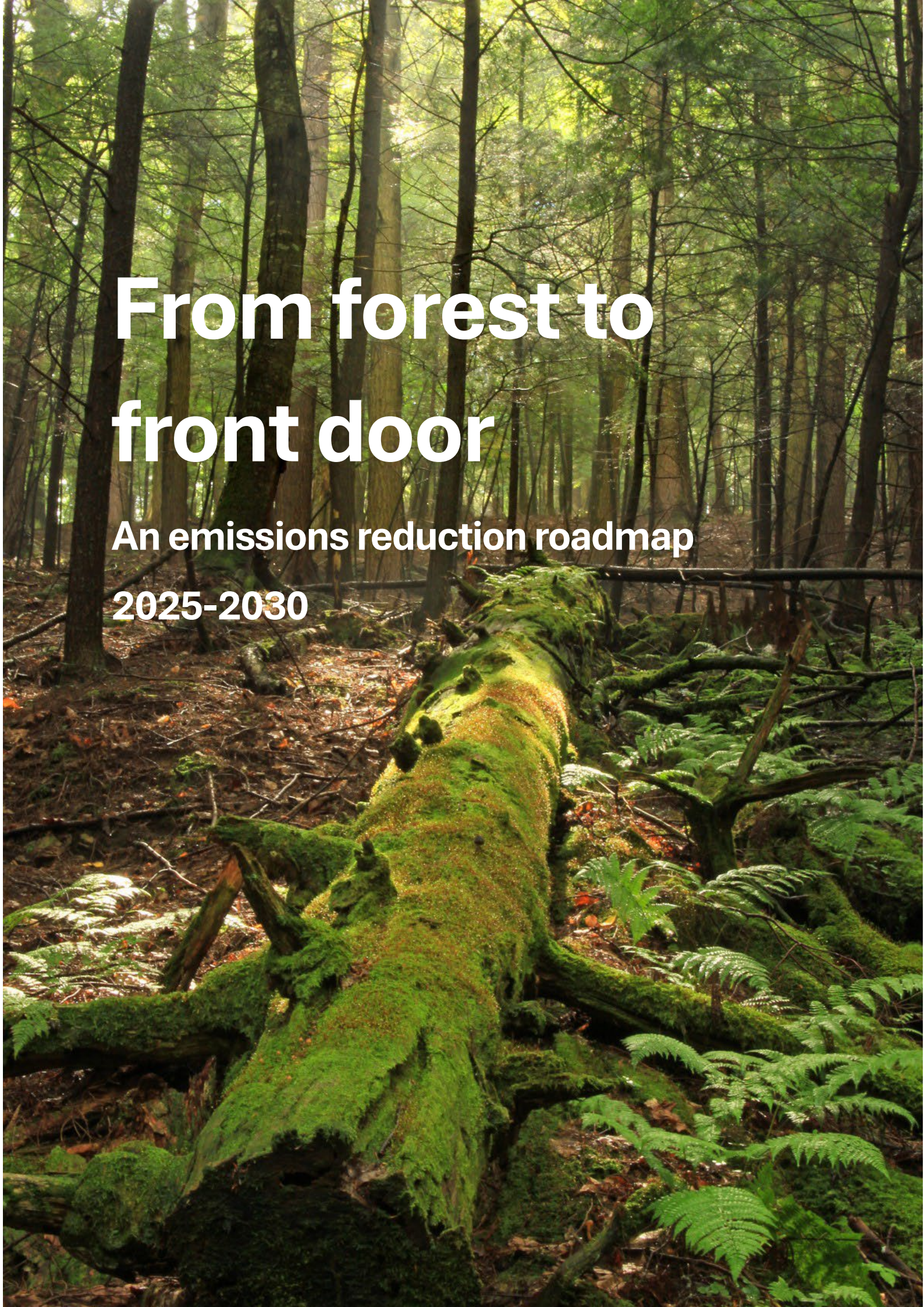


From forest to front door

An emissions reduction roadmap

2025-2030

Contents

List of tables

List of figures

Foreword

“At Highland Heritage Woodworks (“HHW”), we are not only committed to showcasing the untapped potential of locally sourced Scottish timber but also to leading the way in sustainable practices. Our dedication to achieving net zero emissions is a fundamental aspect of who we are and what we care about. Since our inception in 2021, sustainability has been at the core of everything we do, guiding our decisions and shaping our operations.

Our journey towards emission reduction involves meticulous attention to every detail of our production process. From the responsible sourcing of raw materials to the innovative use of technology, we strive to minimise our impact. Investing in state-of-the-art equipment such as our electric Mebor wide band horizontal sawmill which enables us to enhance efficiency, reduce waste and reduce emissions whilst ensuring that each piece of timber is utilised to its fullest potential. Subscribing to a fully renewable electricity tariff ensures that we further minimise the emissions required for our energy needs.

Our commitment to sustainability is evident in our adherence to stringent certification standards. As accredited holders of the Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC), and our recent certification with Grown in Britain (GIB), we continually reinforce our dedication to promoting sustainable forestry and reducing our impact. These certifications are not merely badges of honour but reflect our unwavering commitment to environmental stewardship.

Looking forward, HHW is resolutely focussed on our “Forest to Front Door” philosophy, which encapsulates our aim to maximise the value of each piece of timber while ensuring minimal waste and environmental impact. Every product we create is a testament to our pledge to sustainability and our pursuit of net zero emissions; whilst focussing on providing highly skilled rural based jobs, with a focus on traditional skills and craft.

This emissions reduction roadmap showcases our intent over the next 5 years.”

Guy Phillips

CEO and Founder

1. Background to the organisation

About Highland Heritage Woodworks

HHW is a pioneer in the Scottish timber industry, dedicated to demonstrating the untapped potential of locally-sourced timber. Founded in 2021 by Guy Phillips and Armands Balams, the team is passionate about locally sourced Scottish timber and driven by a commitment to sustainability and innovation.

At HHW, we blend traditional craftsmanship with modern technology to transform Scottish wood into premium products. The three pillars to our business are bespoke master carpentry, high end cabin manufacture and high-quality, precision cut, kiln dried lumber production from the sawmill. From richly grained Douglas fir floors to bespoke kitchens made from Aberdeenshire elm to unique eco-friendly cabins which blend seamlessly into the countryside, our range of products is as diverse as the landscape that supplies our timber. Every piece tells a story of heritage, quality, and ecological responsibility.

Having started down the master carpentry path, we quicky realised that to provide the quality we wanted to give to our customers that we needed more control of our raw material, and as such we invested in a modest bandsaw mill and timber drying kiln, ensuring the best outcome for the fantastic raw materials Scotland provides. Today, our expanded facilities include a state-of-the-art 60m^3 timber drying kiln and a Mebor wide band horizontal sawmill, propelling our production capacity to meet the increasing demands for low-carbon, sustainable building materials.

We are accredited to the Programme for the Endorsement of Forest Certification (PEFC) and the Forest Stewardship Council (FSC) programme. Both organisations ensure that timber bought and sold under their marks conform to the strictest environmental and social standards. In addition, in March 2024, we reached a milestone by becoming certified holders with Grown in Britain (GIB), affirming our commitment to promoting certified homegrown timber. This partnership underscores our dedication to environmental stewardship and supports our mission to help customers reduce their environmental impact.

