HGVs have been rolled out this year, they are still in the early development phase and as a result costs are expected to be high. An alternative solution would be to change the 7.5 tonne vehicle for two electric vans that could transport the same weight. Due to the short daily mileage charging at the facility overnight should be sufficient.

Changing the 7.5t HGV to two electric vans (or a single van doing double the mileage) would reduce annual emissions by 8.8 t/CO_2e. This saving includes running both vans fully loaded compared to the single HGV. If

on certain days, the material could be delivered by a single journey the emissions saving would increase further.

6.7.3 Risks and considerations

For this solution to be financially viable the cost of two vans compared to a replacement HGV should be assessed. The alternate option requiring consideration is a single van making double the journeys. Average daily material weights, distances, delivery schedules and driver availability should be considered when assessing the available options.

This cost benefit analysis should also consider savings generated from reduced running costs by switching from diesel to electric. The running costs could be reduced further if the vehicles were to charge via Ethypharm's onsite Solar PV system, if this were installed.

The main barrier to electric HGVs currently is the lack of charging infrastructure and lengthy charging times using available charging points. This may not be an issue for Ethypharm as electric HGVs have a range of 200-300 miles before requiring recharging. An electric HGV could complete its assumed daily mileage and be recharged at an Ethypharm facility overnight, without causing charging delays.

6.8 Raw Materials

6.8.1 Project Description

The embodied emissions from raw materials used by Ethypharm account for 48% of the total 2022 emissions. This calculation has been based on products being produced from primary materials. If recycled materials could be utilised this could significantly lower Ethypharm's carbon footprint.

6.8.2 Benefits

Due to the nature of application, changing material types is not always possible. As the emissions from raw material use have a significant impact on the annual footprint it is recommended a more in-depth review is conducted of the materials used and the feasibility of changing to less carbon intensive alternatives. The table below highlights the potential savings that could be created by using recycled material.

		Primary Material		Recycled Material		Saving
Material	Quantity Used in 2022 (T)	Emissions Factor (T/CO2e per T)	Embodied Emissions (T/CO2e)	Emissions Factor (T/CO2e per T)	Embodied Emissions (T/CO2e)	Emissions (TCO2e)
Aluminum	3	6.670	20.01	1.690	5.07	14.94
Glass	831	1.402	1,165.70	0.823	684.07	481.63
Plastic	468	3.276	1,533.50	2.749	1,286.44	247.06

Table 2 Recycled Materials Potential Savings – Examples

If all aluminum, glass and plastic used by Ethypharm was made with recycled material Ethypharm's annual footprint would be reduced by 743.6 T/CO_2e.

Due to the medical nature of the materials required, switching to recycled material is not always possible. It is recommended a review is undertaken to identify what packaging types could be made from recycled material while still meeting the requirement standards.

If Ethypharm were able to switch 20% of these materials away from primary production to recycled sources, the annual footprint would be reduced by 148.7 T/CO_2e.

Going forward, Ethypharm should request recycled content data from their suppliers so any reductions in emissions can be tracked.

