



MacArthur
Green

CARBON MANAGEMENT PLAN

2021 - 2022

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MacArthur Green is helping to combat the climate crisis through working within a carbon negative business model. Read more at <https://www.macarthurgreen.com/our-carbon-negative-business-model>.



Contents

1	CARBON MANAGEMENT POLICY	1
2	CARBON MANAGEMENT PLAN	2
2.1	Scope of Carbon Management Plan	2
2.2	Our Carbon Management Process	3
2.3	Our Carbon Reduction Target	3
3	LOCHGAIR WOODLAND PROJECT	4
4	CARBON FOOTPRINT TRACKING	6
4.1	Baseline carbon footprint.....	6
4.2	Carbon footprint 2019-2020 (Year 1).....	6
4.3	Carbon footprint 2020-2021 (Year 2).....	9
5	CARBON REDUCTION PLAN	10
5.1	Acknowledgement of company’s restrictions	10
5.2	Carbon reduction actions	10
5.2.1	Travel	10
5.2.2	Heating & Cooling	11
5.2.3	Lighting.....	12
5.2.4	Electrical Equipment	12
5.2.5	Buildings	13
5.2.6	Supply Chain	13
6	CARBON OFFSETTING PLAN	15

LIST OF FIGURES

Figure 1	The assessment boundary	2
Figure 2	MacArthur Green’s carbon management process.....	3
Figure 3	Woodland at the East Kames end of the site	4
Figure 4	The Shoreline of Lochgair Woodland (looking from East Kames).....	4
Figure 5	MacArthur Team removing invasive species.....	5
Figure 6	Lochgair woodland cumulative carbon sequestration.....	5
Figure 6	Carbon footprint – Baseline (2018-2019).....	6
Figure 7	Carbon footprint - Year 1 (2019-2020).....	7

1 CARBON MANAGEMENT POLICY

At MacArthur Green, we manage and reduce our greenhouse gas emissions so we can be a carbon negative business. We make this happen by:

- **Measuring our emissions:** What you measure, you can manage. We assess and report our carbon footprint on an annual basis.
- **Managing our emissions:** We have a carbon management plan (this document) to make sure we actively plan to reduce our emissions.
- **Setting meaningful targets:** It's no good being vague. By setting targets to reduce emissions (on a per unit turnover basis) year on year we can be clear on what we can review where we are, and what are aiming for. We can also look honestly at what we have achieved to understand whether we have done enough to achieve our goals.
- **Offsetting our remaining emission right now:** Where we can't eliminate emissions, we are offsetting them. Offsetting is still a relatively new thing and so we are circumspect about where we choose to invest to offset. For that reason, we offset our residual emissions through proper projects. For us that means projects verified against:
 - the international Verified Carbon Standard (VCS),
 - Gold Standard; or
 - Certified Emission Reductions (CERs).

We aim to offset our emissions each year by twice our annual emissions, to enable us to offset our entire historic carbon footprint (that means going back all the way to when the company was founded).

- **Offsetting plans for our future:** We have planted a woodland of almost 30,000 native broadleaved trees at a site we bought in Lochgair, Argyll. Our Lochgair Woodland is registered with the Woodland Carbon Code (WCC). It is estimated that the woodland will sequester a total of 10,340 tonnes of carbon over 100 years. This is measured in Woodland Carbon Units (WCU) which is a tonne of carbon dioxide which has been sequestered in a WCC-verified woodland. This means it has been independently verified and is guaranteed to be there. Once we have the WCUs from Lochgair, these can be used to offset any unavoidable carbon emissions from MacArthur Green's business activities. We do not plan to sell any excess units, so in future years, the woodland will be sequestering significantly more CO₂ than MacArthur Green's emissions.
- **Biodiversity bonus features:** We have not stopped at planting our Lochgair woodland. We have installed bird and bat boxes on site to encourage biodiversity, and we are constantly looking at other opportunities to do more and add to our natural capital. For anyone reading this, all ideas and suggestions are welcome!

2 CARBON MANAGEMENT PLAN

2.1 Scope of Carbon Management Plan

The scope of our company's carbon management plan is shown below. We use subcontractors to complete some survey work in other parts of Scotland. We are measuring and including subcontractor mileage in Scope 3.

