PRIVATE AND CONFIDENTIAL

Carbon Management Plan
At WB Alloys Ltd.

Written for WB Alloys Limited
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Accountability for this Document

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Contents

Executive Summary

This report was commissioned to develop a carbon management plan (CMP) for WB Alloys. The purpose of a CMP is to identify and quantify the costs and carbon dioxide emissions associated with energy, water, transport fuel consumptions, waste management, and purchased products and materials, and to propose opportunities to enable the organisation to reduce operating costs and carbon dioxide emissions.

The original scope of this project was to identify and estimate the Scope 1, 2 and 3 greenhouse gas emissions. Whilst this remains the aspiration it has not been possible to complete a comprehensive appraisal of Scope 3 GHG emissions within the timescale permitted for the completion of this project. This interim report presents the results of a more limited assessment of WB Alloy's carbon footprint, and the aspiration remains to complete and include Scope 3 GHG emissions at a later date.

The baseline carbon dioxide emissions arising from scope 1, 2 and 3 greenhouse gas emissions associated with electricity, natural gas, transportation, water and waste management at WB Alloys were estimated to be 271.78 tonnes CO_2e per year.

This project has identified opportunities to reduce greenhouse gas emissions by 146.52 tonnes CO_2e per year over a 5 year period, which is a 61% decrease compared to baseline. The cost to implement these measures was estimated to be £66,235 and estimated savings could be £22,540 per year, giving this CMP a simple payback time of 2.94 years.

These opportunities are summarised in the table below.

Table 1: Summary of carbon reduction projects and estimated cost and emissions savings

Project Reference	Traffic Light Status	Project title	Person responsible	Estimated Capital Cost	Estimated annual savings		Estimated payback (years)	Financial incentives available
					£	Tonnes CO_2e		
CAR 1	Green	Move business to new premises		Unknown	£2,599	65.06	N/A	None
CAR 2	Amber	Install roof mounted solar PV		£45,783	£6,693	5.97	6.84	Interest free loan / cashback available
CAR 3	Amber	Reduce emissions from company fleet		£20,452	£13,248	74.37	4.14	Plug-in grant
CAR 4	Green	Reduce emissions from business travel		N/A	N/A	1.1	N/A	None
TOTAL				**£66,235**	**£22,540**	**146.5**	**4.66**	

Summary of Recommendations

Move business to a new premises:

- In August 2021 WB Alloys moved to a recently refurbished building. This is likely to reduce energy consumption for heating and lighting. This has been included as a measure in the CMP as it occurred after the baseline year.

Install roof mounted solar photo-voltaic:

- It is recommended that WB Alloys purchase and install a 36kWp roof mounted solar photo-voltaic system installed on the main workshop. Additional cost and carbon savings could be realised if the PV system were combined with battery storage which would reduce the quantity of electricity generated by the PV which is exported to the electrical distribution network, maximizing cost savings to the company.

Reduce emissions from company fleet:

- It is recommended that WB Alloys reduce their emissions from fuel consumption for company vehicles by introducing electric vans to the company fleet in place of diesel vans, and electric cars in place of diesel-fuelled pick up trucks. Replace existing vans with 4x electric vans. Phased replacement of 5x pick ups over 5 years.

Reduce emissions from business travel:

- It is recommended that WB Alloys prioritise train and ferry journeys over domestic flights to reduce their emissions associated with business travel.

Further carbon and cost reduction opportunities are likely at WB Alloys, however this will take more time than is available to complete this project and require more data and information to be supplied by WB Alloys.

Carbon Management Plan Strategy

1.1 Introduction

WB Alloy Welding Products Ltd (WB Alloys) was established in 1998. The company has its head office in Glasgow and 5 further sites across the UK, Ireland and the UAE. WB Alloys is a welding consumables manufacturer who supply a range of high quality, high integrity products for both welding and cutting applications. The company also offers cutting and welding services and design and manufacturing solutions. Services include calibration, gas hose testing, PAT testing repairs and certification.

WB Alloys are a forward thinking company and want to take a coordinated approach to carbon management. As such, Tomson Consulting Ltd (TCL) were sought to develop a structured carbon management plan CMP to set objectives and targets to implement carbon reduction projects over the next five years.

The scope of this draft carbon management plan includes:

- **Scope 1 greenhouse gas emissions (GHG) associated with natural gas combustion and on-site transport fuels,**
- **Scope 2 GHG emissions associated with on-site consumption of electricity imported from the external electricity distribution network,**
- **Scope 3 GHG emissions associated with transportation, waste management, water and effluent management to WB Alloys.**

A baseline carbon footprint which includes GHG emissions from these sources was developed. This identified the quantities and costs associated with GHG emissions by Scope and source. Subsequently, opportunities to reduce emissions were identified and developed into this Carbon Management Plan.

The timeline for the development and implementation of this plan is as follows:

Stage 1

Determine key individuals and create a carbon management team.

Stage 2

Set a baseline to define the existing position and the target. The baseline year precedes the following years of this Plan, i.e., a baseline year of 2022 would precede targets set for carbon reduction from 2023 to 2027. Establishing a baseline requires collecting energy consumption data and completing an Excel-based baseline tool which establishes the carbon footprint of the organisation.

Stage 3

Produce a prioritised shortlist of projects by identifying projects and actions that will reduce carbon emissions, energy usage and costs at WB Alloys. Use the identified and implemented carbon savings from this action plan to set the achievable target in reduction in carbon emissions over 5 years. Write brief policies for communicating the carbon management plan to both staff and customers and carbon reduction policies for procurement, maintenance, and staff training. All policies and carbon reduction projects then should be finalised and reviewed with Senior Management prior to implementation.

Stage 4

Implement the Plan. Action the carbon reduction projects, monitor progress, and communicate success to staff and customers.

1.2 Drivers for Carbon Management

The following are key drivers to reduce carbon emissions for WB Alloys.

1.2.1 The costs of climate change

Climate change is commonly accepted to be the greatest threat to our environment, caused by the levels of greenhouse gases (including carbon dioxide) released into the atmosphere. In the UK, business produces almost half of the carbon dioxide emissions. Even one small office can emit three to five tonnes of carbon dioxide per annum.

Many businesses across Europe are being impacted financially by more extreme weather such as flooding and droughts. Flooding risk is forecasted to increase 60% by 2035 (Environment Agency). In 2019 the bill from climate related damage across Europe was estimated to be €18 billion[1].

Reducing greenhouse gas emissions at the business level will contribute towards climate change mitigation. Every business has a role to play in reducing their emissions today, to reduce the future impacts of climate change.

1.2.2 Reducing costs from use of utilities

A structured approach to energy efficiency cuts costs, improves competitiveness and safeguards profits. Energy efficiency improves the bottom line, as cost per output drops.

Business energy costs have increased substantially over the previous years and continue to increase. The average price (excluding Climate Change Levy) for electricity between July and September 2022 was 21.56 pence per kWh, up by 63% or 8.34 pence per kWh compared with July to September 2021, and for gas was 6.53 pence per kWh, which increased by 124% or 3.62 pence per kWh over the same period[2].

By implementing the actions identified in this plan, WB Alloys could save the equivalent of £22,540 per year when compared to business as usual. It will also help the business to stabilise energy costs as they increase further or fluctuate.

1.2.3 Supply chain pressure

Corporate awareness of the benefits of reducing greenhouse gas emissions and penalties of not doing so have increased significantly. It is important for suppliers like WB Alloys to keep up with the commitments made by service providers, who are increasingly committing to reporting on and reducing their Scope 3 emissions and scrutinizing their supply chains for environmental performance. Having a credible carbon management plan in place will enable WB Alloys to remain at the forefront of their industries and provide products to clients who have commitments in place around their supply chain emissions.

1.2.4 Improve staff working conditions

Simple changes can improve working conditions for staff, for example, through making heating and lighting more effective and appropriate for the workspace, reducing the quantities of waste packaging which need to be handled or by releasing funds that could be invested to make their roles easier.

1.2.5 Government Regulations

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, which amended the Climate Change (Scotland) Act 2009, set targets to reduce Scotland's emissions of all greenhouse gases to

net-zero by 2045 at the latest, with interim targets for reductions of at least 56% by 2020, 75% by 2030, 90% by 2040.

1.3 Objectives

WB Alloys will use this carbon management plan to achieve the following goals:

Short Term

- Check and report progress on the opportunities being implemented by the carbon management plan.
- Set and publish performance improvement targets.

Medium Term

- Identify cost-effective energy efficiency measures to implement.
- Consider life-cycle energy costs for all new projects and modifications to existing buildings and equipment.

Long Term

- Reduce environmental emissions and costs associated with energy, water, waste, and transport.

1.4 Scope and Boundary

The scope of this carbon management plan (CMP) includes scope 1, 2 and, a the time of writing, this draft CMP, selected scope 3 greenhouse gas emissions associated with energy, water and waste management at WB Alloys' Glasgow head office. The areas and activities included within the scope of this CMP are:

- Imported electricity consumption,
- Natural gas consumption,
- Greenhouse gas emissions associated with waste management,
- Greenhouse gas emissions associated with business transportation,
- Greenhouse gas emissions from water supply and wastewater treatment.

It does not include GHG emissions associated with:

- Purchased goods and services,
- Buildings and equipment (capital purchases),
- Company investments,
- Upstream or downstream transport, use, consumption, and disposal after the WB Alloys factory gate,
- Any franchises or leased assets the company owns or controls.

1.5 Data Sources and Emission factors

The following data sources were used to estimate the 2021 baseline GHG emissions within scope at WB Alloys (Table 1). In August 2021, WB Alloys moved to a new site consisting of a more modern and thermally efficient building. This led to a reduction in monthly gas and electricity consumption. For the baseline, data from January 2021 – August 2021 has been taken and extrapolated to estimate the company's carbon footprint before they moved sites. This allows the carbon savings made by moving to a more efficient building to be included in the CMP.

Table 1: Source of data used to calculate GHG emissions baseline

Data	Sources	Comments
WB Alloys Head Office		
Electricity Consumption	Monthly consumption and cost data for January 2021 – October 2022.	Half-hourly data not available.
Water Consumption	Monthly meter readings from water bills for the mains water supply for the January 2021 – November 2022.	Including usage and wastage.
Company Transport	Annual mileage of company vehicles. Business travel journey type, location of departure and destination.	Make/model, engine size, fuel type and carbon emission factor of company vehicles reported. Business travel including flights, trains and ferries. Costs estimated based on journeys described.
Waste Management	Monthly quantities and costs of different waste categories provided.	Size of bin/skip reported.

GHG emission factors were obtained from 2021 Government emission factors for on-site utility consumption, business travel and waste management[1]. Carbon emission factors for company fleet vehicles were provided by WB Alloys.

In the future it is hoped to include the potential GHG emissions and costs associated with Scope 3 GHG emissions. This is likely to comprise the greatest proportion of CO_2e emissions (typically >90% of total emissions). However, this has not been possible at the time of writing this report.