Who works at HHW?

HHW currently employs 10 staff including sawmillers, master carpenters, a materials handler / yard manager and a timber sourcing specialist.

The leadership team includes a CEO, a Chief Financial Officer (CFO) and Operations Director; more information is set out in the management section of this document.

In October 2023 we became accredited as a Living Wage Employer, and actively support Fair Work principles.

Management

Guy Phillips: CEO and founder

After a successful 25 year career as a geologist at BP, Guy set up Highland Heritage Woodworks with his long-time friend and founder Armands Balams.

After helping his father build the family home when he was young, Guy has remained connected to building beautiful things from wood. He is a firm believer in 'Forest to Front Door', making the best use of the raw materials on our doorstep to craft products and structures of exceptional quality with genuine sustainability.

Guy says 'It's important to be passionate about everything you do. Getting the right balance between family, adventure and work is a constant challenge. Guy's passion for adventuring has seen him winter in the Arctic, complete the Haute Route on skis and as the autumn years draw in, turn his attention to long distance mountain running, packrafting and gravel riding, all of which are a welcome distraction from work.

Armands Balams: Operations Director and founder

Since moving to the UK from Latvia in 2008, Armands career has ranged from small artisanal workshops to large scale manufacturing facilities, but always working with timber. Since graduating from the world-famous carpentry college in Riga, RTU, Armands has designed and built pretty much anything you could imagine in wood. From multi-tiered spiral staircases, to post and beam oak barns, and from high-end kitchens to National Trust property renovations. Each with it's own design challenges, but always with an eye for detail.

Since starting HHW, Armands has focused his efforts on building the sawmilling and timber products side of the business to help drive quality, but from a manufacturing perspective.

His focus on perfection means that large scale post and beam structures for timber frame houses are given the same level of focus as if he were making a piece of fine cabinetry.

Will Inglis: CFO

Will is a qualified chartered accountant who had a 15 year career in London advising private equity firms and corporates on complex cross border mergers and acquisitions. He then had a 7 year stint working overseas for an airline as Head of Strategy before the lure of his homeland brought him back to Scotland.

Will has a passion for working with young start-up businesses and initially supported Highland Heritage Woodworks as a Board Advisor before joining as CFO in 2024.

When he is not looking after the pennies and helping drive the growth strategy he can be found messing about on the water, riding his bike, snowboarding and walking his hound in the woods.

Will has overall responsibility for ensuring HHW performs sustainably. This is done through monthly meetings where progress reports on this roadmap are provided. An annual review is undertaken and our performance is disclosed publicly on our website

Where are HHW located?

HHW is based on the Dunecht estate in rural Aberdeenshire, with the main office located at the former Dairy Buildings, outside of which there is wood storage shed and yard, a small metalworking shop, and a workshop accommodating a large planer, thicknesser, horizontal belt sander, hand tools and dust extraction system. Located outside of the workshop there is a small timber drying kiln. HHW presently lease these buildings from the Dunecht Estate, on a ten-year lease. Operating hours are 8am to 6pm Monday through to Friday, and 8am to 12 noon on Saturday's. HHW operate all year round, with operations only closed on Christmas Day, Boxing Day, New Year's Day and Sundays.

Some 0.7 miles from the main office on another part of the estate is the site of our sawmill operation, housed in a newly refurbished and repurposed agricultural building.

Figure 1 – a) map of northeast Scotland b) satellite image of the Dairy Buildings on the Dunecht Estate c) location of the sawmill d) map showing the distance between the Dairy Buildings and the sawmill

a)

b)

d)

c)

Day to day operations

The Sawmill

Our electric powered Mebor sawmill is comprised of a number of different components, a horizontal band saw (HTZ 1200 Plus), a motorised log deck, a 3-way sorting table and a multi-rip edger (VR800) This is located 0.7 miles away from the Dairy Buildings. Travel between the two sites is normally by car once or twice per day. Large timber deliveries are delivered directly to the sawmill.

The purpose of the horizontal band saw is to break down large logs into smaller pieces of lumber to serve the requirements of the customer and their order. This typically involves the removal of the 4 'slabwood' faces to create a central block that is cut into a variety of sizes to maximise recovery and minimise waste. This is an extremely capable tool which enables us to make short work of quickly cutting timber down to the specified size. The motorised log deck which operates with hydraulic rams helps load the logs efficiently onto the bed of the sawmill Once cut, the various timber boards are processed further with the multi-rip edger. This is a machine with a collection of circular saw blades that rips the wide board into a collection of narrower pieces, ready for stacking, packing and further processing.

In the yard area adjacent to the sawmill is where our raw materials are stored. The yard accommodates logs delivered directly from forestry operations as well as semi processed timber that has been through various value adding stages within the sawmill and kilning process.

Figure 2 – Mebor Sawmill

The Drying kiln

Our electric powered 60m^3 Secal drying kiln is instrumental in enabling the wood to be processed into a quality raw material. Kiln drying is a standard process in wood production and is used to reduce moisture levels in the timber to ensure the material is fit for purpose for the specific use case. Excess moisture in the wood can cause problems when it comes to being utilised and if this moisture isn't removed it can lead to problems such as warping and twisting in the wood itself, and poor performance when applied to interior joinery, exterior cladding or structural timbers in housing. Kilning is a technical process with many variables, and ensuring the right moisture content for the timber species in question, and the desired use case is what drives the value of the final product

We place wood in the chamber where it is carefully brought up to the right temperature and then held at that temperature over a multi-day cycle. For each kiln drying cycle we control the temperature and humidity to ensure that the moisture is evaporated and vented out. The type of wood, its thickness and the target moisture content determine the length of kiln drying required. We try and maximise the amount of wood dried per cycle but this very much depends on the thickness of the wood and the specific customer requirements. Presently the kiln is utilised 3-4 days per week, but the frequency will increase as demand continues to grow.

Our ability to dry wood sets us apart from our competitors, and we have already proved to ourselves, though the use of our smaller kiln, that the value of timber is significantly increased when processed correctly, and importantly, the right market is found. For example, an elm or ash log can be bought for as little as £100/tonne. It can be freshly milled and graded and sold for perhaps 2 or 3 times that. However, once milled and kiln dried, and turned into a final product such as a s set of kitchen doors, it can be sold for 10 or 20 times that original amount. It takes dedication, craft and know-how to create that value, but it's part of the DNA of HHW and its Forest to Front Door narrative. These differing margins for the same raw material show the value of the kiln and the significant leverage it brings to our operation. Another example is the kiln drying of softwoods that can be used in the construction industry. Plentiful local species like Scots Pine, Douglas Fir and Larch which can be structurally graded by our team and become valuable materials that local and national building companies are prepared to buy.

Figure 3 – Drying Kiln & Biomass Woodchip Store

The workshops

The workshop area is where our master carpentry team are based with all the associated specialised equipment. Examples include the planer and thicknesser, where we turn the raw planks of kiln-dried timber from the sawmill into the boards and beams needed for the particular project being undertaken. The workshops are also used to carry our secondary processing of the sawmill products ready for our customers to build their own projects. The workshop utilises a collection of electrically powered hand tools as well as more traditional hand tools such as hammers and chisels. Due to the high volumes of particulate matter generated through the workshop processes it is necessary to run an efficient dust extraction system.