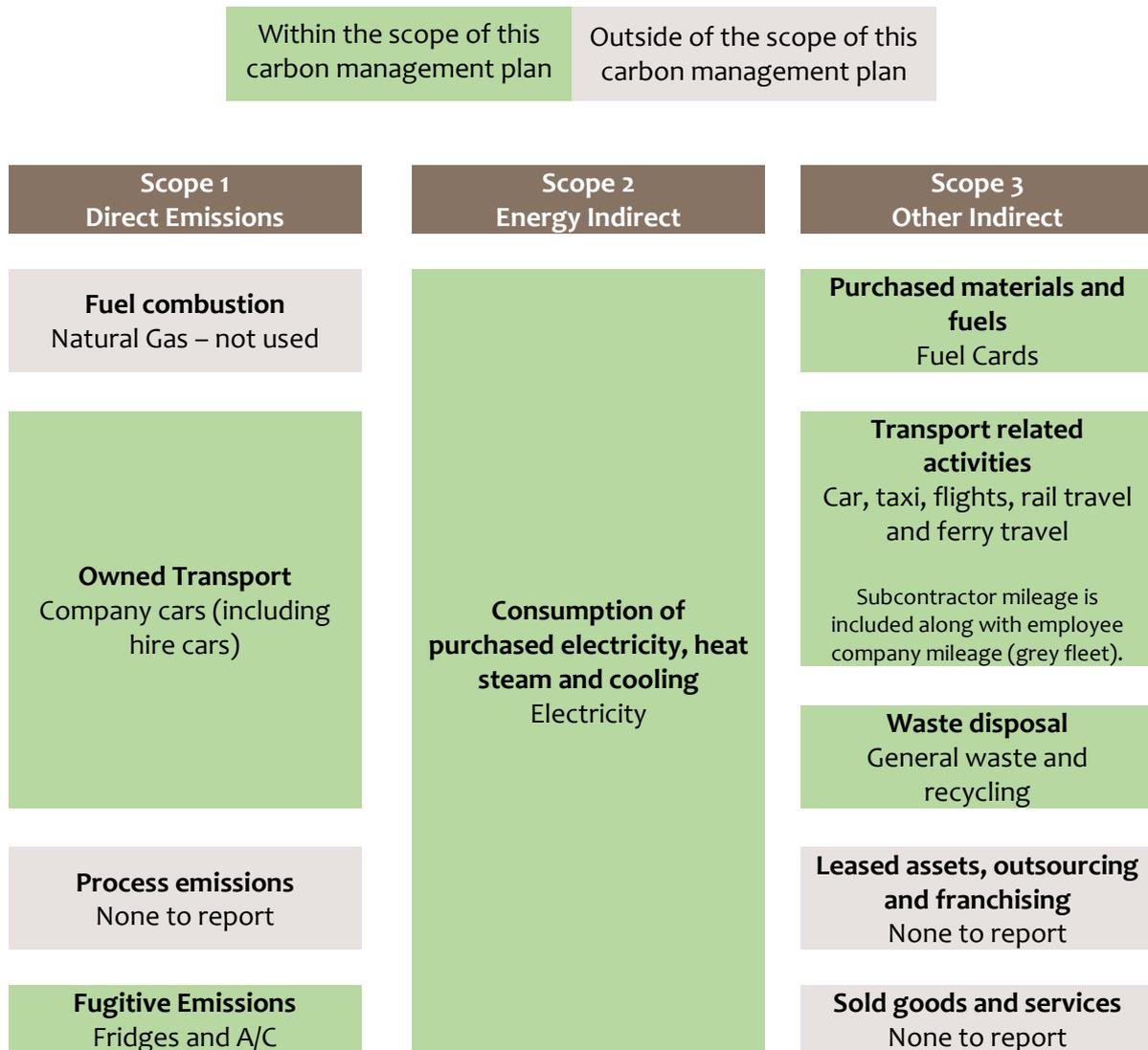


Figure 1 The assessment boundary.

The areas not within the scope of the carbon management plan have not been covered for the following reasons:

- MacArthur Green does not operate any processes which release greenhouse gases into the atmosphere as fuel combustion (natural gas).
- There are no direct emissions from processes.
- There are no leased assets, outsourcing or franchising to report.

2.2 Our Carbon Management Process

The carbon agenda is changing all the time, with new opportunities to explore and pursue. For this reason, this carbon management plan is frequently reviewed, with an annual review and update at least once a year.