1.6 Carbon Reduction Target

- The baseline year for WB Alloys carbon management plan carbon emissions is based on data from January 2021 – August 2021.
- Overall, baseline greenhouse gas emissions for scopes 1, 2 and selected scope 3 activities associated with WB Alloys were estimated to be 271.78 tonnes CO_2e per year,
- WB Alloys aims to reduce the CO_2e emissions for scopes 1, 2 and selected scope 3 emissions by 60 % by 2026 compared to its 2021 baseline.

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[1] Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021

2.0 Emission Baseline and Projections

2.1 Overall Scope 1, 2 and 3 Baseline Emissions

Total scope 1, 2 and selected scope 3 greenhouse gas emissions associated with WB Alloys and within the scope of this project for the baseline year (2021) were estimated to be 240.64 tonnes CO_2e (table 2 below), of which the majority (77%) are associated with Scope 1 (figure 1).

Table 2: Breakdown of CO2e emissions and costs by scope at WB Alloys

CO_{2e} Emission Contributor	**Baseline Cost**		**Baseline CO_{2e} emissions**	
	£/year	**%**	**Tonnes/year**	**%**
Scope 1: Natural gas, fuel for transportation	£81,661	79	185.68	77
Scope 2: Electricity	£11,620	11	15.76	7
Scope 3: Water, waste management, business travel	£9,953	10	39.20	16
Total	**£103,234**	**100**	**240.64**	**100**

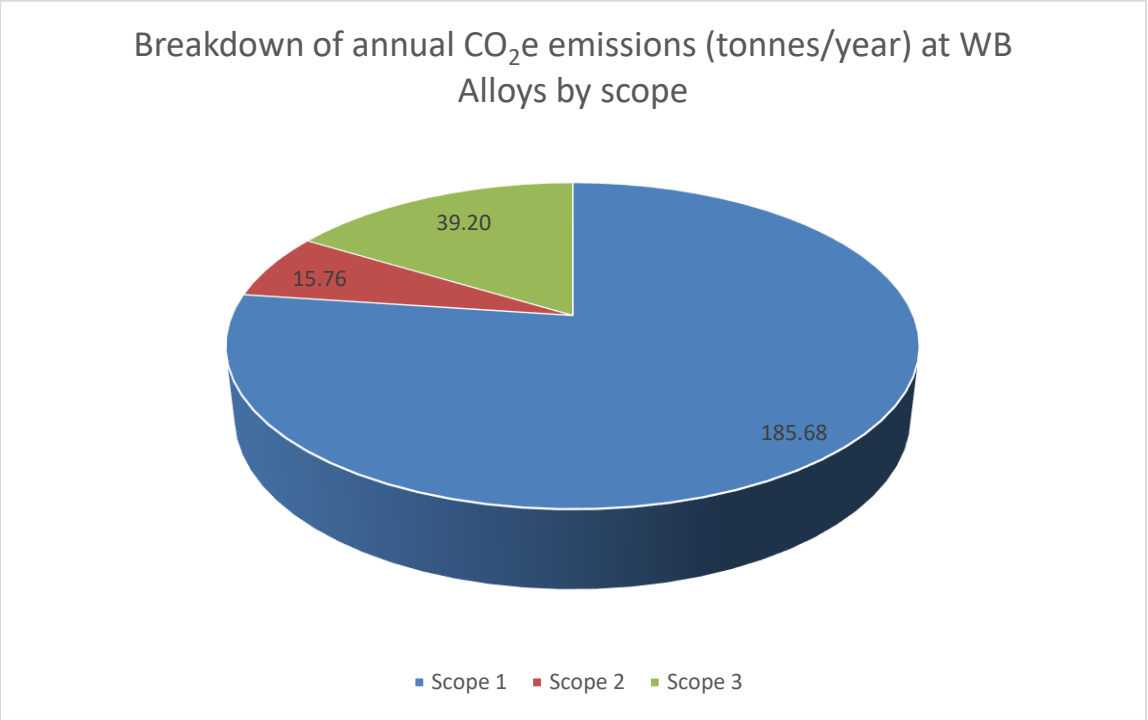

Figure 1: Breakdown of annual CO_2e emissions in tonnes at WB Alloys.

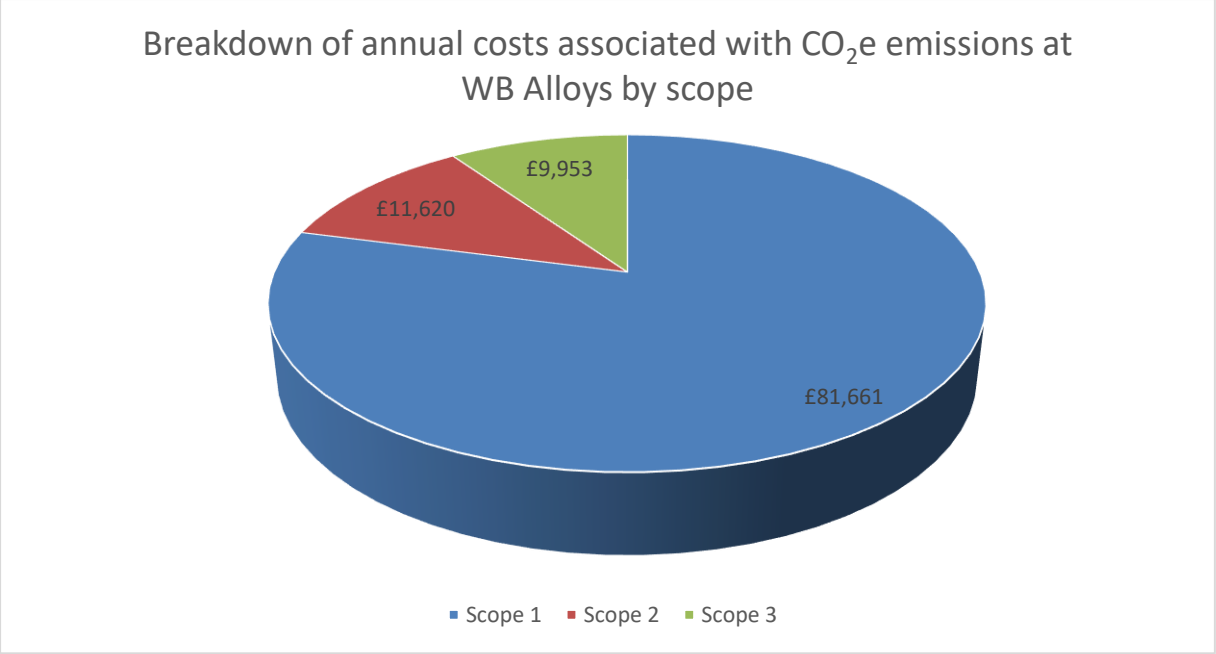

Figure 2: Breakdown of annual costs associated with CO_2e emissions by scope at WB Alloys

Figures 1 and 2 indicate that the largest proportion of emissions and costs is from Scope 1 emissions, including consumption of natural gas and fuel for transportation. It is likely that if data for more Scope 3 categories were included in this carbon footprint, the share of emissions from Scope 3 would increase.

When determining the most appropriate projects to reduce carbon emissions it is vital to identify where the greatest savings may be made and to target these areas accordingly. Figure 3 and Figure 4 give an overview of the carbon emissions and costs from the baseline year for different categories of emissions. Most emissions (50%) within the reduced scope of this project are associated with transportation (figure 3).

Table 3: Baseline greenhouse gas emissions within the scope of the carbon management plan at WB Alloys

CO_{2e} Emission Contributor	**Baseline Cost**		**Baseline CO_{2e} emissions**	
	£/year	**%**	**Tonnes/year**	**%**
Site Energy Use	£22,623	22	85.31	35.45
Transport	£73,733	71	120.42	50.04
Water	£1,774	2	0.04	0.02
Waste	£5,104	5	34.87	14.49
Total	**£103,234**	**100**	**240.64**	**100**

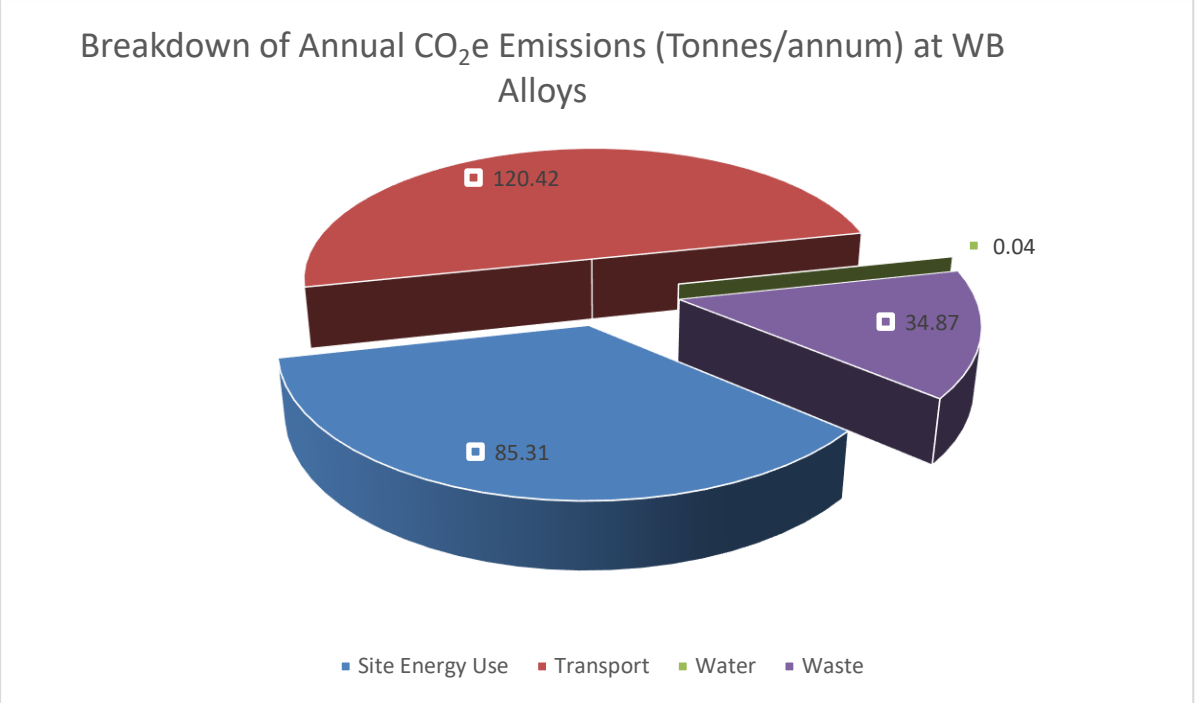

Figure 3: Summary of Scope 1, 2 and selected Scope 3 greenhouse gas emissions at WB Alloys for the baseline year