In the yard area adjacent to the workshop is where some of our semi-processed timber is stored as air dried stock, ready for use in future projects.

Figure 4 – Outside of the Dairy Buildings workshop

Other activities

HHW also utilises chainsaws on an ad-hoc basis, but this constitutes a very small part of the business.

2. Scope of this plan

2.1 Organisational boundary

The organisational boundary sets out which assets are to be included in the calculation of an emissions footprint. We have chosen an operational control approach. According to the Greenhouse Gas (GHG) protocol under the operational control approach, a company accounts for 100% of emissions from operations over which it or one of its subsidiaries has operational control. This means we are including emissions associated with activities from the Dairy Buildings and the sawmill site.

2.2 Operational boundary

The operational boundary sets out the emissions sources to be included in the baseline footprint. Our operational boundary is shown in table 1 below.

Scope 1 emissions are defined as direct emissions occurring from sources owned or controlled by HHW. These can arise from stationary combustion, emissions from exhausts of vehicles and fugitive emissions.

Scope 2 emissions are indirect emissions that arise from the generation of purchased energy.

Scope 3 emissions are the result of activities from assets not owned or controlled by HHW, but form part of our supply chain. This consists of both activities upstream and downstream of ourselves. Our supply chain is illustrated in Figure 5.

Table 1 – Operational boundary

Scope 1	Scope 2	Scope 3
Fuel used for heating - biomass	Purchased electricity	Biomass burning – briquettes (use of sold product)
Fuel used for equipment		Business travel
Fuel used in vehicles		Electricity transmission and distribution
		Employee commuting /Working from home
		Waste generated in operations
		Water supply and treatment

In keeping with the GHG protocol, HHW operational boundary includes all scope 1 and scope 2 emissions. Scope 3 emissions are considered discretionary, but HHW have included this where data is available as for most businesses, including HHW, scope 3 will account for a significant proportion of emissions. HHW aim to increase the number of scope 3 categories included as stakeholder engagement and data collection methodologies improve.

There are several scope 3 categories that aren't included within this initial baseline and plan, the reason for this is illustrated in table 2. At this point it is not possible to quantify the emissions associated with Scope 3 emission categories that aren't included and are of relevance to HHW. This will be explored further as net zero planning progresses.

Table 2 – Scope 3 categories not included in the baseline

SCOPE 3 CATEGORIES	
Upstream	
Purchased Goods and Services[1]	It is important to note that the main raw material used by HHW is timber. This naturally sequesters carbon and methane, locking these emissions within the bark and wood until the material is disposed of as waste at the end of its useful life. If we took account of these sequestered (or avoided) emissions within our calculations, then it's likely that HHW would be considered carbon positive – which means HHW would sequester more emissions than emitted during business operations, negating the need to do anything further. To be accountable and transparent in what HHW do, the decision has been taken to exclude the timber as a purchased material and the associated sequestered emissions as it paints an overly positive light on HHW overall emissions footprint. It was felt that this would significantly distract from areas that are within operational control to improve. In relation to this, other purchased goods and services would be minimal, with some emissions associated with fuel already captured in Scope 1. Most purchases are likely to be featured in capital goods. Further exploration of purchased goods and services is needed, however it is likely to contribute an insignificant amount to HHW overall emissions footprint. This is something that HHW will look to collate information on over the coming reporting periods.
Capital Goods[2]	This category looks at extraction, production, and transportation of capital goods purchased or acquired by HHW during reporting periods. Data on purchased capital goods is not presently collected. This is something that HHW will look to collate over coming reporting periods.
Upstream transportation and distribution of products[3]	This category includes the emissions associated with the transportation and distribution of products and services procured by HHW in vehicles that are not owned by HHW. Data on number of deliveries per year and where those deliveries have travelled from and in what kind of vehicle is not presently collected. This is something that HHW will look to collate information on over the coming reporting periods.
Upstream leased assets	HHW does lease assets from the Dunecht Estate, however emissions associated with this activity are covered by scope 1 and 2 emissions, as well as some scope 3 emission categories such as water supply and treatment, where it has operational control. HHW does not have data on the life cycle emissions associated with manufacturing or construction of these leased assets. HHW feels that the responsibility for emissions associated with construction and maintenance of these leased assets rests with the lessor, as such this aspect is not deemed relevant and is not included in this plan.

[1] This category includes all upstream (i.e., cradle-to-gate) emissions from the production of products purchased or acquired by the reporting company in the reporting year. Products include both goods (tangible products) and services (intangible products). Reference page 20, GHG Protocol Technical Guidance for Calculating Scope 3 emissions.

[2] Capital goods are final products that have an extended life and are used by the company to manufacture a product; provide a service; or sell, store, and deliver merchandise. In financial accounting, capital goods are treated as fixed assets or as plant, property, and equipment (PP&E). Reference page 36, GHG Protocol Technical Guidance for Calculating Scope 3 emissions.

[3] Transportation and distribution of products purchased in the reporting year, between a company's suppliers and its own operations in vehicles not owned or operated by the reporting company (including multi-modal shipping where multiple carriers are involved in the delivery of a product, but excluding fuel and energy products). This category also includes third-party transportation and distribution services purchased by the reporting company in the reporting year (either directly or through an intermediary), including inbound logistics, outbound logistics (e.g., of sold products), and third-party transportation and distribution between a company's own facilities. Reference page 49, GHG Protocol Technical Guidance for Calculating Scope 3 emissions.

Table 2 (continued) – Scope 3 categories not included in the baseline

SCOPE 3 CATEGORIES	
Downstream	
Franchises	HHW does not operate any franchises, therefore this scope 3 emission category is not deemed relevant and is not included in this plan.
Investments	HHW does not have any financial investments with the objective of making a profit, therefore this scope 3 emission category is not deemed relevant and is not included in this plan.
Downstream leased assets	HHW does not own any assets which it leases to other entities, therefore this scope 3 emission category is not deemed relevant and is not included in this plan.
Downstream transportation and distribution of products[4]	HHW uses its own company vehicles for delivery of master carpentry products. The emissions associated with the use of these company vehicles is already captured in scope 1 emissions under fuel use. HHW uses third party delivery providers for sawmill products. The type of vehicles used and distance travelled for such deliveries isn't information that HHW presently collects data on. This is something that HHW will look to collate information on over the coming reporting periods.
Processing of sold products[5]	HHW does process purchased timber into new materials that will be sold as a product. The emissions associated with processing are already captured under scope 1 and scope 2 emissions, where fuel and electricity are used to power equipment and machinery. Waste generated from this activity is also captured as emissions within scope 1 – fuel for heating and scope 3 – biomass combusted offsite as well as waste generated. As such, emissions associated with processing are not relevant as they are already reported on. In relation to other purchased goods, HHW does not do any manufacturing of purchased products into new ones. For example, the screws and hinges that are bought by HHW aren't transformed into new products, they are used as screws and hinges within the product being made by HHW. Emissions associated with the manufacture of those screws and hinges would form part of the emission footprint of the organisation who has made them.
Use of sold products	HHW has included the use of sold briquettes in its initial baseline but has not included use of other products, as information on this has not been collected before. Most products created by HHW are comprised mainly from wood, wood dowel fixings, with some use of adhesives, and occasional fixtures and fittings which are metal such as screws, hinges and drawer runners. The product range comprises of things like staircases, cabinetry, doors, bookcases and shelf units. They are designed to last indefinitely subject to maintenance. As a product they emit no emissions in their use.
End of life treatment of sold products	HHW does not have data on what happens to its sold products and has no control over how customers deal with products as the end of their life. HHW build products to last, given it's all from natural materials, rather than Medium Density Fibreboard (MDF) or chipboard, as a result it's expected that they last a lifetime, to be handed on (furniture), or to stay in situ (staircases). Given that HHW products are comprised of wood and metal, both materials can easily be recycled should the consumer wish to do so. The wood within the product would have sequestered carbon throughout its growth, however it's understood that this could be emitted depending on the waste treatment method used at end of life. HHW feels that the responsibility for emissions associated with end of life treatment rests with the customer, as such this aspect is not deemed relevant and is not included in this plan.