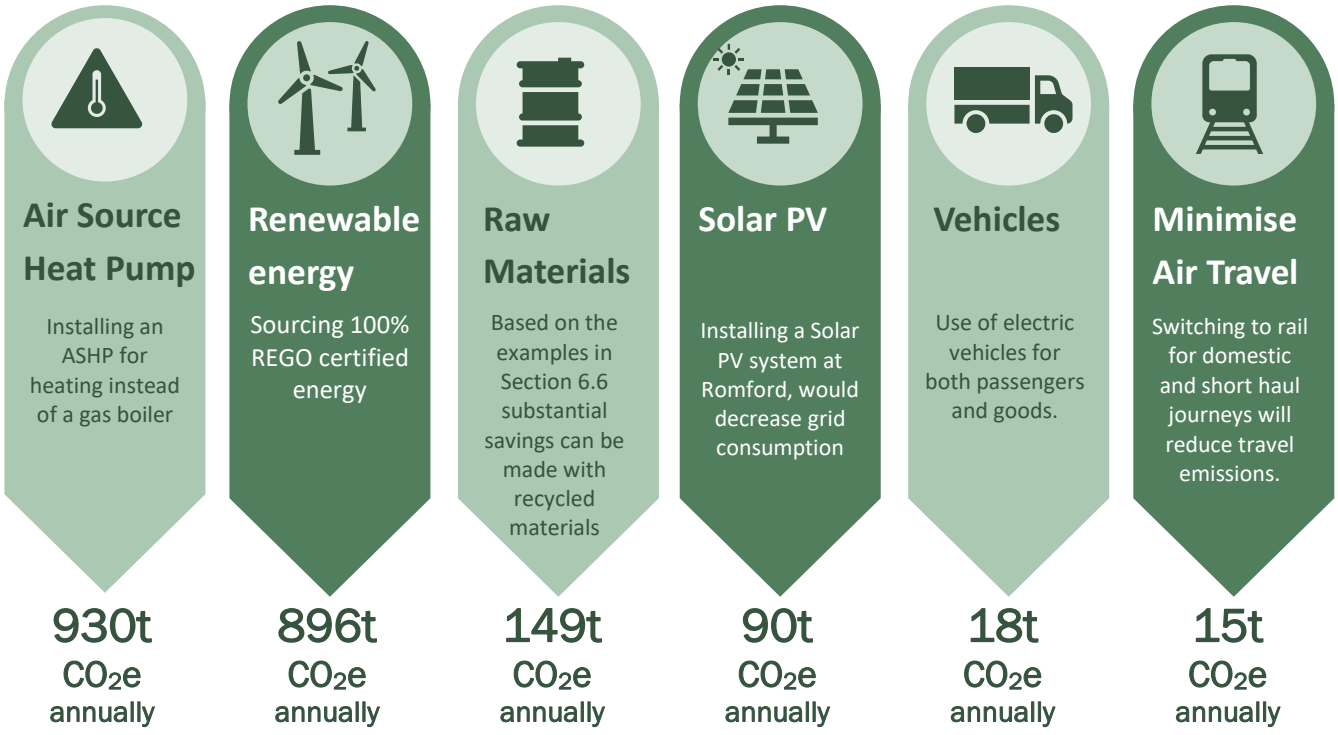
6.8.3 Risks and Considerations

While a potential reduction target of 20% has been calculated for increasing the recycled content, the suitability of recycled material is not known at this point. A suitability review of packaging material with recycled content should be conducted. Once the suitability has been assessed the 20% target should be amended to reflect what Ethypharm believe to be an achievable target.

Retrieving recycled content data from suppliers is not always possible especially when purchasing products instead of pre-manufactured raw materials. This info may need to be requested from further up the supply chain which could be out of Ethypharm's control.

7. Project Summary

The following key projects if implemented will have the largest impact on the business' carbon footprint and/or are the most realistic projects to be pursued with quantifiable savings.



It is noted that the above projects are considered separately and may have overlapping benefits.

A number of opportunities have been identified and emissions savings quantified. If Ethypharm believe the scale set out in this plan is not achievable or it could be surpassed, then this plan can be updated. Examples

of this could include adjusting the number of EVs that could be purchased, adjusting the recycled material content target or removing a measure completely if Ethypharm do not believe it to be suitable or achievable.

Based on combining REGO certified energy and installing heat pumps some 1,825.2 tonnes of CO_2e could be saved in the next 5 years with minor changes and some investment.

In addition to these projects with significant carbon saving potential, Ethypharm could increase savings further by increasing recycled material content, switching to EVs and reducing air miles.

Larger projects such as installing a Solar PV system could also be considered. It would require further assessment and consideration regarding suitability, upfront investment and landlord permissions.

8. Target Setting

As outlined in section 5.0 of this report continued business growth (assumed to be 3%) is likely to cause an increase in annual emissions. It is estimated annual emissions will be 7,566 T/CO_2e by 2027, an increase of 1,051 T/CO_2e. To achieve a 10% emissions reduction from the 2022 baseline (6,516 T/CO_2e), Ethypharm would need to reduce annual emissions by 1,702 T/CO_2e by 2027.

The figure below outlines the projected annual emissions accounting for business growth, no business growth (baseline) and with a 10% reduction target.