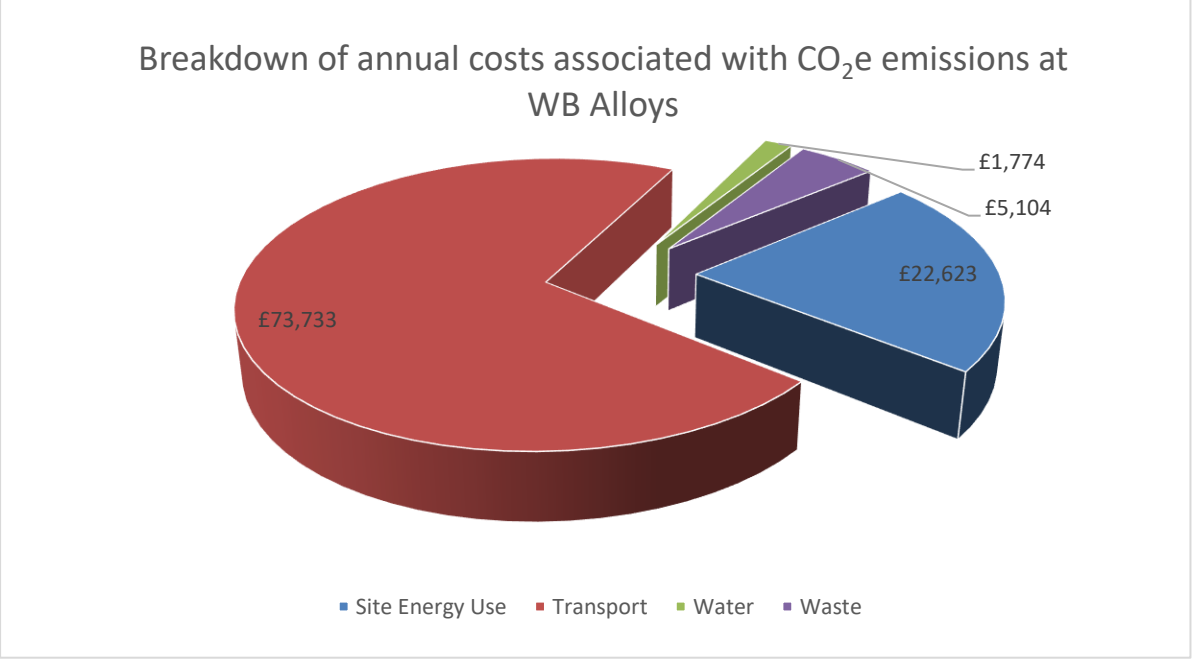

Figure 4: Summary of costs associated with greenhouse gas emissions included in this project for baseline year.

Figure 3 and Figure 4 illustrate that, based upon the data supplied, most of the costs and carbon emissions based upon site activities at WB Alloys come from emissions associated with transportation, followed by energy use (natural gas and electricity). It is likely that if data for purchased goods and services had been included in this CMP it would make up the largest proportion of cost and emissions. Typically Scope 3 greenhouse gas emissions are at least 90% of a companies overall greenhouse gas inventory (carbon footprint).

2.2 Transportation emissions

A breakdown of transportation costs and CO_2e emissions indicates that most costs and CO_2e emissions come from the company's fleet of vehicles. Fuel for company vehicles was reported to cost £70,658 in the baseline year and was estimated to contribute 116 tonnes CO_2e per year (96.5% of all transportation emissions). Within the company fleet, most emissions come from pick-up trucks, followed by diesel vans.

Table 4: Costs and CO_2e emissions associated with employee mileage in company fleet vehicles and other business travel at WB Alloys during the baseline year. Costs in red are estimated.

	Mode of Transport	Cost		CO_2e emissions	
		£/year	%	Tonnes/year	%
Company vehicles	Petrol car	£70,658	95.83	9.61	7.98
	Diesel car			0.00	0.00
	Diesel van			32.44	26.94
	Electric car			0.00	0.00
	Hybrid electric car			7.79	6.47
	Pick-up			66.29	55.05
Business travel	Domestic Flight	£810	1.10	1.17	0.97
	Short Haul Flight	£1,170	1.59	2.12	1.76
	Long Haul International Flight	£700	0.95	0.91	0.76
	Ferry	£250	0.34	0.06	0.05
	Train	£145	0.20	0.03	0.02
Total		**£73,733**	**100**	**120.42**	**100.00**

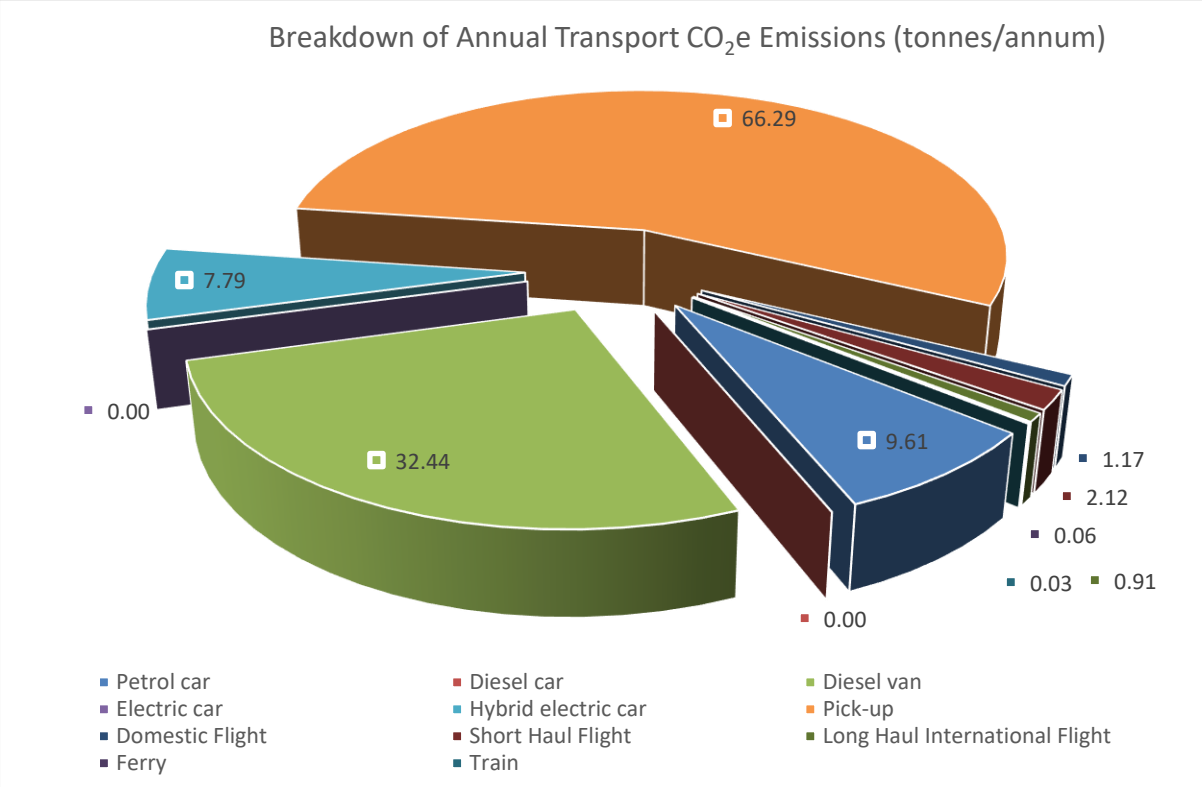

Figure 5: Breakdown of transportation CO_2e emissions by vehicle type for business travel at WB Alloys in the baseline year.

Data provided by WB Alloys indicated that over the baseline period there were 16 company vehicles with active fuel cards. The company fleet consists of 1x diesel car, 2x electric cars, 6x hybrid cars, 3x petrol cars, 5x diesel/heavy oil pick-ups, and 9x diesel vans. Figure 6 shows reported employee mileage by type of vehicle. A list of business travel was also supplied, which included trips taken by aeroplane, ferry and train, to locations across the UK, Europe and to Dubai.

There is a risk that baseline emissions associated with transportation could be underestimated due to COVID-19 restrictions affecting international travel during the baseline year. This has been accounted for in the business as usual scenario assumptions, by assuming a 40% increase in transportation from 2021 – 2022.

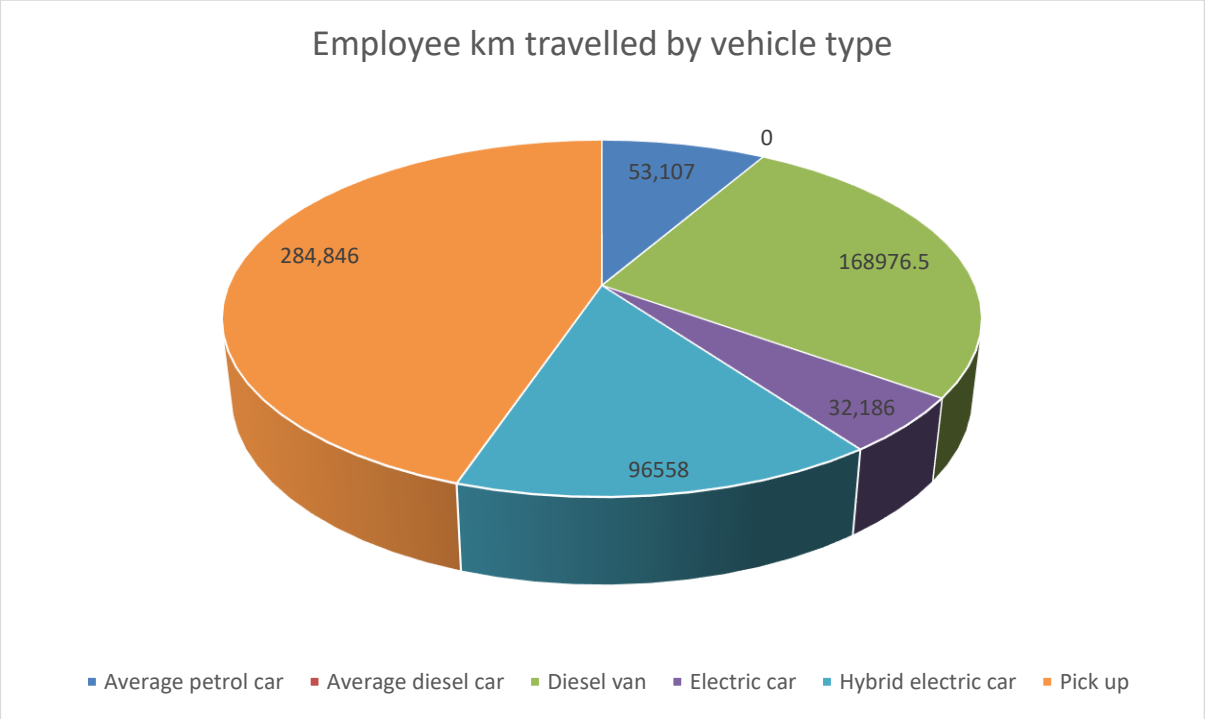

Figure 6: Annual km travelled in company vehicles by vehicle type.

2.3 On site energy use

Based upon the billing information supplied for this project, in the baseline year electricity consumption contributed 15.76 tonnes CO_2e per year, and natural gas consumption contributed 81.53 tonnes CO_2e per year. This is estimated annual consumption from before the company moved sites in August 2021 (Table 5).