Carbon management is a cyclical affair. Our plan is to take carbon emissions on a downward spiral to zero. For those who like a visual, here is an overview of the process below.

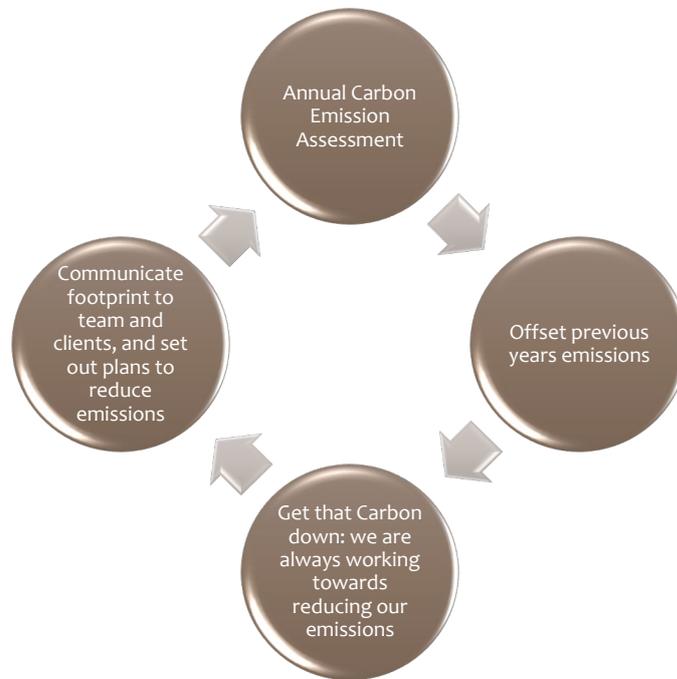


Figure 2 MacArthur Green's carbon management process.

2.3 Our Carbon Reduction Target

We aim to reduce our annual carbon footprint on a **per unit turnover basis (tCO₂e/£m turnover)** by at least 10% per year on an ongoing basis. We meet this target by the actions detailed in Section 4.

3 LOCHGAIR WOODLAND PROJECT

It's been an eventful time for our Lochgair Woodland with lots of learning along the way.

Not all of our trees survived, as is the way with woodland planting from time to time, so we have replaced these where necessary.

Bracken control has been an issue on site, as has rhododendron. We also have deer that managed to get past the deer fencing (via a gap in the fence above a stream), so deer control by our Director, David MacArthur, has been ongoing.

We have been hindered in getting contractors on site due to Covid-19 restrictions. We have now appointed contractors to manage invasive species on an ongoing basis.



Figure 3 Woodland at the East Kames end of the site (2020).



Figure 4 The Shoreline of Lochgair Woodland (looking from East Kames).



Figure 5 MacArthur Team removing invasive species.

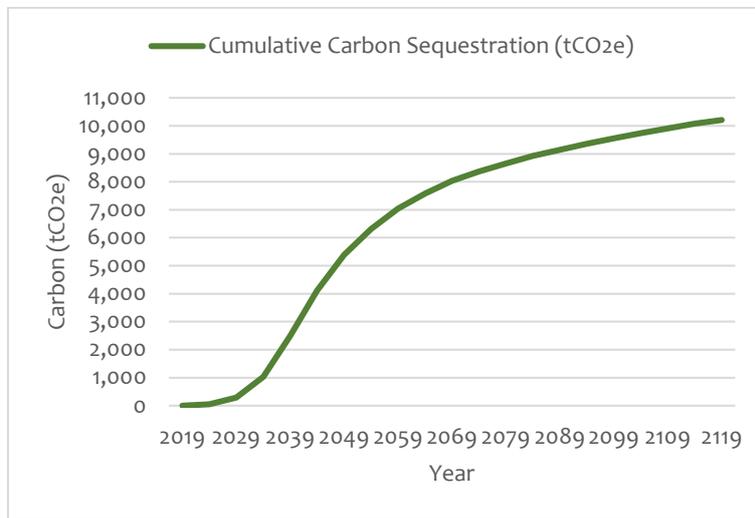


Figure 6 Lochgair woodland cumulative carbon sequestration.

4 CARBON FOOTPRINT TRACKING

4.1 Baseline carbon footprint

The baseline year for comparing future carbon footprint reductions was 01/02/18 to 31/01/19. This period is aligned to the company's financial year. MacArthur Green's carbon footprint for the baseline year was **52.85 tCO₂e**. The detailed results and the methodology used for the calculations can be found in the carbon footprint appraisal report for that year.