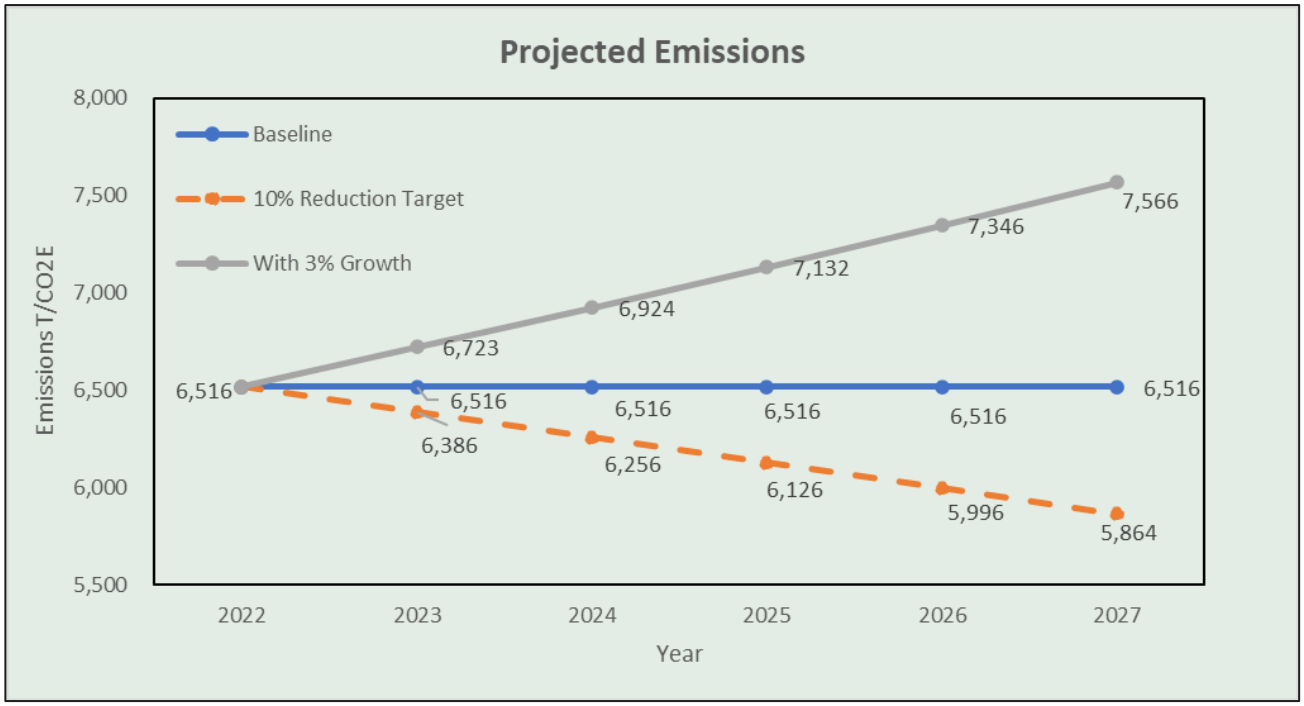


Figure 4 Projected Emissions Scenarios

With the introduction of the following mitigation measures outlined in this report the annual emissions would be below the 10% reduction target. As implementation timeframes are not yet known, an estimated year has been included to highlight the impact the measures have on the annual footprint.

2024 Purchase of REGO approved energy reducing the annual footprint by 896 T/CO_2e, compared to baseline levels.

2024 Introduction of a travel managment plan reducing air travel by 50%, saving 15 T/CO_2e, compared to baseline levels.

2025 Ensure 20% of materials purchased are from recycled sources, saving 149 T/CO_2e, compared to baseline levels.

2026 Install ASHPs in all locations reducing emissions by 930 T/CO_2e, compared ot baseline levels.

Figure 5 below highlights the estimated impact of these projects on annual emission levels. As no projects are planned to be introduced in year 1 (2023) the emissions would increase with business growth. While the implementation years may change the final emissions values for 2027 should be consistent.