[4] This category includes emissions that occur in the reporting year from transportation and distribution of sold products in vehicles and facilities not owned or controlled by the reporting company. Reference page 102, GHG Protocol Technical Guidance for Calculating Scope 3 emissions.

[5] This category includes emissions from processing of sold intermediate products by third parties (e.g., manufacturers) subsequent to sale by the reporting company. Intermediate products are products that require further processing, transformation, or inclusion in another product before use (see box 5.3 of the Scope 3 Standard), and therefore result in emissions from processing subsequent to sale by the reporting company and before use by the end consumer. Emissions from processing should be allocated to the intermediate product. Reference page 106, GHG Protocol Technical Guidance for Calculating Scope 3 emissions.

3. Data sources

The data used in calculating baseline emissions is from historical data contained within HHW administrative systems. Where possible this has been compiled using accurate invoice values, however where gaps exist there have been approximations made using internal expertise. Going forward, a robust plan will be put in place to ensure accurate data collation and reporting for all fields through live capture and regular reporting.

All baseline emission data, sources and assumptions / exclusions are listed in Table 3 below and on the following page.

Table 3 – Data sources and assumptions

Scope 1 Data	Unit of measurement	Data source	Assumptions / information
Fuel used for heating workshops	Kg of waste wood	Currently estimated	Estimated based upon 150kg being produced each day for 5.5 days a week and consumed over 30 weeks. The remainder of the year this material is stockpiled for sale or use during months when heating is required.
Fuel for equipment	Litres of petrol	Fuel receipts	At the point of production only litres of fuel was collated. This was split 70% diesel and 30% petrol as an estimate in use. In relation to fuel used for machinery it is assumed that all fuel delivered within the reporting period is consumed, however there is potential for a degree of variance given the size of the storage tanks and current ad hoc replenishment process.
Fuel used in vehicles	Litres of diesel	Fuel receipts	At the point of production only litres of fuel was collated. This was split 70% diesel and 30% petrol as an estimate in use.
Scope 2 Data	**Unit of measurement**	**Data source**	**Assumptions**
Purchased electricity	kWh	Invoice from electricity supplier	That the electricity provided is of a renewable origin. That emissions associated with provision of electricity will reduce as more renewables come onstream and decarbonise the grid; however, it should be noted that there has fluctuations in relation to grid intensity over the past few years.

Table 3 – Data sources and assumptions (continued)

Scope 3 Data	Unit of measurement	Data source	Assumptions
Business travel	£	Business receipts	Distance based methods used for business travel by air and rail. Spend based method[6] used for vehicle spend as no data currently collected on distances travelled for this mode. Secondary emissions factors are used for conversion from Environmentally-extended input-output (EEIO) databases. According to the UK EEIO database, the emission factor for vehicle hire is approximately 0.15 kg CO2e per £ spent[7]. It is known that some of these secondary emissions factors are a little dated, but they are what is presently used at the time of baseline emissions calculation.
Electricity transmission and distribution	kWh	Invoice from electricity supplier used to compile annual consumption	That emissions associated with provision of electricity will reduce as more renewables come onstream and decarbonise the grid.
Employee commuting	Km	Staff interview	That employees are providing accurate data on their mode of transport and distance travelled. Some use company vehicles for their commute, as such the emissions associated with this is captured in Scope 1.
Waste	Kg	Estimated based upon weight of 1 bag of wood waste	Most waste generated onsite is wood waste. This is collected and compressed into briquettes for combustion on/offsite. The emissions associated with this are already covered in Scope 1 (fuel used for heating workshops) and Scope 3 (use of sold product). The remaining waste on site is de minimis and is estimated to be around 200kg of mixed recycling per annum.
Water	m^3	Included in rent of Dairy buildings and is not metered.	No water meter on site, means UK average for an office worker was used. This is suggested as 50 litres per day[8]. This will likely be above that which HHW utilises – but erring on side of caution will take account of occasional other use for cleaning equipment. Assumes 5 onsite staff for reporting period and during those days. Assumes 55 days of closure for holidays (Christmas Day, Boxing Day and New Year – and closed on Sunday's) Convert litres to m^3. Waste water streams are not measured, so a 95% of supply water has been assumed to go to waste as per guidance from the Department of Energy Security and Net Zero (DESNZ).
Working from home	Hours – to note there are no formal working from home arrangements in place	Staff interview	During the baseline year only 1 member of staff worked remotely for a small amount of time. The majority of HHW activity is onsite. The hours are estimated based upon the person working a set amount per week, multiplied by 47 weeks a year (assuming 5 weeks off for annual leave).

[6] The spend-based method for calculating greenhouse gas emissions estimates emissions by multiplying the financial expenditure on goods and services by relevant emission factors. It should be noted that this method can be be problematic due to its reliance on financial data, which may not accurately reflect the actual emissions associated with specific goods and services. For example the cost of a unit of steel could increase year on year, whereas the emissions would likely remain the same.

[7] Transport and environment statistics 2022 - GOV.UK

[8] waterusebusiness.pdf

To ensure business continuity, HHW have documented how this plan has been created, so that anyone within the organisation can replicate should the need arise.

Data was then collated and converted to a tCO_2e equivalent[9] using Department of Energy Security and NetZero (DESNZ) emission conversion factors for company reporting. The baseline year covered two releases of DESNZ factors, but the year of 2023 was chosen as the reporting period covered most of this year.

The bullets below discuss measures to address any data gaps and assumptions made.