The chart below shows the breakdown of the emissions during the baseline year:

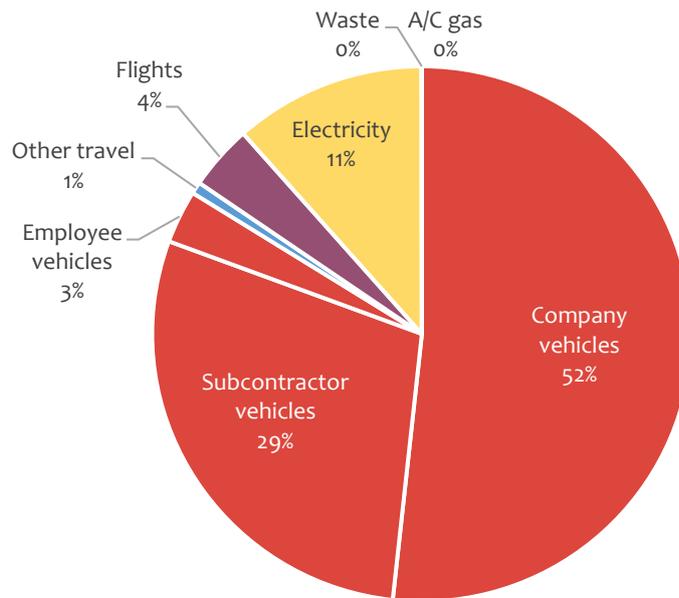


Figure 7 Carbon footprint – Baseline (2018-2019)

4.2 Carbon footprint 2019-2020 (Year 1)

The subsequent year (hereafter referred to as 'Year 1') was 01/02/2019 to 31/02/2020. MacArthur Green's carbon footprint for Year 1 was **57.29 tCO₂e**. The detailed results and the methodology used for the calculations can be found in the carbon footprint appraisal report for that year.

The chart below shows the breakdown of the emissions during Year 1:

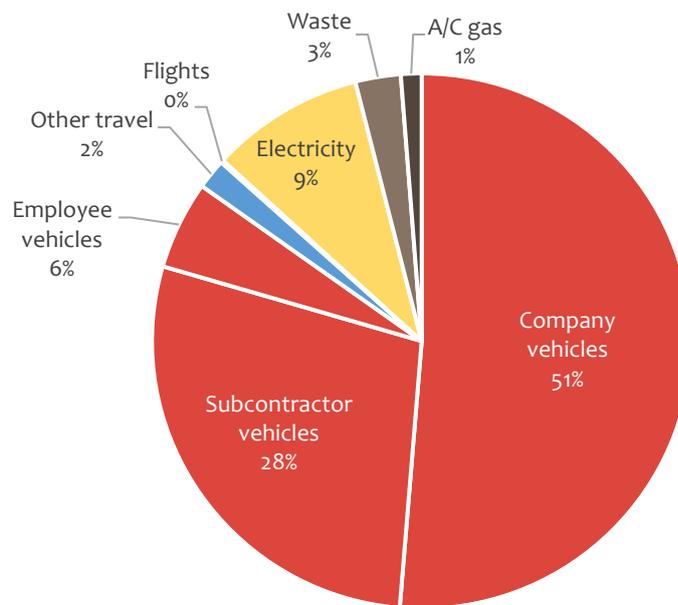


Figure 8 Carbon footprint - Year 1 (2019-2020)

Table 1 Carbon footprint comparison.

Element	Baseline 2018-2019 (tCO ₂ e)	Year 1 2019-2020 (tCO ₂ e)
Company vehicles	28.89	29.4
Subcontractor vehicles	16.14	16.2
Employee vehicles	1.79	3.1
Other travel	0.40	1.0
Flights	2.19	0.1
Electricity	6.43	5.3
Waste	0.01	1.6
A/C gas	0.00	0.7
Total Tonnes of CO₂e	55.85	57.29
Tonnes of CO₂e per employee	2.8	2.1
Tonnes of CO₂e per £M turnover	30.7	34.4
Total vehicle travel	46.8	48.6
As a percentage of total	84%	85%
Number of survey hours	15846	14809
Number of miles (all vehicles)	142459	152122

Our carbon footprint has unfortunately **increased** in comparison with the baseline year. This is primarily due to an increase in the number of miles travelled for survey work. This is due to the project locations and since the projects that we are working on change from year to year, it is not easy to make an annual comparison. The number of miles travelled (including subcontractor mileage) **increased by approximately 10,000 miles**.