Table 5: Estimated baseline greenhouse gas emissions associated with on-site consumption of electricity and natural gas at WB Alloys.

Utility	Baseline Cost		CO_2e emissions		Baseline Total kWh
	£/year	%	Tonnes/year	%	
Electricity	£11,620	51	15.76	18.47	74,325
Gas	£11,003	49	69.55	81.53	380,067
Totals	**£22,623**	**100**	**85.31**	**100**	**454,392**

At present there is no sub-metering of electricity consumption at WB Alloys and so it is not possible for the company to accurately monitor trends in electricity consumption, costs and GHG emissions

which could identify potential energy efficiency opportunities or monitor electrical efficiency improvements.

Consequently, to improve understanding of electricity consumption at their sites, it is recommended that WB Alloys regularly access and review half hourly electricity consumption data, which may be available for the Hillington site.

Half-hourly electricity meter data is extremely valuable to identify:

- The extent and time of peak electrical demands,
- The quantity and proportion of electricity consumption and cost which occurs continuously regardless of need or occupancy,
- Regularly occurring increases in electricity consumption which may be associated with equipment and facilities that are operating without effective control.

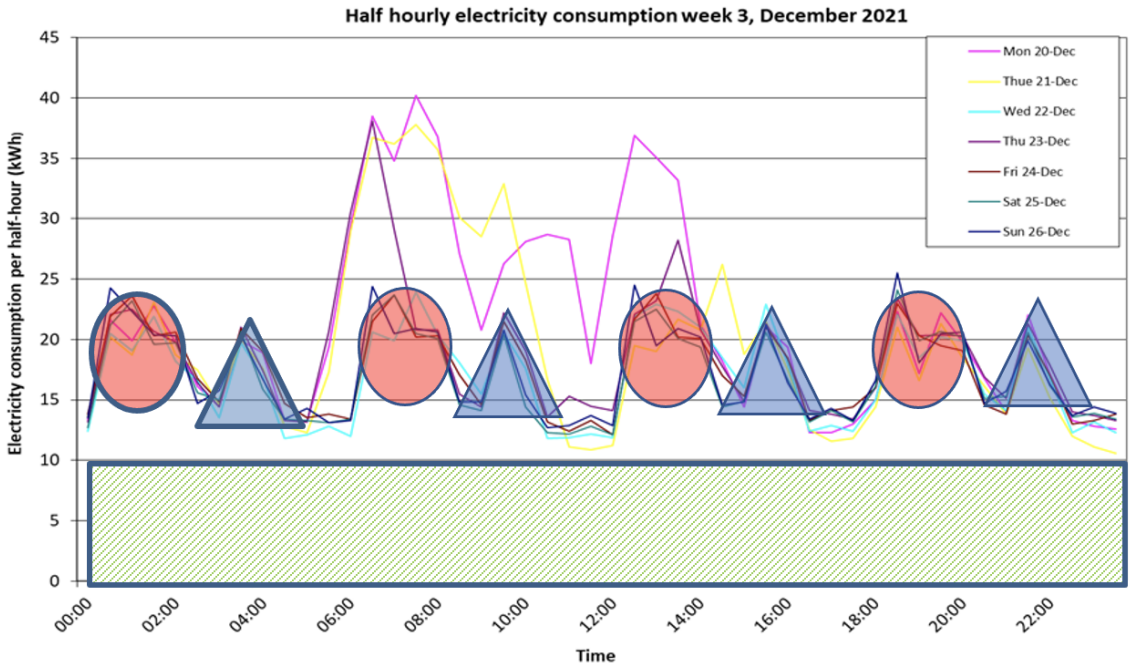

Figure 7: Example of half-hourly electricity data at a site highlighting areas to improve electrical efficiency through reducing continuous background consumption (green) , operation of cyclical demand (blue triangles) and other recurring equipment (red).

It is strongly recommended that WB Alloys identify if half-hourly electricity meter readings are available for the site electricity supply. If so, the company should regularly download this data and use this to analyse electricity demand and consumption, particularly during "non-working" periods.

2.4 Projection and Value at Stake

Projections and Value at Stake figures are used to highlight the difference between the 'Business as Usual' scenario and the target of reducing carbon emissions.

The Business as Usual (BAU) scenario predicts the effect on cost and carbon emissions of taking no action to limit the organisations increasing consumption of energy, water, as well as the extra cost of

energy associated with inflation and increased business turnover. The assumptions used in the BAU calculation are highlighted in Table 6.

Table 6: Business as usual assumptions

Aspect	Assumption
Energy costs	Assumed a rise of 80% per annum in year 1; 17% in year 2; 10% in year 3, 5% in year 4 and 3% in year 5.
Water costs	Assumed a rise of 5% per annum in years 1 to 3; followed by a 3% increase in years 4 and 5
Waste management	Assumed an increase of 10% in year 1, 6% in year 2, 5% in year 3, 4% in year 4 and 3% in year 5
Increase in transport	Assumed an increase of 40% per annum in year 1; 10% in year 2; 5% in years 3 and 4, and 3% in year 5.

2.3.1 BAU and Value at Stake Scenarios based on Carbon Dioxide Emissions

Figure 8 below shows predicted carbon dioxide emissions over the period from the baseline to the end of five-year plan. It shows both 'Business as Usual' (BAU) and targeted emissions.

Figures for BAU growth indicate an expected average 5% year-on-year increase in emissions, based on WB Alloys predictions for business growth over the next 5 years.

The target to reduce carbon emissionsis shown as the blue line. This reduction in emissions requires the introduction of constant year-on-year carbon savings initiatives to be successful. Close monitoring and management of the carbon reduction projects will be required if annual targets are to be met.

The difference between the BAU and predicted target figures gives the overall 'value at stake'. The cumulative value at stake over the five years of the plan for WB Alloys is 1,117 tonnes CO_2e.

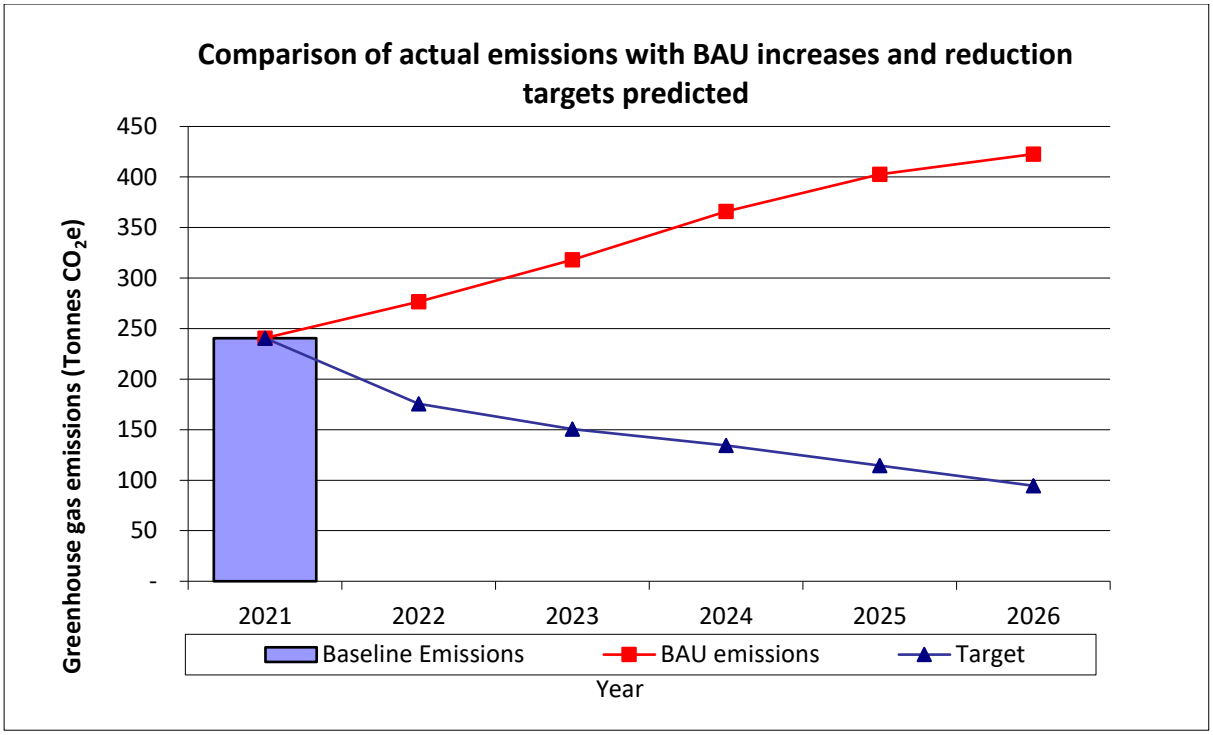

Figure 8: Emissions projection for business as usual scenario compared to carbon reduction targets at WB Alloys

2.3.2 BAU and Value at Stake Scenarios based on Cost

Figure 9 below shows the Business as Usual (BAU), and the targeted financial costs, associated with producing carbon emissions. BAU figures were based on the year-on-year percentage cost increases for energy, water and waste quoted in Table 6.

The financial 'value at stake' is the difference between the 'BAU' and 'Target' lines. If WB Alloys did not implement any carbon reduction initiatives an additional £100,523 per annum was estimated to be required to maintain a 'stand still' position by 2026. The prediction shows that the additional costs to WB Alloys over 5 years when compared to the target performance is £459,323.

To conclude, the cost of taking no action (the value at stake) is estimated to be £459,323 over a 5-year period.