- Workshop heating uses timber offcuts from the manufacturing processes onsite. This figure has been estimated but an audit is scheduled during winter 2024/beginning of 2025 to provide more accurate measurement.
- Water consumption on site is minimal and is included within the rent. To improve accuracy of data then a water meter would need to be installed within each of the buildings in which HHW operates and water is used. The decision to install will rest with both the Dunecht Estate as landlord and provision of such facilities through their utility provider. This opportunity will be investigated by HHW but implementation of this is out with HHW control.
- For more accurate recording of hours spent working remotely, those who undertake this activity will be asked to log hours monthly, for collation.
- Onsite waste generated that isn't wood is minimal, comprised of paper, plastics, and metal which are recycled. Presently the weight of this is estimated. HHW could look to audit this going forward to gain more accurate information, however the effort to do so is disproportionate to the value obtained. As such, its likely HHW will continue to use an estimated figure.
- During the baseline year, estimates have been made over the percentage of total fuel which is diesel and petrol. More accurate recording of fuel will be undertaken to provide greater clarity going forward. It is also envisaged that HHW will be substituting some of its diesel use for vehicles with Hydrogenated Vegetable Oil (HVO) For kilning operations, the main fuel source is woodchip, but a back-up diesel boiler exists which will be converted to run on HVO in the near future. HHW will make sure that data is collected on these new fuel sources when they first start to be utilised.
- As only spend based data is available for the baseline period, work will be undertaken to gather business travel data in a better format to improve accuracy.
- Collation of further data on:
    - Purchased goods and services
    - Capital goods
    - Upstream transportation and distribution
    - Downstream transportation and distribution

[9] The European Commission define carbon dioxide equivalent as a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential. [Glossary:Carbon dioxide equivalent - Statistics Explained (europa.eu)]

4. Baseline emissions

4.1 Overall emissions

HHW have chosen 2023/24 as the baseline year for collating emissions, running from 1st March 2023 to 29th February 2024. Table 4 illustrates a breakdown of our emissions footprint for this period, utilising the Department for Energy Security and Net Zero (DESNZ) 2023 conversion factor data set[10]. Figure 6 displays the footprint in a more visual representation.

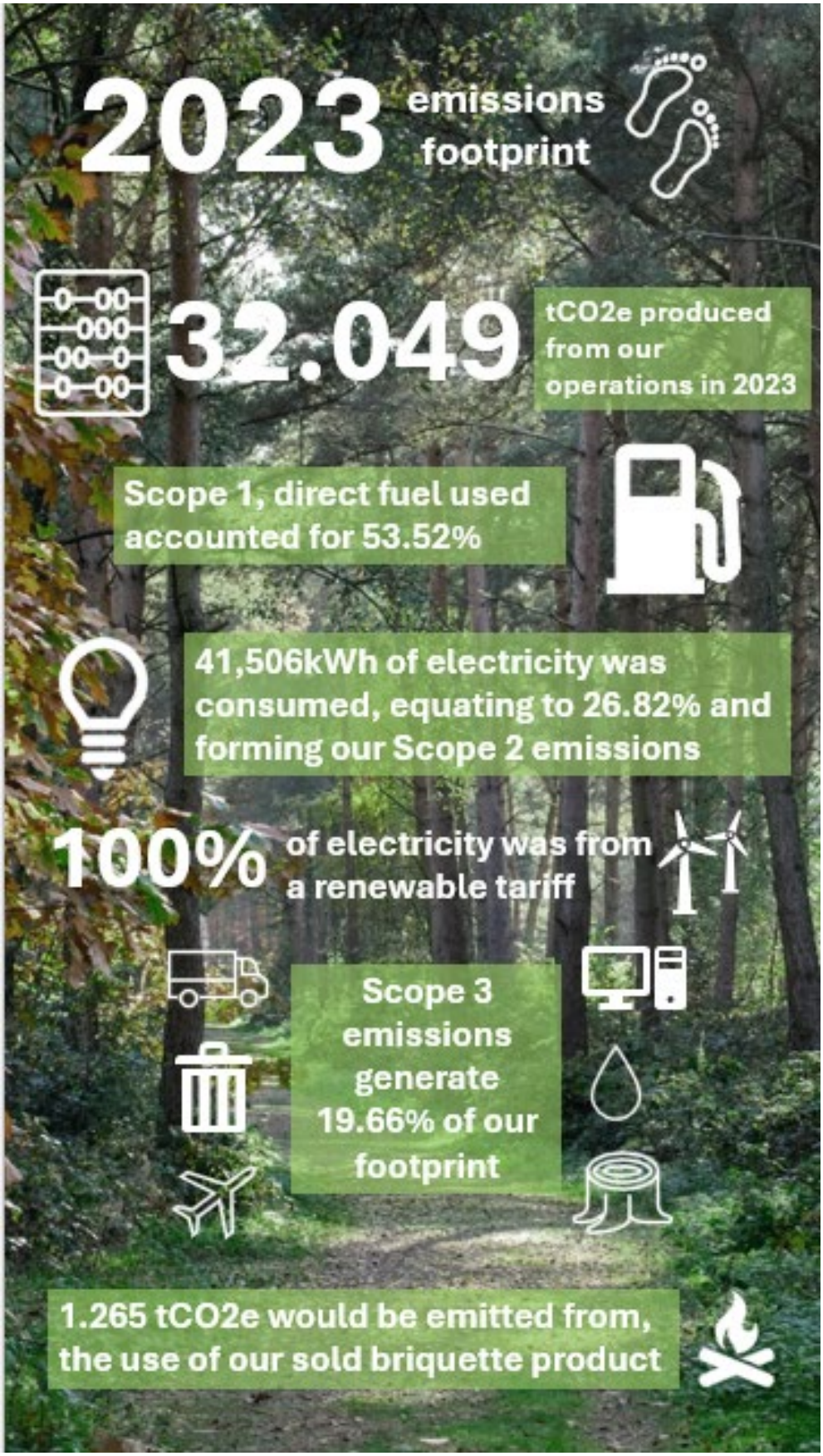
Table 4 – Absolute[11] emissions for HHW

Scope	Activity data	Conversion factor	kg CO_2e	tCO_2e	Total tCO_2e per scope
Scope 1					
Fuel for equipment	1995 litres of petrol	2.1 kgCO_2e	4189.500	4.190	Total Scope 1 emissions: **17.152 tonnes**
Fuel for vehicles	4656 litres of diesel	2.51 kgCO_2e	11686.6	11.687	
Fuel used for heating	24.75 tonnes	51.56192 kgCO_2e	1276.158	1.276	
Scope 2					
Purchased electricity (located based)	41506 kWh	0.207074 kgCO_2e	8594.81	8.6	Total Scope 2 emissions: **8.6 tonnes**
Purchased electricity (market based)	41506 kWh	0	0	0	
Scope 3					
Business travel: air	1296 km	0.27258 kgCO_2e	353.26	0.353	Total Scope 3 emissions: **6.302 tonnes**
Business travel: rail	637 km	0.035463 kgCO_2e	22.589	0.0225	
Business travel: vehicle	£643	0.15 kg CO2e per £ spent	96.45	0.096	
Electricity transmission and distribution	41506 kWh	0.01792 kgCO_2e	743.7875	0.74	
Staff commuting	18906 km	0.1921 kgCO2e per km	3632	3.63	
Waste (mixed recycling)	200kg, equates to 0.2 tonnes	22.281 kgCO_2e per tonne	4.4562	0.0045	
Water Supply	77.5m^3	0.1770 kg CO_2e	13.7175	0.013718	
Water treatment	73.625m^3	0.2010 kg CO_2e	14.80	0.0147986	
Use of briquette product – burning for heat offsite (sales)	24.534 tonnes	51.56192 kgCO_2e per tonne	1265.02	1.265	
Working from home	468 hours worked from home per year	0.33378 kgCO_2e	156.2	0.156	
			TOTAL	**32.049**	

[10] Greenhouse gas reporting: conversion factors 2023 - GOV.UK

[11] Absolute emissions refer to the total quantity of greenhouse gases emitted by an entity, such as a company or organisation, over a specific period. This measure is straightforward and focuses on the actual volume of emissions released into the atmosphere, without considering the size or output of the entity. Absolute vs intensity based carbon targets – The lowdown - Sweep

Figure 5 – HHW emissions footprint infographic



4.2 Scope 1 emissions

Scope 1 emissions account for **53.52%** of HHW emissions footprint for the baseline year, equating to **17.152 tCO_2e.** Figure 7 provides a visual breakdown of Scope 1 emissions.