In November 2019, we replaced one Toyota Hilux with a Toyota Rav4. Future vehicle changes are discussed in Section 4. The average tCO₂e/km figure for company vehicles **decreased by 6%** in Year 1 compared to the baseline year.

The emissions from flights **decreased by 96%** from 2.19 to 0.1 tCO₂e. We implemented a zero flight policy in 2019, and have only had one flight since then. This was a flight to Dublin where public transport options were not practical. We have not used any flights since then.

Electricity consumption decreased by 1,254 kWh (6%), while the associated emissions has decreased even further due to the continual decarbonisation of the national energy supply, meaning that the overall emissions from electricity consumption **decreased by 18%** compared to the baseline year.

The emissions from other travel have **increased** from 0.4 to 1.0 tCO₂e. This is due to several projects which required ferry travel and train travel.

The emissions from waste were calculated as 1.6 tCO₂e for year 1 and was calculated as 0.01 in the baseline year. This is due to a difference in the way that the emissions were calculated, and we expect to have a more accurate figure for comparison in Year 2.

4.3 Carbon footprint 2020-2021 (Year 2)

A year like no other during the Covid-19 pandemic, 2020 required a full operations review to ensure health and safety was considered alongside and delivering client projects to time and on budget.

In terms of carbon emissions, the relevant changes to business operations were:

- No vehicle sharing – we prohibited sharing vehicles for travelling to site. Where a survey required two surveyors, this would involve sending each surveyor in their own vehicle rather than one vehicle. Our carbon emissions from fuel consumption will accordingly have increased due to the increased mileage (an increase of 32% in the number of miles compared with the previous year, despite the number of survey hours being approximately the same). This is difficult to compare year on year as the number of miles can vary depending on the project locations.
- Office energy – a skeleton team are working from the office has meant reduced electricity consumption. The central heating system uses recycled air so cannot be used at present, and we have had to open windows for ventilation and use individual electric heaters. We used 32% less electricity compared to the previous year.
- Working from home – we have not included employee commuting in the scope of our carbon calculations, but it is something we plan to look at in future. Enabling home working for almost all our employees has meant that the requirement for commuting has been very minimal.
- Suzuki Jimny – a 2009 model vehicle was replaced with a new 2020 model. Unfortunately, there were no four wheel drive electric vehicle options available and this vehicle is used for off road driving to access survey locations. The CO₂ emissions figure for the new vehicle is 174 g/km compared to 191 g/km for the old vehicle. This is a 12% decrease.
- Electric vehicle charge point – this was installed at the office with grant funding from Energy Saving Trust. It means we can now rent or purchase an electric vehicle.

5 CARBON REDUCTION PLAN

5.1 Acknowledgement of company's restrictions

We rent our office premises in Glasgow. The terms of our lease mean we unfortunately cannot make structural energy improvement changes to the building, which is not uncommon. Due to the length left of our lease it would not be cost effective to install new systems (e.g. heating controls, LED lighting) without our landlord being willing to pay for these at least in part as an upgrade to the property. This is not an option at present.

The survey work that we do means that our team require to use 4x4 vehicles to get safe access to site across rough tracks to carry our surveys. This restricts what we can do to minimise our carbon emissions as there are no suitable long range, electric vehicles (EVs) on the market currently. However, we are constantly monitoring new models coming on to the market.

5.2 Carbon reduction actions

The following actions are designed to help our company reduce our carbon emissions and meet our target.

Six months after the end of the appraisal period, all carbon reduction actions must be assessed against performance. Should an action not be in place or is incomplete, a corrective action should be enacted to ensure our reduction target is met.

5.2.1 Travel

Action Number	TR01
Action description	Zero flight policy. The company will avoid travel by plane unless it is impractical to use other forms of transport, for example due to the total travel time.
Allocated to	Operations Manager.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Check number of flights used in 2019-2020 financial year and look at the reasons.
Corrective action (only if performance assessment reveals the action is not being carried out)	If flight travel has been used unnecessarily, look at other ways to implement the zero flight policy (Director approval before purchase of flights for example).
Results	One flight was taken in 2019 (Dublin). No flights were taken in 2020 or 2021 to date.