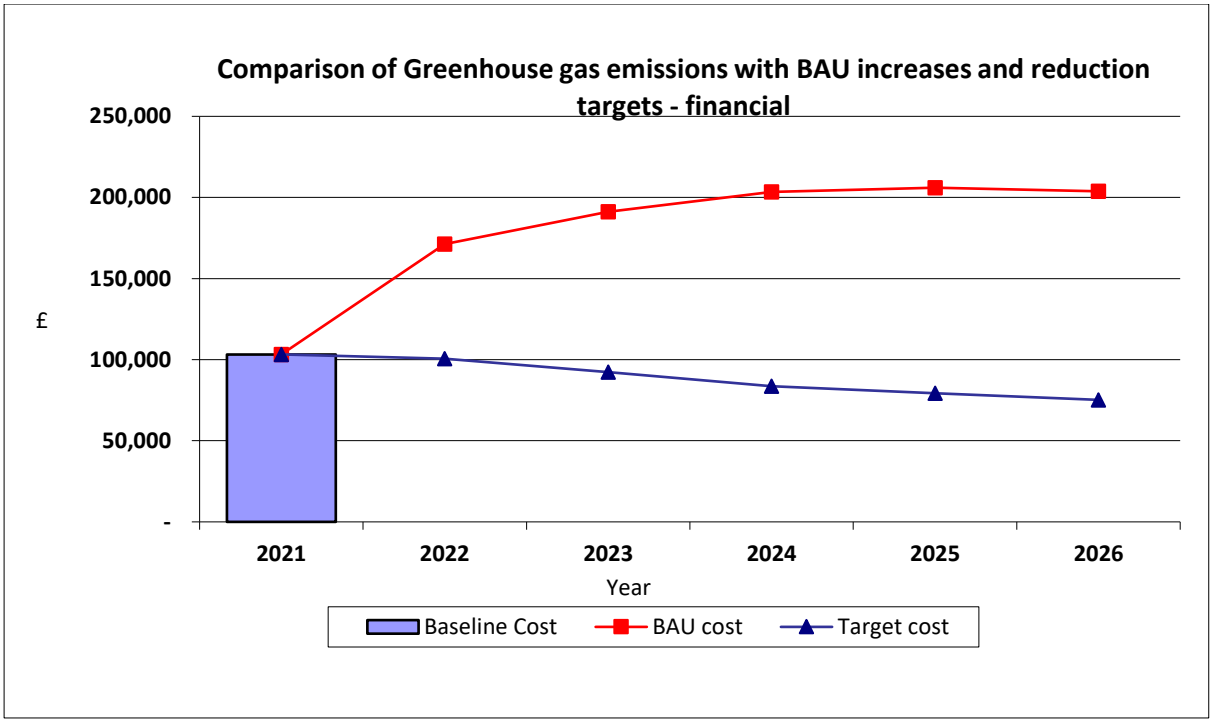

Figure 9: Projected costs of business as usual scenario compared with carbon reduction targets at WB Alloys

3 Carbon Management Projects

This section details all the carbon reduction projects that WB Alloys aims to implement over the next 5 years.

If these carbon reduction projects are implemented, WB Alloys could save an estimated £22,540 and reduce CO_2e emissions within the scope of this project by 61%.

Table 7 summarises carbon reduction projects that have been identified and are either in progress at present or planned for future implementation.

Table 7: Summary of carbon reduction projects at WB Alloys

Project Reference	Traffic Light Status	Project title	Person responsible	Estimated Capital Cost	Estimated annual savings		Estimated payback (years)	Financial incentives available
					£	Tonnes CO_2e		
CAR 1	Green	Move business to new premises		Unknown	£2,599	65.06	N/A	None
CAR 2	Amber	Install roof mounted solar PV		£45,783	£6,693	5.97	6.84	Interest free loan / cashback available
CAR 3	Amber	Reduce emissions from company fleet		£20,452	£13,248	74.37	22.54	Plug-in grant
CAR 4	Green	Reduce emissions from business travel		N/A	N/A	1.1	N/A	None
TOTAL				**£66,235**	**£22,540**	**146.52**	**2.94**	

3.1 Move to new premises

After the company moved sites in August 2021, energy consumption changed due to the demand and use of the new building at 70 Montrose Avenue, Hillington. Based on the data provided, electricity and gas consumption decreased, which is likely to be due to the smaller and more modern construction and thermal efficiency of the new building. Table 8 shows the estimated annual consumption of electricity and natural gas at the new site.

Table 8: Estimated greenhouse gas emissions associated with on-site consumption of electricity and natural gas in WB Alloys' new building.

Utility	Estimated Cost		CO_2e emissions		Estimated Total kWh
	£/year	%	Tonnes/year	%	
Electricity	£18,145	91	13.00	64	61,308
Gas	£1,879	9	7.25	36	39,639
Totals	**£20,024**	**100**	**20.25**	**100**	**100,947**

Table 9 shows energy use converted into a kWh/m^2 basis. The billing data supplied indicates that the new site has a higher electricity consumption per m^2, but a lower natural gas consumption per m^2. The cost of electricity per m^2 is higher at the new site, whilst cost of natural gas per m^2 is lower at the new site. Due to the smaller size of the new site, absolute savings in consumption of gas and electricity have been observed despite the higher use per m^2 for electricity.

Table 9: Energy, cost and CO_2e emissions per m^2 at WB Alloys' old and new sites

	Old site			New site		
Utility	Energy usage	Cost	Emissions	Energy usage	Cost	Emissions
	kWh/m^2	£/m^2	kg CO_2e/m^2	kWh/m^2	£/m^2	kg CO_2e/m^2
Electricity	14	£2.12	2.87	29	£8.58	6.15
Gas	69	£2.00	12.67	19	£0.89	3.43
Totals	83	£4.12	15.54	48	£9.47	9.57

Table 10 shows the estimated absolute savings in consumption of electricity and natural gas associated with WB Alloys moving sites in 2021. This indicates that the overall CO_2e savings of moving to a more efficient building were 65 tonnes CO_2e per year. Despite lower consumption of electricity, the overall cost is higher at the new building. This is likely to be due to a higher tariff reflecting the steep price increases seen at the beginning of 2022.

Table 10: Annual cost, CO_2e and kWh savings associated with WB Alloys moving sites in August 2021.

Utility	Estimated cost savings	CO_2e emissions savings	Estimated total kWh savings
	£/year	tonnes/year	kWh/year
Electricity	-£6,525	2.76	13,017
Gas	£9,124	62.30	340,428
Total	**£2,599**	**65.06**	**353,445**

Based on billing data for natural gas and electricity consumption between January 2021 – October 2022, it is estimated that the move will save the company 61,308 kWh of electricity and 39,639 kWh natural gas per year, resulting in savings of £2,599 and 65.06 tonnes CO_2e per year.

3.2 Roof mounted solar PV

The potential for solar photo-voltaic at WB Alloys sites was estimated in brief. Electrical output was estimated using site-based information (areas, orientation, and angle), electrical output information from the PV panels identified on the quotation and half hourly weather station data from near the respective locations. This information was used as input to specialist energy modelling software (Energypro) to estimate the quantity of generated electricity over time and compare it to the half hourly electricity consumption at the site.

Where excess electricity was generated over on-site demand this will be exported to the local electrical distribution network. WB Alloys could sell this electricity via the Smart Export Guarantee scheme which gives a guaranteed price per kWh of small-scale renewable electricity exported to the electrical network. At present the best SEG tariff rate is £0.055 per kWh electricity exported without a tie-in to an existing electricity account[1].

The area, orientation and angle of roofs included in this assessment are shown in the following figure (figure 10). To connect any on-site electricity generation equipment to the local electrical distribution network which has a generation capacity of more than about 11kW (for three phase electrical connections) it is necessary to obtain a connection agreement for the local electrical distribution network operator (DNO). The possibility, cost and time constraints to obtaining a connection agreement can be highly local. At Hillington the DNO is Scottish Power Energy Networks (SPEN). Consultation with their online maps[2] identified that there may not be any constraints in the local electrical substations, however it is strongly recommended that if WB Alloys were interested in developing solar PV at Hillington they contact SPEN at a very early stage in the project's development.

Figure 10: Indicative locations which could be used for solar photo-voltaic panels at Hillington

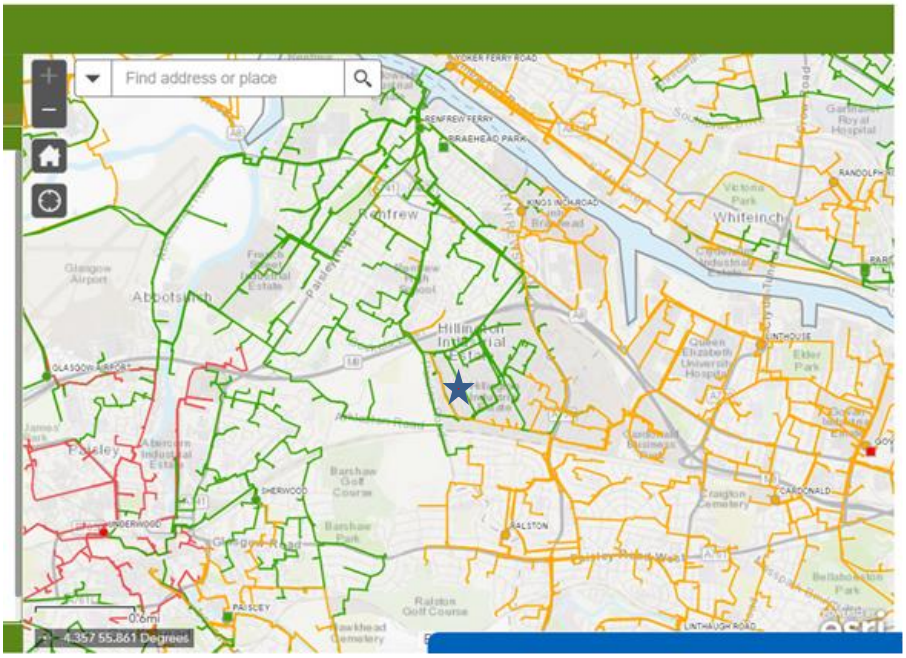

Figure 11: Excerpt from SPEN distributed generation maps Hillington showing the location of WB Alloys (blue star).

Data was inputted into EnergyPro, a proprietary software tool which uses local weather station data to estimate electricity generation at half-hourly intervals against on-site demand. Due to the limited half-hourly electricity data at the time of writing this report the daily electricity consumption profiles for Hillington were estimated based upon previous project experience.

Based upon the measurements taken online and electricity meter readings supplied for this project it was estimated that on-site solar PV could generate 30,807 kWh electricity per year reducing greenhouse gas emissions by 5.97 tCO_2e compared to baseline emissions (table 11). Using the assumed electricity consumption profiles for the site it was estimated that 7,509kWh electricity per year would be exported to the local electricity network. This is when there is excess electricity generation over on-site demand.

Table 11: Estimated economic and environmental benefit of solar photo-voltaic installations at WB Alloys – Hillington

kWp	Estimated kWh/year electricity	Savings	Capex	Opex (£/year)	Net Benefit	Simple payback period (years)	TCO_2e savings
36	30,807	£7,309	£45,783	£616	£6,693	6.26	5.97

Investment in a solar PV system at Hillington could be eligible for an interest free loan or cashback from the Energy Savings Trust in Scotland. In addition, it could be possible to enable a third-party company to install and operate a PV system at Hillington and sell electricity to WB Alloys at a guaranteed and preferential rate via Power Purchase Agreement (PPA).

The potential cost benefit could be improved by:

- Comparing on-site generation with actual half-hourly electricity consumption data for the site,
- Optimising the size of the PV system to minimise electricity exports and maximise the quantity of imported electricity which is offset by on-site generation,

- Considering battery systems to store excess electricity during periods of high generation and low on-site demand (e.g. at weekends and early mornings in summer), although this will increase the capital cost significantly. However, battery storage could be used to import electricity during times of lower tariffs.