1,995 litres of petrol is used to power equipment, creating 4.190 tCO_2e. This equipment includes chainsaws and the woodmizer sawmill. 4,656 litres of diesel is used within company vehicles, creating 11.687 tCO_2e.

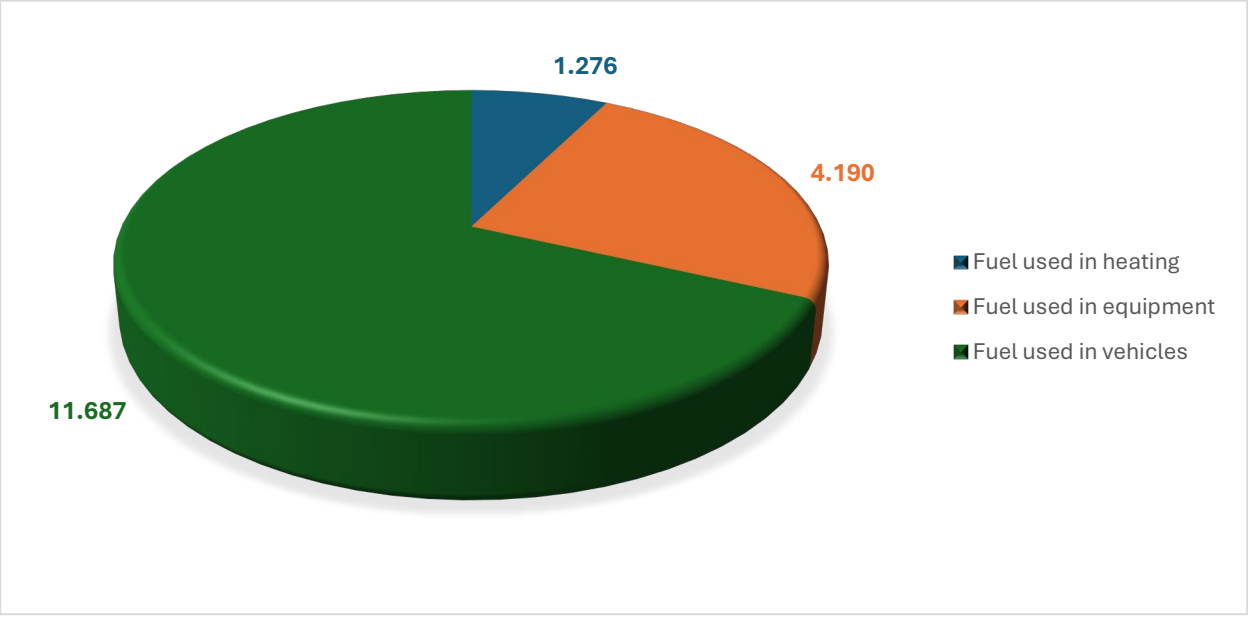
Company vehicles are used for business purposes such as attending meetings, visiting clients and delivering products. Occasionally vehicles are used to commute between the Dairy building and the sawmill. HHW owns 2 vans, 1 truck and 2 forklifts. These are all fuelled by diesel and are in daily use. The vans and truck are sized as follows:

- Ford Transit 1995cc
- Mercedes Vito 2148cc
- Mitsubishi L200 2400cc

Waste wood is recycled on site into briquettes for combustion. The briquettes are either used by HHW in its own stove heating system or sold to third parties for combustion offsite (as discussed within Scope 3 emissions). It is estimated that 24.75 tonnes of briquettes is burnt directly by HHW, equating to 1.276 tCO_2e.

There are no refrigerant gases used on site.

Figure 6 – Scope 1 emissions in tCO_2e for 2023-2024



4.3 Scope 2 emissions

HHW does not purchase any steam, heat or cooling.

Electricity for the site is purchased from Octopus Energy. The tariff is renewable energy guarantees of origin (REGO[12]) certified. A copy of the REGO certification is available from HHW upon request.

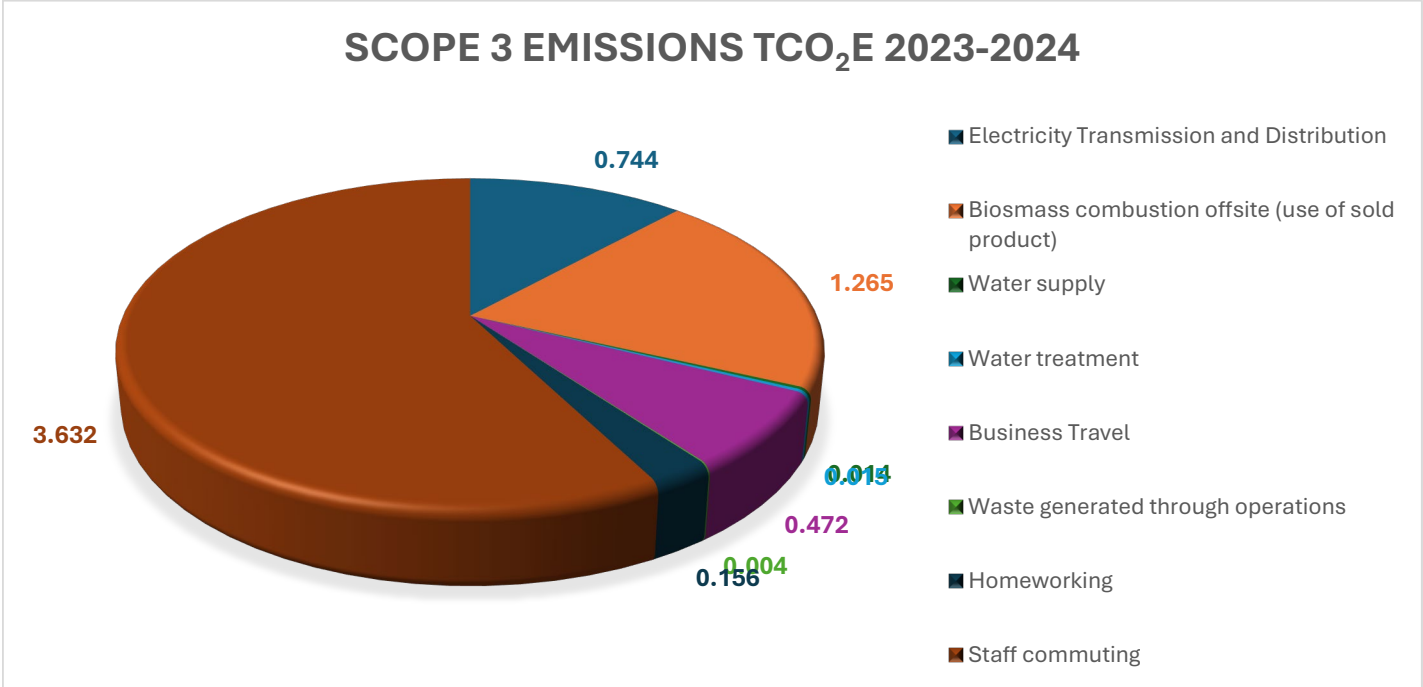
In the reporting period 41,506kWh of electricity was consumed. Under located based reporting this equates to **8.6 tCO_2e**, equating to **26.82%** of the overall footprint. Under marked based reporting this equates to 0 tCO_2e.