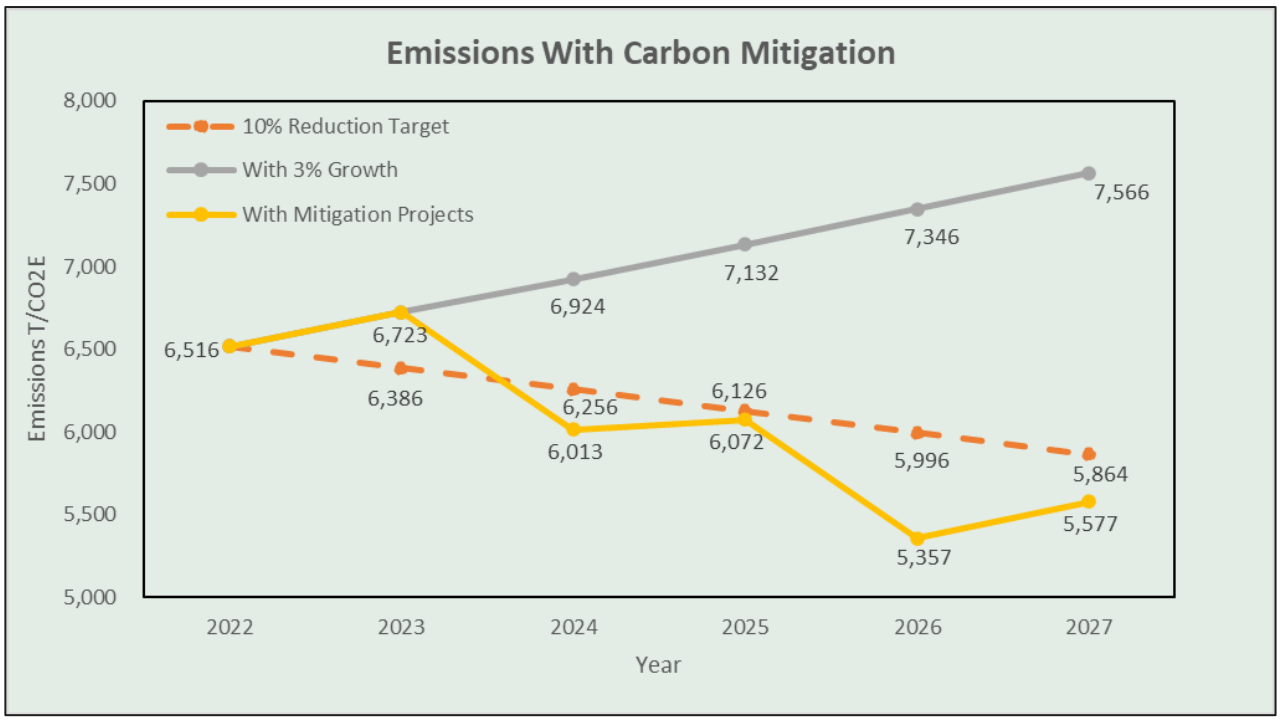


Figure 5 Projected Emissions with Carbon Mitigation Projects

If Ethypharm were able to introduce all measures highlighted in this report the final 2027 emissions value could be reduced by a further 108 T/CO_2e.

The projects presented within this Carbon Management Plan anticipate that carbon emissions will decrease through the implementation of these reduction opportunities by a minimum of:

Ethypharm is anticipated to achieve this emissions reduction target if opportunities are explored, and solutions implemented within this timespan. There is potential for the organisation to exceed this 10% target depending on level of implementation of opportunities outlined in Section 6.

9. Other Areas of Potential Improvement

The emissions associated with refrigerant usage in 2022 were 289 tonnes CO_2e, which accounted for 8% of the total emissions. The emissions associated with the use of refrigerants vary greatly depending on the individual refrigerant type used. For example, these can range from less than 1 kg CO_2e per kg of refrigerant used to over 20,000 kg CO_2e per kg of refrigerant. Ethypharm's most used refrigerant by weight (R410A) emits 2,088 kg CO_2e per kg of refrigerant used. A review could be conducted into current use and the feasibility of switching to less carbon intensive refrigerants where possible.

Changing refrigerant types of existing units is not always possible therefore the most efficient time to do so is when a unit reaches the end of its operational life and requires replacing. While looking for a new unit the emissions impact of the refrigerant required should be considered. It is recommended a review of Ethypharm's existing units is undertaken to determine the current refrigeration type used and a potential replacement date for the unit.

As Ethypharm increases the number of units with less carbon intensive refrigerants the emissions from annual top up values will decrease. In time this will help to reduce Ehypharm's annual footprint. As the number, age and operational lifespan of the existing units are not currently known the savings potential cannot be accurately forecasted and included in the carbon management plan at this stage.

10. Management and Delivery of the Carbon Management Plan

In order to ensure that there is effective and ongoing ownership of the Carbon Management Plan, it is important to have a fully defined governance structure.

The Carbon Management Plan and carbon saving target will be approved by internal management, providing endorsement and a clear commitment at the highest level, reinforcing the need for action across the business.

The specific objectives of the Carbon Management Plan will be included in the organisation's strategic plan and other high-level plans. Key stakeholders at all levels of the business will provide overall support for promoting a culture of carbon reduction. The key to success of this Carbon Management Plan is effective engagement within the different areas of the business.

11. Progress Reporting

This Carbon Management Plan is considered as a 'live' document – envisaged to change with the needs and scope of business operations.

To ensure the Plan remains fit for purpose the document should be reviewed annually, with attention to:

- Progress towards the overall carbon reduction target (in terms of tCO_2e)
- Progress of identified carbon reduction projects, including;
  - Any financial savings achieved
  - Costs of implementing projects
  - Wide benefits of projects

The annual progress review shall be incorporated within annual Business Carbon Assessment reporting.

12. Contact Details

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