If WB Alloys are interested in developing PV at Hillington it is recommended that the company:

- Obtain half-hourly electricity consumption data for the site supply and compare this to predicted electricity generation at half-hourly intervals. This will determine the quantity of electricity which may be exported from the site and the potential cost savings and income from on-site electricity generation,
- Contacts the relevant electrical DNO to obtain an outline agreement, cost and time estimate for connection,
- Obtain site-specific quotations for the design, purchase, installation, commissioning and maintenance of solar PV systems,
- Obtain specialist advice from a suitably qualified and experienced structural engineer to confirm the integrity and load bearing capacity of the roofs which are proposed for solar PV systems,
- Contacts Renfrewshire Council to identify if there are any additional planning obligations required for the installation of a solar PV at this location for example potential for visual impact,
- Contacts Glasgow Airport safeguarding officers to determine if there is a requirement to complete a glint and glare assesment, although Glasgow Airport are developing a solar PV farm and there are roof mounted PV systems on commercial buildings at Inchinnan (Figure 12).

Figure 12 *Satellite image of Glasgow Airport / Hillington area showing existing roof mounted solar PV on buildings close to Glasgow Airport (blue stars) with WB Alloys shown as a red star*

3.3 Reducing emissions from company fleet

The UK government has committed to phase out the sale of new petrol and diesel vehicles by 2030. WB Alloys has a key opportunity to remain ahead of the mainstream by implementing this target even earlier, for example committing to not buying new petrol or diesel vehicles by 2024 and phasing out the existing ones by 2030.

Data provided by WB Alloys indicated that over the baseline period there were 16 company vehicles with active cards. The company fleet consists of 1x diesel car, 2x electric cars, 6x hybrid cars, 3x petrol cars, 5x diesel/heavy oil pick-ups, and 9x diesel vans. Section 2.2 illustrates that of these vehicles, diesel-fuelled pick-up trucks (Model: Ford Ranger Wildtrak) are responsible for the highest proportion of transportation emissions (55%), followed by diesel vans (27%). If the mileage completed by carbon intensive vehicles such as pick-ups and diesel vans could be replaced with less carbon intensive vehicles this would reduce the overall transportation emissions produced by WB Alloys.

According to the vehicle register provided, only 4 of the 9 vans reported mileage. If the 9x diesel vans on the company vehicle register were to be replaced with 4x electric vans, for example the Ford E-Transit, this could reduce CO_2e emissions by a total of 24.0 tonnes CO_2e per year based on the baseline mileage. Electric vehicles would also be cheaper to run, so annual operational savings based on the baseline mileage could be approximately £4,933 per year. The marginal cost of purchasing 4x electric vans compared to new diesel vans would be around £20,542 (table 12). This project could be eligible for a plug-in grant[2] from the UK Government. Furthermore, the existing diesel vans could be traded in which would reduce the cost further.

Figure 12: The Ford Ranger Wildtrak, a relatively carbon intensive diesel vehicle

Table 12: Estimated cost of replacing diesel vans with electric vans

Item	Cost	Notes
Ford E-Transit	£48,048	Excl VAT
Funding through UK Government plug-in scheme	£5,000	Maximum per van
Cost for 4x electric vans vans	£172,192	Excl VAT
Cost for diesel Transit	£37,935	Per van, Excl VAT
Cost for 4 diesel transits	£151,740	Excl VAT
Marginal cost E-Transits	£20,452	

This section has outlined the potential benefits of replacing the company's diesel vans with an electric alternative. It is recommended that the whole company fleet is examined and replaced with electric vehicles, targeting the vehicles with the highest mileage and highest emissions. For example, replacement of the 5 pick-up trucks could be phased over the 5 year plan, at a cost of approximately

[2] https://www.gov.uk/plug-in-vehicle-grants#vans

£50,000 per vehicle (based on the average cost of an electric vehicle), leading to average savings of 10 tonnes CO_2e and £1,663 per year per pick up that is replaced.

To assess the potential for electric vehicles to replace some or all of the existing diesel fuelled fleet it is recommended that WB Alloys:

- Monitor vehicle trip mileage for at least one year,
- Review the trip mileage data for each vehicle,
- Identify which vehicles do regular, shorter trips which may be more suitable for an electric vehicle,
- Identify which vehicles are due for replacement, or are the least fuel efficient,
- Prioritise which vehicle, or vehicles would be best to prioritise for replacement with an electric model.

The principal risks around this measure are associated with the cost of replacing the company vehicles, and the willingness of staff to change their vehicles. A phased approach is recommended, for example first ensuring a policy that no new diesel vehicles are added to the fleet beyond a certain date, and then slowly phasing out the existing diesel vehicles.

3.4 Reducing emissions of business travel

WB Allows provided details of all trips taken by air, train and ferry over the course of 1 year. Analysing this data revealed that 20 domestic flights were taken during the reported period , mostly consisting of return journeys between Scotland and Bristol. Domestic flights are a carbon intensive method of transportation compared to other options such as train. Short haul flights made up a high proportion of business travel emissions. Some of these journeys were made to places that can be reached from the UK by train or ferry, such as Amsterdam and Brussels.

TCL calculated the potential CO_2e savings that could be achieved if all journeys that could reasonably be made by train are done so. The results are shown in Table 13, and indicate that travelling by train where possible instead of taking domestic and short haul flights could save WB Alloys approximately 1.15 tonnes CO_2e per year.

Table 13: Details of business travel taken during the baseline period.

			CO_2e emissions (kg)	
Journey type	**Number of journeys**	**km travelled**	**Business as usual**	**Domestic trips and trips to Amsterdam and Brussels taken by train**
Domestic flights	20	9,008	1,171	0
Short haul flights (European)	18	26,113	2,120	1,745
Long haul flights (non-European)	2	11,696	914	914
Ferry	10	450	58	58
Train	7	736	26	457
Total	**57**	**48,003**	**4,290**	**3,175**
			Savings:	**1,115 kg CO_2e per year**

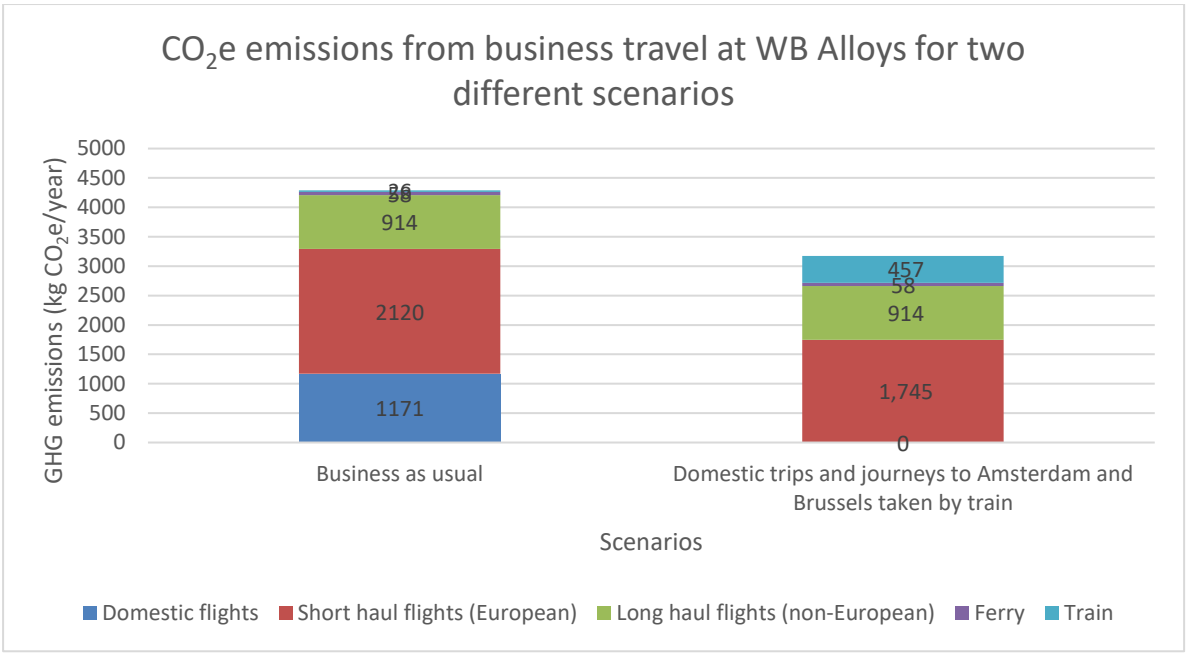

Figure 13: Business as usual CO_2e emissions of business travel at WB Alloys, and potential savings if journeys are taken by train where feasible.

4 Implementation

4.1 Updating/Creating Internal Procedures

This section describes the timeline by which WB Alloys to update and create internal policies relating to energy efficient maintenance of equipment, procurement of energy efficient plant and machinery andstaff awareness training relating to the projects being implemented as part of this plan.

Table 14 – Policies and target of internal procedures

Policy	Relevant Carbon Trust Guidance on Creating/Updating the Policy	Target date for creating Policy
Energy Efficient Maintenance	http://www.carbontrust.co.uk/cut-carbon-reduce-costs/products-services/technology-advice/Pages/lighting-maintenance.aspx	Quarter 1, 2023
Procurement of energy efficient plant and equipment	Energy Saving Scotland Small Business Loans and Cashback Scheme https://energy.zerowastescotland.org.uk/SMELoan	Quarter 1, 2023
Staff Awareness Training/Induction of the Carbon Management Plan	Creating an awareness campaign pack (CTG001) https://www.carbontrust.com/resources/creating-an-awareness-campaign-guide	Quarter 2, 2023

4.2 Structure and responsibilities of the Carbon Management Plan Team

This section outlines the team responsible for implementing the Carbon Management Plan.

Table 15 outlines the responsibilities of everyone. The Carbon Management Plan's Project Leader, Gary McCrae will be responsible for the carbon management plan overall, for reporting its progress to the managing director and monitoring its effectiveness. Progress with a carbon management plan will stallif the Project Leader leaves the post before the Programme is fully established and embedded withinthe running of the organisation. Therefore, Colin Allan has been assigned the role of Deputy Project Leader.

Both the Project Leader and Deputy Project Leader will be responsible for identifying and prioritising new initiatives, updating the plan, arranging and chairing quarterly meetings to review progress on development of the plan and the subsequent implementation of its projects. The Carbon Management Plan team will be assigned responsibilities for developing internal policies (according to their job roles) and implementing the action plans attached to each project.

Table 15 – Roles and responsibilities of the Carbon Management Programme team.

Role in Carbon Management programme	Name and job title	Responsibilities	Contact details
Project Leader	Gary McCrae	Overall management of CMP, setting targets, monitoring performance	gary.mccrae@wballoys.co.uk

Deputy Project Leader	Colin Allan	Overall management of CMP, setting targets, monitoring performance	Colin.Allan@wballoys.co.uk
Team members		Overseeing all aspects of CMP implementation and performance, marketing	

The team members will carry out the following roles as follows:

Project Leader and Deputy Project Leader

Duties: Overall management of carbon management plan. Survey of inventory and energy use; ongoing monitoring and target setting; technical aspects of energy and environmental management; Collation of energy and environmental statistics and production of reports.