Action Number	TR02
Action Description	Plan for replacement of Hiluxes and Jimny with a lower emissions model. Replacing one Hilux with Rav4 (118 g/km CO ₂) will result in a 40% reduction for that vehicle.
Allocated To	Operations Manager & Directors.

Action Number	TR02
Performance assessment (to be completed 6 months after the end of the appraisal period)	One vehicle to be replaced. Commitment to change all vehicles to hybrid or electric by end of 2021.
Corrective action (only if performance assessment reveals the action is not being carried out)	Consider adding fuel monitoring equipment to hiluxes to track fuel consumption and encourage more efficient driving.
Results	<p>Driver efficiency training given to Ornithology Field Surveyor who drives the Jimny. Feedback to be sought from Surveyor and training may be rolled out to team.</p> <p>We now have an EV charge point at the office, which means we can look at EV or PHEV vehicles. We have carried out a review of 4x4 vehicles available in the market and shared our findings with subcontractors so they can make informed decisions about buying or using 4x4 vehicles too.</p> <p>We have spoken to our client for one of our Ecological Clerk of Works sites about leaving one of our more fuel intensive 4x4 vehicles on site at their construction compound and switching to using a small EV to get our surveyors to and from site. This received great feedback from the client, and we are now renting a small EV with the right range to see how that goes. We will monitor how much fuel this saves us.</p> <p>Renting rather than buying allows us get used to this new way of working before making the financial commitment of buying an EV in a market where things like range are improving all the time.</p>

5.2.2 Heating & Cooling

Action Number	HCo1
Action Description	Measure and track electricity use in office (weekly readings). Use thermometers to monitor temperature. Aim for 5% reduction on previous year.
Allocated To	Operations Manager.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Compare annual electricity usage.
Corrective action (only if performance assessment reveals the action is not being carried out)	Investigate costs for new heating controls to be added to current system (possible funding available from Resource Efficient Scotland).
Results	<p>Due to Covid, we have not been able to use our current heating and cooling system as it uses recycled air, which is not permissible according to HSE due to the risk of passing round Covid.</p> <p>We have also had to keep windows open to ensure adequate ventilation in accordance with HSE guidance. To keep team members warm, we have bought electric heaters. electricity in the office has decreased by 32% in 2020 compared with the previous year.</p>

5.2.3 Lighting

Action Number	Ll01
Action Description	<p>Quotes for LED bulb replacement have been obtained. £3,825 and £2,159. Ex VAT.</p> <p>All lights to be switched off using master switch at end of day.</p>
Allocated To	Directors.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Review energy use (aim for 5% reduction as per HC01) and review LED lighting quotes.
Corrective action (only if performance assessment reveals the action is not being carried out)	Look at LED lighting quote again if reduction has not been achieved.
Results	<p>The cost was deemed too expensive by Directors as we do not have a long lease on the office, and our landlord is not looking to pay towards this. We would need security of tenure to be sure we would enjoy the benefit of this investment.</p> <p>We have instead looked to replace lightbulbs as they go with LED lights, and will continue on that basis.</p>

5.2.4 Electrical Equipment

Action Number	EQ01
Action Description	Low energy equipment shall be purchased where this option is available (printers, monitors, laptops, PCs, kitchen appliances, heaters).
Allocated To	Operations Manager.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Check equipment purchased in 2019-2020 and whether energy consumption was a factor in purchasing decision.
Corrective action (only if performance assessment reveals the action is not being carried out)	Update the purchasing procedure and ensure this is communicated effectively.
Results	<p>We have purchased a printer that has been refurbished rather than purchasing a new machine. This is an excellent working example of circular economy thinking where repurposing functioning equipment helps to reduce waste. We will look to find a good cause for our existing printer as it still works but is unsupported by our service contract.</p> <p>The purchasing procedure has been updated to highlight energy consumption and sustainability. This is communicated to employees during the induction.</p>

Action Number	EQ02
Action Description	Batteries.
Allocated To	Operations Manager.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Record number of batteries purchased over 12 month period. Monitor this in the next appraisal period and continue to look for alternative options.
Corrective action (only if performance assessment reveals the action is not being carried out)	n/a.
Results	It has not been possible to use rechargeable batteries with the Anabat devices. It's possible that future models of this bat device will have a removeable lithium rechargeable battery. Part used batteries are donated to Hillhead Primary School as they still work, but are not sufficiently charged to allow them to be used in Anabat detectors as we need to be certain they will not run out whilst commissioned on site.