4.4 Scope 3 emissions

Scope 3 emissions comprise **19.66%** of the overall emissions footprint, equating to **6.302 tCO2e**. The baseline year will seem low compared to future years as the business is in its infancy, with projected growth and procurement of capital goods forecast. Further enhanced data gathering and improved methodologies are likely to alter the footprint going forward; especially factoring in upstream and downstream transportation and distribution.

Figure 8 illustrates scope 3 emissions broken down into their respective categories. As you can see at present staff commuting produces the most emissions within this scope, however this will change over time.

Figure 7 - Scope 3 emissions in tCO_2e for 2023-2024



[12] Renewable Energy Guarantees of Origin (REGO) | Ofgem

Business travel

Business travel was insignificant during the baseline year, included one return trip between Aberdeen and London via the overnight sleeper train, and two domestic return flights between the same locations. A small amount of business travel was done by car.

Overall business travel accounted for **0.472 tCO2e**, with the most emissions being attributable to air.

There were no hotel stays during the baseline year.

Electricity transmission and distribution

To fully account for emissions associated with electricity purchased by HHW, then emissions associated with the grid infrastructure that transmits and distributes the electricity from the point of origin to the site should be included.

For the baseline year emissions associated with electricity transmission and distribution equated to **0.74 tCO2e**.

HHW has no control over grid infrastructure, but is aware that as the grid decarbonises then the conversion factor used to calculate this scope 3 emission is likely to reduce. However, it should be noted that there have been issues regarding grid intensity over recent years.

Staff commuting and working from home

Staff commuting accounts for **3.63 tCO_2e**, and working from home is attributed to **0.156 tCO_2e**. It should be noted that presently 3 employees use company vehicles for their commute, as such the emissions associated with this activity is already covered by Scope 1, fuel used in vehicles. There are 2 employees whose commutes aren't included as their place of work does not include HHW main office – they work remotely from their own properties.

Waste

HHW produces a lot of wood waste. This material is used on-site and offsite for fuel, as per the relevant scope 1 and 3 emissions. The very small volume of general waste generated is recycled. This has been estimated to be around 200kg per annum contributing to **0.0045 tCO_2e**.

Water

HHW use very little water onsite. This is mainly used through its staff kitchen and toilet facilities. As such an estimation of water consumption has been made based upon average consumption for a UK office worker.

In the reporting period 77.5m^3 of water was consumed, and 95% of this being treated. This equates to 0.0137 tCO_2e for supply and 0.0148 tCO_2e for treatment.

Use of sold products

24.53 tonnes of briquettes are sold to third parties for resale and combustion offsite, equating to 1.265 tCO_2e. HHW has no control over how the briquettes are used and whether there is any flue systems utilised to remove harmful pollutants and reduce emissions.

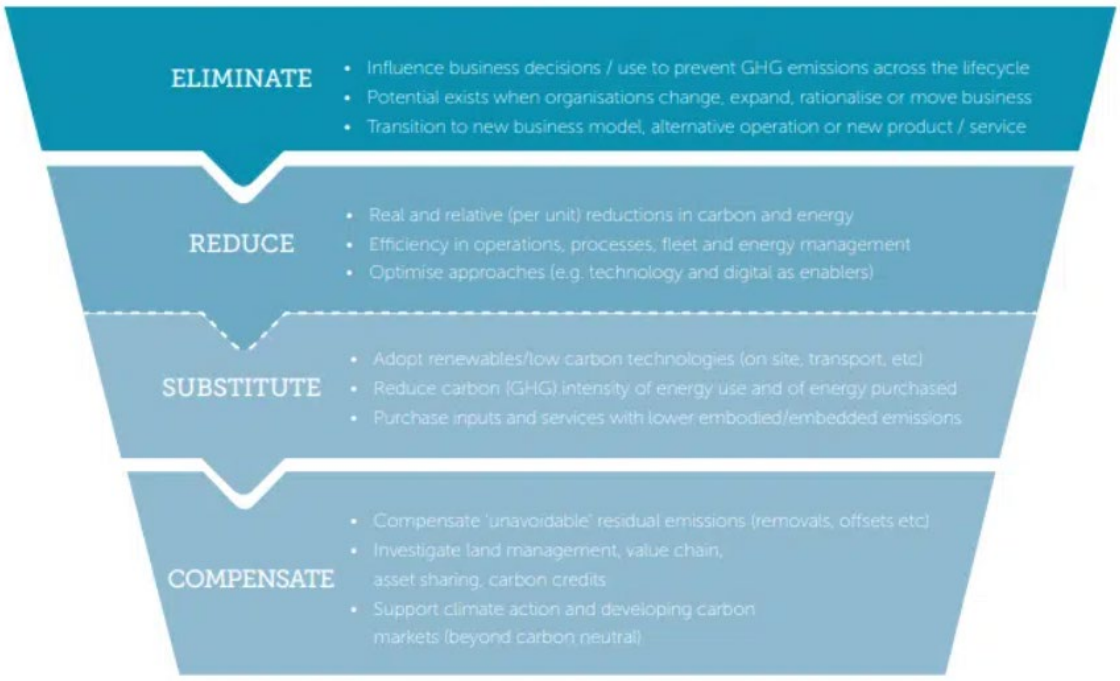
5. Targets and action planning

HHW is reporting on absolute emissions but reserves the right to consider an intensity-based approach once more data on our emissions becomes available[13].

In line with the GHG management hierarchy (as identified within Figure 9) HHW intend to achieve net zero through eliminating GHG at source, emission reductions, then GHG removal enhancements within our operating boundary, before offsetting.

This will be done in accordance with the best practical options that are available to HHW, factoring in impact and cost. Consideration will be given to changes in consumption (e.g. eliminating activities, more circular business models), application of emission reduction technologies and substitution (e.g. using lower embodied carbon materials, electricity or fuels).

Figure 8 – GHG management hierarchy, provided by the Institute of Environmental Management and Assessment (IEMA), updated 2020



[13] Absolute reductions are defined as a decrease in the total quantity of GHGs emitted. Reduction in the intensity of GHG emissions is defined as a decrease in GHG emissions per unit of output, expressed as a production volume, cost or revenue. Reference – ISO 14068 standard, note 3, section 10.1.

5.1 Actions

To decarbonise HHW need to take actions to reduce its emissions and mitigate those that are hard to abate. Table 5 outlines actions that **HHW plan to take over the short to long term, aligning to the Scottish Government target of reaching net zero by 2045**. Without fully undertaking options appraisals for each action, its impossible to say whether attainment of net zero will be achievable without significant offsets at this stage; and what likely interim targets there will be. Part of this plan will be about undertaking such assessment to highlight the actions that will reap the most emissions saving whilst not entailing excessive costs.

According to the SBTI Corporate Net Zero Standard[14] short and long term targets are defined as follows:

Short-term targets: These are aimed at achieving rapid and significant reductions in GHG emissions within a 5-10 year period. Companies are expected to set these targets to roughly halve their emissions by 2030.