Team members

Duties: Overseeing all aspects of the implementation and development of the CarbonManagement Plan

4.3 Performance Measurement

The Project Leader will be responsible for leading a regular programme of energy auditingto check on the progress of implementing existing carbon reduction projects and identifying new projects. Team staff will be responsible for auditing their assigned carbon reduction projects on a quarterly basis. The results of these audits will be communicated back to the Carbon Management Team at quarterly team meetings. Any actions required to improve methods of data collection will bediscussed and resolved at the meetings.

Table 7 in this Carbon Management Plan will be updated regularly after each quarterly meeting to checkthe progress of the implemented carbon and financial savings against agreed targets. Progress on eachof the carbon reduction projects (short, medium and long term) will be reviewed at quarterly teammeetings, and projects will be discussed, and issues resolved, where possible. The team will be responsible for taking team meeting minutes on a revolving responsibility basis and circulating these minutes to the team with assigned actions. The Office Manager will be responsible for disseminating the key points from minutes to all internal staff following the meetings.

4.4 Communication Strategy

Employee engagement in carbon reduction can help change behaviour in the workplace; reduce unnecessary energy and water consumption and waste production. In terms of energy alone, it is estimated that up to 5% of energy consumption and costs can be saved through running an awareness campaign. Staff will be more likely to change their own habits if they understand how their actions affect energy consumption.

WB Alloys is committed to implementing an employee engagement programme as part of this carbon reduction plan. Following the development of the carbon reduction projects, the Project Leader and Deputy Project Leader will work together to develop a communications plan for using creative and varied incentives e.g., quizzes, competitions to engage staff during Energy Awareness week and throughout the year.

The Carbon Management team aim to raise awareness and motivation amongst employees by appointing Environmental Champions in each Department. The role of the champions will be

motivating other employees to assist in implementing carbon reduction projects and assist with running an ongoing Energy Awareness Campaign within their Department. A suggestions box will be set up for staff to provide their ideas to help implement the projects and suggest new projects to add to the list.

The Project Leader and Deputy Project Leader will inform staff of progress made on implementing carbon reduction projects on a quarterly basis via updating a staff notice board, and a regular e-newsupdate.

The summary section of this Carbon Management Plan and a list of the carbon reduction projects being implemented (split into short, medium and long term) will be published on the WB Alloys websitefor viewing by customers. Information on the Plan will also be included in prospective client tender proposals, where appropriate.

4.5 Project Management Programme

Appendix 2 sets out WB Alloys' plans to manage the implementation of the carbon reduction projects identified in Section 3. Each project plan is SMART – specific, measurable, achievable, and realistic and time bound. Each project has been presented by the Project Leader to senior management and signed up for approval to ensure they receive sufficient funding and staff resources.

5.0 Achieving Net Zero

A “net-zero” target refers to reaching net-zero carbon emissions by a selected date, but differs from zero carbon, which requires no carbon to be emitted. Net-zero refers to balancing the amount of emitted greenhouse gases with the equivalent emissions that are either offset or sequestered in a defined period. This should primarily be achieved through a rapid reduction in carbon emissions, but where zero carbon cannot be achieved, offsetting through carbon credits or sequestration through rewilding or carbon capture and storage needs to be utilised.

Achieving carbon neutrality, or having a net-zero carbon footprint, requires a business to balance its carbon emissions with an equivalent amount sequestered or offset. Alternatively, it can purchase enough carbon credits to make up the difference between its emissions and a zero-carbon baseline. At present there are several business orientated standards which relate to achieving net zero or climate neutrality. Both are potentially applicable to WB Alloys but both have differing initial and ongoing requirements.

This section has briefly reviewed two of the most relevant standards and how they apply to the current operations at WB Alloys.

5.1 PAS 2060

PAS 2060 is an internationally recognised standard designed to verify the accuracy of claims of carbon neutrality and ensure that business emissions do not contribute to a net increase in global greenhouse gas emissions.

PAS 2060 presents four key stages to carbon neutrality: measurement, reduction, offsetting and documentation. At the end of the process, businesses can pursue certification by an accredited certification body, for example NQA. Although the standard does allow companies to purchase carbon credits as part of the process, it's important to note that offsets must meet certain criteria, and companies cannot receive verified PAS 2060 certification using offsetting alone.

The standard builds on existing environmental standards such as ISO 14001 and PAS 2050, which deal with the emissions of products throughout their lifespans. The PAS 2060 standard can be used to demonstrate to customers the validity and progress towards attaining carbon neutrality.

The main elements of the standard include:

- Defining the organisational boundaries and scope of the PAS 2060 certification,
- Producing a carbon footprint of the subject using recognized methods and to an accepted international standard.
- For a product or service, Scope 3 greenhouse gas emissions need to be considered as part of the carbon footprint,
- Documenting the methods and results of the carbon footprint,
- Demonstrating a commitment to achieving and, if applicable, maintaining carbon neutrality,
- Developing a documented carbon management plan which contains:
    - A timescale for achieving climate neutrality which are appropriate,
    - Targets for GHG reduction appropriate to the timescale for achieving climate neutrality,
    - Assumptions made and justification of the techniques and measures to reduce GHG emissions,
    - The carbon offset strategy for the subject including an estimate of the quantity of GHG emissions to be offset and nature of offsets.

- Updating the carbon management plan every 12 months to include progress against targets, offset,
- Assessing progress against achieving the stated GHG emission reduction targets,
- Offsetting residual GHG emissions through carbon credits which meet internationally recognised standards,
- Requirements for independent verification, certification and/or self-verification,
- Requirement for a Qualifying Explanatory Statement which supports the commitment to carbon reduction.

5.1.1 Organisational boundaries and scope

PAS 2060 permits the use of several methods to assess the baseline and ongoing greenhouse gas footprint within the scope of the PAS 2060 certification. These included the IPCC GHG protocol and ISO14064 – 1. The standard ISO14064 – 1 requires the organisation to determine the greenhouse gas sources *which it can control and has a level of influence over*. Therefore, if both these two conditions can be met, whilst it would be necessary to account for and report GHG emissions from some or all the materials used at the factory in the carbon footprint it may be possible to exclude some of the GHG emissions from reduction targets at this time.

5.1.2 Carbon offsetting as part of PAS2060

PAS2060 requires companies to offset GHG emissions remaining at the end of each qualifying period. These could be achieved by the purchase of carbon credits which support a variety of projects that have demonstrable GHG reductions. To be eligible for PAS 2060 the carbon credit schemes must meet certain criteria.

There are a wide variety of carbon credit schemes available which support GHG reduction projects throughout the world. These include small-scale community renewable energy generation, tree planting and peatland restoration. A small sample was obtained for this project to determine the availability and indicative price of carbon credits. The search focused on carbon offsetting projects in the UK.

Woodland Carbon Code

As this market matures, there have been attempts to create a standard for UK carbon credit sequestration as exhibited by the Woodland Carbon Code. The code ensures that credit-generating projects:

- *Are responsibly and sustainably managed to national standards.*
- *can provide reliable estimates of the amount of carbon that will be sequestered or locked up as a result of the tree planting;*
- *must be publicly registered and independently verified.*
- *meet transparent criteria and standards to ensure that real carbon benefits are delivered.*[1]

The code also makes requirements to assure for good forest management, long term planning, additionality (proof that sequestration funded through the purchase of credits is *additional* to sequestration that would have occurred in the same area naturally) and that double counting is prevented (a carbon credit is offsetting only *one* set of emissions associated with *one* entity).

Currently, companies in the UK are paying between £10-20 for Pending Issuance Units (PIUs). One PIU is the potential for one tonne of CO_2 to be generated by a woodland.

UK Peatland Code

Similarly, to the Woodland Carbon Code, The UK Peatland Code is a market standard applied to projects seeking to market the sequestration value of their enhancement efforts.

Prices for PIUs associated with peatland projects vary and can be found on the UK Peatland Code Registry.

Clean Development Mechanism

The Clean Development Mechanism is a UN-backed initiative aimed at promoting and recognising voluntary action on climate change.

Combined with current auditing progress and carbon action plan, a contribution to a carbon offsetting scheme can help an organisation become recognised at 'bronze' 'silver' or 'gold' levels by the UNFCCC's 'Climate Neutral Now' initiative.
Valid carbon offset projects an organisation can contribute to are available to view via the UN Carbon Offset Platform.

Credits associated with different projects can vary between USD1.70 – 3.50 / tonne CO2.

Gold Standard

Gold Standard is a voluntary carbon offset programme developed to support projects that lasting benefits within social economic and environmental spheres. Gold Standard can be used to verify credits applied to other schemes, like projects associated with the Clean Development Mechanism.

Gold Standard projects can be found in the Gold Standard Project Registry.

Verified Carbon Standard

The Verified Carbon Standard accredits carbon offset projects in a similar manner to Gold Standard and CDM. Unlike other offsetting standards Verra do not have a requirement for carbon reduction projects to have wider social or environmental aims.

It applies high standards to its projects, working with third party auditors who are accredited under approved GHG Programmes. Existing approved offsetting programmes are periodically reviewed to ensure continued compliance.

Credits and their linked projects can be viewed at the Verra Registry.

5.2 Science Based Targets Initiative (SBTi)

The SBTi is a partnership between the CDP, the United Nations Global Compact, World Resources Institute (WRI) and the Worldwide Fund for Nature (WWF). The SBTi call to action is one of the We Mean Business Coalition commitments.
The Science Based Targets initiative (SBTi):

- Defines and promotes best practice in emissions reductions and net-zero targets in line with climate science.
- Provides technical assistance and expert resources to companies who set science-based targets in line with the latest climate science.
- Brings together a team of experts to provide companies with independent assessment and validation of targets.
- The SBTi is the lead partner of the Business Ambition for 1.5°C campaign - an urgent call to action from a global coalition of UN agencies, business and industry leaders, mobilizing companies to set net-zero science-based targets in line with a 1.5°C future.

SBTi has developed a streamlined small to medium enterprise (SME) route[3] which:

- Bypasses the letter of commitment and standard target validation process.
- Includes pre-defined target options for reducing scope 1 and scope 2 emissions from the SME science-based target setting form.
- Unlike bigger companies, SMEs do not have to set targets for scope 3 emissions, but they must commit to measure and reduce them.

The process for participating in the SBTi is as follows:

- Step 1: complete SME science-based target setting form available on the SBTI website,
- Step 2: Due diligence and target approval – review performed by SBTi. Terms and conditions signed.
- Step 3: Invoicing and payment – onetime fee of up to USD $2,000 (+ applicable VAT) to set Near Term and Net Zero Targets sent to targets@sciencebasedtargets.org
- Step 4: Payment, verification and target confirmation – communications pack and relevant details of target publication sent to SME. Call to Action Team engages with companies as they set targets. Targets are validated by a lead reviewer, and an appointed approver. The lead reviewer completes a desk review, and the appointed approver peer reviews it. The lead reviewer and appointed approver are from two different partner organisations.
- Step 5: Target publication – targets published on SBTi website, CDP websites and We Mean Business.