5.2.5 Buildings

Action Number	BU01
Action Description	The office space is rented and we are unable to make modifications to the building. Lease ends – 31 Dec 2022.
Allocated To	Directors.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Not applicable.
Corrective action (only if performance assessment reveals the action is not being carried out)	Not applicable.
Results	We will consider energy efficiency of potential new offices should we not extend our lease. Should we look to extend our lease, we will attempt to negotiate inclusion of energy efficient measures in our lease with cost sharing with landlord where possible.

5.2.6 Supply Chain

Action Number	SC01
Action Description	Communicate carbon reduction aims to subcontractors and encourage them to look at lower emission vehicles. Collect current vehicle data (CO ₂ emissions g/km) and ask for this information for all new subcontractors.

Action Number	SC01
Allocated To	Operations Manager & Project Managers.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Use vehicle emissions data for carbon footprint 2019-2020 calculation.
Corrective action (only if performance assessment reveals the action is not being carried out)	Identify alternative subcontractors where possible if positive change is not apparent.
Results	Letters have been sent to sub-contractors to inform them of our carbon negative approach and encourage them to adopt similar measures to reduce carbon emissions. The feedback received so far is very positive. Range and 4WD capability are the limiting factors for subcontractors when thinking of changing to an electric vehicle. We shared our research so far with them and will continue to update them with our findings over the coming months.

Action Number	SC02
Action Description	Request details of carbon reduction plans for top suppliers and aim to influence positive change. Update purchasing policy to include carbon management checks for new suppliers where practical or where the purchase is over a certain amount.
Allocated To	Operations Manager.
Performance assessment (to be completed 6 months after the end of the appraisal period)	Top 10 suppliers to be contacted in 2019-20 and positive responses received.
Corrective action (only if performance assessment reveals the action is not being carried out)	Identify alternative suppliers.
Results	The purchasing policy has been updated. Responses from top suppliers to be collated and summarised.

6 CARBON OFFSETTING PLAN

Our main aim is to be a carbon negative company, but we don't just want to tick the box. For us, the journey to being carbon negative had to be authentic to our business and our team.

Our team voted on the offsetting schemes and this helped to ensure everyone felt involved in the process.

Looking ahead to when Lochgair Woodland begins to sequestrate carbon, we have taken care to explore biodiversity benefits available to us along the way and are continually learning about what more we can do or how we can improve.

It doesn't stop with being carbon negative, our mission is to reduce carbon emissions to as close to zero as possible.

In order to achieve this carbon negative status, we have committed to achieve carbon reductions within our organisation. We will offset all residual emissions by a factor of two (it's a climate emergency after all, so we all need to do more).

Our offset projects and methodology for offsetting meet the following principles:

- The offsets we purchase or the allowance credits we surrender represent genuine, additional GHG emission reductions elsewhere.
- The projects involved in delivering our offsets meet the criteria of additionality, permanence, leakage and double counting.
- Our carbon offsets are verified by an independent third party verifier.
- Our credits from carbon offset projects are only issued after the emission reduction associated to the offset project has taken place.
- Our credits from carbon offset projects are retired within 12 months from the date of the declaration of achievement of carbon neutral status.
- Our credits from carbon offset projects are supported by publicly available project documentation on a registry which provides information about the offset project, quantification methodology and validation and verification procedures.
- Our credits from carbon offset projects are stored and retired in an independent and credible registry.

View our carbon offset certificate here: <https://www.macarthurgreen.com/files/2020-carbon-footprint-offset-certificate-CarbonNeutral.pdf>

Our offset credits are retired from either Markit or APX Registry on our behalf by Carbon Footprint Ltd. Our offset credits can be tracked by anyone on the registry website (<http://mer.markit.com/br-reg/public/index.jsp?s=ca> or <https://apx.com/registries/apx-vcs-registry>) by running a search using our company name (and the date of retirement in the case of APX Registry) – the credits will appear as retired by Carbon Footprint Ltd with a statement saying “Retired on behalf of Company”. When doing this, information will be displayed including:

- The amount of offset.

- The type of offset and projects involved.
- The number and type of carbon offset credits used and the time period over which the credits have been generated.