Long-term targets: These focus on achieving deep decarbonisation by 2050 or sooner. Companies must aim to reduce their emissions by at least 90% before 2050. Any remaining emissions should be neutralised through permanent carbon removal and storage.

Table 5 – Actions to deliver net zero

Scope	Action	Target timeframe (Short term / Long term)	Indicative cost	Responsibility (Chief Executive Officer/Chief Financial Officer/Operations Director)
All	Improve data collection on areas where there are gaps or scopes aren't currently reported on	Short term – End of 2025	The cost to provide resource to implement monitoring systems and data collection.	CEO/CFO/OD
All	Quantify each action against financial cost and emissions savings made – to establish an interim emission reduction target and trajectory	Short term – End of 2025	To cost to provide resource to undertake this research and compile the data. This could be done as a student project which would help reduce cost but could impact output results.	CEO/CFO/OD
All	Develop a pathway to price embedded carbon per products	Long term – by 2040	Cost to undertake a Lifecyle Analysis of specific products and get this verified by a third party. Potential cost of environmental product labelling and certification.	CEO/CFO

[14] The Corporate Net-Zero Standard - Science Based Targets Initiative

Table 5 – Actions to deliver net zero (continued)

Scope	Action	Target timeframe (Short term / Long term)	Indicative cost	Responsibility (Chief Executive Officer/Chief Financial Officer/Operations Director)
1 -fuel for equipment	Ensure all equipment is serviced and maintained to ensure optimal running performance and reduce emissions associated with poor fuel combustion	Short term – ongoing requirement to be reviewed annually / as per equipment requirements	Minimal cost, in fact cost savings might arise from ensuring equipment is maintained and operating effectively – making them fuel efficient.	OD
1 – fuel for equipment	Investigate feasibility of changing fossil fuel based equipment to cleaner fuelled alternatives	Medium term – End of 2030	When equipment comes to the end of its life and requires replacing, alternative fuelled options will be considered.	OD
1 – fuel for vehicles	Investigate using HVO /electric alternative for forklifts onsite	Short term – End of 2026	Capital cost of replacing current forklift with an electric one. If direct fuel replacement with HVO, then there will be the increased cost associated with the price differential of using this alternative fuel.	OD
1 – fuel for vehicles	Investigate alternative fuels for company vehicles instead of diesel	Medium term – End of 2030	There will be a requirement to have vehicles that are fit for HHW purposes and can deal with the range required. Costs might involve charger installation on site and higher capital / lease costs associated with alternative fuelled vehicles.	CEO/CFO
1	Reduce vehicle journeys between the Dairy buildings and the sawmill – changing to provision of a bike	Short term		
1	Invest in a biomass boiler to heat the kiln.	Short term – End of 2025		CEO /CFO
2 purchased electricity	Investigate energy utilisation and efficiency measures.	Short term – End of 2025	Free if utilising business support services from Business Energy Scotland in the form of a site audit.	CEO / CFO
	Investigate onsite renewables with the landlord.	Short term - June 2026	Free to have discussion with landlord.	CEO / CFO

	If landlord is agreeable to onsite renewables undertake an onsite assessment into feasibility.	Short term - June 2026	Free if utilising business support services from Business Energy Scotland or Scottish Enterprise Ongen assessment.	CEO / CFO
	Install onsite renewables if feasible.	Short term - End of 2028	Cost will depend on type of renewables but will likely require significant capital expenditure and potential change to infrastructure. Costs will be investigated as part of the feasibility assessment.	CEO / CFO
3	Establish green leasing arrangements with the landlord.	Short term – End of 2025.	Free to have discussion with landlord.	
3	Increase home working (where practicable to do so).			

6. Governance

At HHW everyone will play a role in helping achieve the requirements of this plan, whilst continuing to grow the business and minimising impact. The CEO will be responsible for overseeing the plan, whilst the CFO will help provide the data and advise on how actions will impact financial management.

6.1 Plan review

HHW will publish progress against this plan on an annual basis and publicly disclose this through the website. This plan will be reviewed at the end of the reporting period but not updated unless:

- Scientific information indicates a need for revision.
- A change in the technical, economic or social contexts.
- There is a significant change to our operations.
- Significant changes occur in our structure (due to reorganisations, mergers/acquisitions, divestitures.
- Or closures that impact the plan as a result of corrective actions or a situation occurs that requires re-calculation of the baseline which impacts the plan.

6.2 Monitoring

HHW is a small business, with many of its staff fulfilling multiple roles and responsibilities. How HHW monitors performance will differ to that from a larger small to medium sized enterprise (SME) or a large corporation.

Where opportunities arise to act on a day-to-day basis this will be done immediately with consideration given to the degree of impact and cost relating to the action taken.

Weekly meetings held between the CEO and CFO include monitoring of the plan on its agenda.

Strategic business planning meetings incorporate monitoring of this plan and consider future trends to ensure HHW is progressing .

6.3 Managing risk

Businesses across all sectors are being impacted by extreme weather. By preparing our business to the uncertainties that extreme weather can bring to HHW and its supply chain, these risks can be managed to ensure business continuity and potentially identify opportunities for new products and services. According to Adaptation Scotland[15] some example climate impacts for business include (but not limited to):

- People – Workers are unable to get to work and customers unable to access premises due to flooded roads and cancelled service.
- Products and services – Businesses cannot source their usual supplies due to disruption of supply chains.
- Premises – Heavy rain causes a roof to leak, damaging equipment and stock. Wind could cause infrastructure damage due to flying debris or fallen trees.
- Overheating results in heat stress for workers.
- Processes – Business operations are halted due to loss of electricity, water or telecoms after a storm.
- Place – Local flooding affects workers, customers, and operations. Goods unable to leave the premise.

It is imperative that HHW consider not only emissions reduction but also take measures to adapt to the changing weather patterns arising from climate change. The benefits of doing so include ensuring business continuity, future proofing our products and services, whilst minimising damage and repair costs which might impact our insurance premiums.

To adapt, over the short term, HHW will:

- Develop contingency plans for extreme weather conditions.
- Introduce health and safety protocols to protect workers during extreme weather conditions.
- Involve workers in reporting climate risks in reference to the Fair Work Charter for Severe Weather[16] created by the Scottish Trade Unions Congress (STUC).
- Assess flood risk from pluvial events.
- Identify ways to make the premises more resilient to extreme weather.
- Poorly maintained buildings are less able to withstand extreme weather and are more likely to suffer structural damage and harm your business. As such HHW will ensure regular building inspection and maintenance activity, with particular attention given to drains, gutters, downpipes, loose external cladding or roofing, and loose masonry.
- Check existing and renewed insurance covers our business for a range of eventualities connected to weather related disruptions.
- Prepare for supply chain disruption by diversifying our network of suppliers, in line with the UK Government's Supply Chain Resilience Framework[17], working closely with out timber procurement specialist.
- Identify which processes, equipment and machinery are most important and how to protect them from extreme weather.
- Ensure data and information is backed up.
- Take the opportunity when it arises to collect storm recovered timber.

[15] v5-6166-as-business-resilience-final.pdf
[16] fair-work-severe-weather-charter-final.pdf
[17] DBT supply chains resilience framework - GOV.UK