SME companies are required to publicly disclose company-wide scope 1 and 2 GHG emissions and emissions and progress against targets via annual reports, sustainability reports, CDP and websites. SMEs are not required to set targets for scope 3 emissions. They are required to monitor and reduce scope 3 emissions and encouraged to set their own targets but they will not be published by SBTi. Companies must not use offsets or avoided emissions as progress towards achieving the target.

Currently there are 1,733 companies in the SBTi which have set Net Zero targets. Participating in the SBTi would increase the global profile of WB Alloys. Because SBT is a widely recognised initiative, it can add to the legitimacy of SMEs' environmental strategies, helping them stand out in their sectors.

SBTi GHG reduction targets for SMEs aiming to achieve Net Zero are:

- Near-term targets (to be attained between 5 and 10 years after submission to SBTi):
    - Scope 1 and 2 GHG emissions, covering 90% of emissions, with a Linear Annual Reduction of 4.5%
    - Scope 3 GHG emissions, no mandatory reduction targets for SMEs, but must be quantified.
- Long-term targets (not later than 2050):
    - Scope 1 and 2 GHG emissions, covering 95% of emissions, with an absolute reduction of 90% compared to base year
    - Scope 3 GHG emissions, covering 90% of scope 3 emissions, with a 90% reduction compared to base year by 2050 at latest

[3] SME Target Validation Booking System (jotform.com)

6.0 Conclusions and Next Steps

This draft CMP used a baseline year of 2021 to establish the baseline carbon footprint of WB Alloys head office in Glasgow, considering Scope 1, 2 and a limited selection of Scope 3 emissions. Consumption and billing data for electricity, gas, water, waste management, and transportation was obtained and used to establish a baseline footprint for the year 2021, taking data from before the company moved sites.

Total scope 1, 2 and limited 3 greenhouse gas emissions at WB Alloys which were assessed for this project for the baseline year were 120 tonnes CO_2e.

It would be expected that the proportion of Scope 3 GHG emissions would increase if a full GHG inventory of the company's supply chain was completed to the standard required by the GHG protocol.

This CMP identified measures to be implemented over a 5 year time scale to reduce GHG emissions at WB Alloys.

If WB Alloys implement all recommended measures, they could save £22,540 per year and reduce CO_2e emissions by 146.52 tonnes per year, 61% of emissions within the scope of this project. Over a five year timespan, the cumulative value at stake was estimated to be 1,117 tonnes CO_2e.

The next steps towards implementing this CMP are as follows:

- Assemble a Carbon Management Plan Team who will meet and discuss the CMP and oversee implementation of decarbonisation measures.
- Allocate recommended carbon reduction projects to a member of the CMP team to oversee their completion.
- Develop and implement training and awareness raising of the potential benefits of carbon management across key teams and individuals within the company,
- Take first steps towards recommended carbon management projects, including site specific consultations and quotations for recommended investment measures.
- Complete a high-level screen of WB Alloys' key customers to identify if, and what Net Zero pathway they may be following (e.g., Science Based Targets Initiative or PAS2060),
- Discuss the options for achieving Net Zero certification. Decide on, and allocate responsibility to implement the preferred approach and set targets accordingly to incorporate this goal into the company's 20 year plan.
- Adapt existing purchase monitoring and reporting systems to include CO_2e emission factors,
- Devise and implement a process to review progress against agreed CO_2e reduction targets.

Appendix 1: Emission Factors

Energy type	GHG Factor (kg CO_{2e}/kWh or tonne gross) for baseline year
Electricity (grid) (kWh)	0.212
Natural gas (kWh)	0.183

Source: UK Government GHG conversion Factors for Company Reporting[13]

Fuel or vehicle type	Units	GHG factor (kgCO_2e/unit specified) for baseline year
Average petrol car	km	0.25
Average diesel car	km	0.23
Domestic flight	Km	0.13003
Short-haul flight	Km	0.08117
Long-haul flight	Km	0.07818
Ferry – Car passenger	Km	0.12952
Train – National Rail	Km	0.03549
Large electric car	km	0.05573
Average electric van	km	0.05020

UK Government GHG conversion Factors for Company Reporting

Waste type	GHG Factor (kg CO_2e /tonne) for baseline year
General waste - landfill	446.242
Average construction	0.989
Commercial and industrial waste - landfill	467.046
Recycling – paper and board	21.294

UK Government GHG conversion Factors for Company Reporting

Emission type	GHG Factor (kg CO_2e /m^3) for baseline year
Water supply (m^3)	0.149
Wastewater (m^3)	0.272
Total water consumed (m^3)	0.407

UK Government GHG conversion Factors for Company Reporting

Appendix 2: Project Management Programme

Project Reference	Traffic Light Status	Project title	Person responsible	Estimated Capital Cost	Estimated annual savings		Estimated payback (years)	Financial incentives available
					£	Tonnes CO_2e		
CAR 1	Green	Move business to new premises		Unknown	£2,599	65.06	N/A	None
CAR 2	Amber	Install roof mounted solar PV		£45,783	£6,693	5.97	6.84	Interest free loan / cashback available
CAR 3	Amber	Reduce emissions from company fleet		£20,452	£13,248	74.37	22.54	Plug-in grant
CAR 4	Green	Reduce emissions from business travel		N/A	N/A	1.1	N/A	None
TOTAL				**£66,235**	**£22,540**	**146.52**	**2.94**	

Project: ***Reference:***	**CAR 1 – Move business to new premises**
Owner (person)	
Department	Company Director
Description	Moving from Dalsetter Avenue to a new refurbished premised at Hillington will reduce energy consumption due to improved building fabrics, lighting and space heating
Benefits	Reduced energy consumption for heating, lighting etc. Improved staff comfort and working conditions
Funding	
Resources	Internal resources required to manage process. Funding to implement new lighting, heating etc
Ensuring Success	Obtaining impartial advice and financial support on energy efficient lighting, heating, building fabrics etc Incorporating good energy efficiency measures into the new building (e.g. lighting, space and hot water heating)
Measuring Success	Monitoring energy consumption before and after moving premises
Timing	2021
Notes	Although the new building may improve energy efficiency, absolute costs may rise due to higher tariffs.

Project: ***Reference:***	**CAR 2 – Install roof mounted Solar PV**
Owner (person)	
Department	Company Director
Description	Obtain detailed site-specific quotation for design, installation and maintenance of 36 kWp solar PV (and in combination with battery)
Benefits	Financial savings: £6,693 CO_2e Emissions reduction: 5.97 tonnes of scope 2 CO2e
Funding	Estimated cost £45,783 Source of funding: Potential public / private sources TBC
Resources	People, commitment, finances
Ensuring Success	Sufficient time for staff to implement. Principal risks: Availability of finance, PV panels, contractors, licensing with DNO.
Measuring Success Timing	Reduction in imported electricity Complete feasibility work in 2023 to install panels in 2024
Notes	

Project: ***Reference:***	**CAR 3 – Reduce emissions from company fleet**
Owner (person)	X
Department	Company Director
Description	Introduce company fleet policy whereby carbon intensive vehicles such as diesel vans and pick up trucks are *phased out over several years* in favour of less carbon intensive vehicles such as hybrid and electric cars.
Benefits	Financial savings: N/A CO_{2e} Emissions reduction: Total possible scope 3 emissions savings of 74.37 tonnes CO_2e per year.
Funding	Marginal cost of replacing 4x vans and 5x vehicles from company fleet, compared to a business as usual scenario whereby new diesel vehicles are purchased. Plug-in grant may be available. Existing diesel vehicles could be traded in for discount.
Resources	People and commitment
Ensuring Success	Sufficient staff authority to implement actions Principal risks: Willingness of staff members to change their vehicle type.
Measuring Success	CO_2e emissions of employee mileage. Monthly monitoring against target
Timing	Replace existing vans with 4x electric vans in 2023 Replace pick-up trucks with electric vehicles: 1x in 2024, 2x in 2025, 2x in 2026.
Notes	

Project:	**CAR 4 – Reduce emissions from business travel**
Reference:	
Owner (person)	X
Department	Company Director
Description	Introduce business travel policy whereby journeys that feasibly could be taken by train are done so, for example trips between Scotland and Bristol, Amsterdam and Brussels.
Benefits	Financial savings: N/A CO_{2e} Emissions reduction: Scope 3 emissions savings of 1.15 tonnes CO_2e per year.
Funding	Potential additional cost of journeys, potential savings also possible.
Resources	People, commitment, time and planning
Ensuring Success	Sufficient staff authority to implement actions Principal risks: Willingness of staff members to change their travel methods.
Measuring Success	CO_2e emissions of business travel. Annual monitoring against target
Timing	· Start date: July 2023
Notes	

Appendix 3 – Company vehicle register with CO_{2e} Emission Values

Vehicle Type	Make/Model	Annual mileage	Engine Size	Fuel Type	CO_{2e} Emission Value
CAR	Toyota Lexus Saloon 300h F-sport		2494 CC	Hybrid Elec	107
CAR	Lexus IS300h F-sport Premium /nav Pro		2494 CC	Hybrid Elec	113
CAR	Lexus NX f-Sport	20,000	2494 CC	Hybrid Elec	135
VAN	Renault master 2DR		2298 CC	Diesel	207
Pick-up	Toyota Hilux	25,000	2393 CC	Diesel	189
VAN	Toyota Prorace Medium Van	25,000	1999 CC	Diesel	139
Pick-up	Volkswagen Amarok a33 v3 3.0TDI	20,000	2967 CC	Diesel	231
VAN	Mercedes-Benz sprinter 315 van		1950 CC	Diesel	233
CAR	Audi Q7	20,000	2995 CC	Hybrid Elec	61
CAR	Audi A7	20,000	1984 CC	Hybrid Elec	46
VAN	Mercedes-Benz Sprinter 314 CDI	30,000	2143 CC	Diesel	207
CAR	Hyundai Kona SUV Electric	12,000	0 CC	Electric	0
CAR	Audi TT Roadster	5,000	1984 CC	Petrol	166
VAN	FORD TRANSIT VAN 360 L2H2 2.0TDCI 130 EBI TND RWD	30,000	1995 CC	Diesel	225
CAR	CITROEN C3 AIRCROSS HATCHBACK 1.2	18,000	1200 CC	Petrol	134
CAR	Mercedes-Benz S-CLASS amg	10,000	3982 CC	Petrol	273
CAR	Land Rover Discovery Sport SW		1498 CC	Hybrid Elec	36
Pick-up	ford ranger wildtrak	12,000	1996 CC	Heavy Oil	244
Pick-up	ford ranger wildtrak	60,000	1996 CC	Diesel	241
VAN	ford transit van (J BOOBYER)		1996 CC	Diesel	159
Pick-up	ford ranger wildtrak	60,000	1996 CC	Diesel	241
VAN	Renault Trafic LWB Diesel	20,000	1997 CC	Diesel	186
VAN	Ford Transit Connect 200		1499 CC	Diesel	151
VAN	Renault Master TD MM33 DCI		2298 CC	Diesel	207
CAR	Toyota Hilux active D-4D 4x4		2494 CC	Diesel	193
CAR	MINI electric hatchback 135Kw	8,000	0 CC	Electric	0