

MoorLIFE 2020 Project:

D5 Carbon Audit Update Report 2019

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(LIFE14 NAT/UK/000070)



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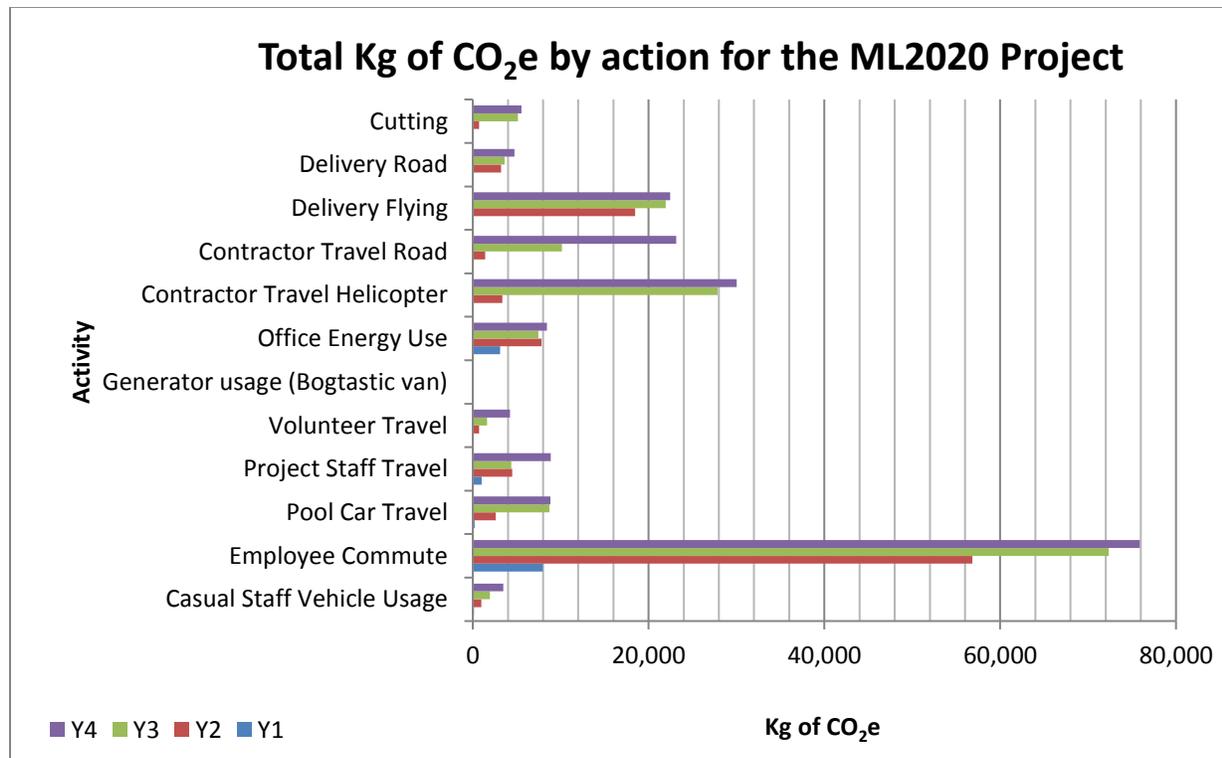
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Highlights

- As part of the MoorLIFE 2020 project, action D5, Moors for the Future Partnership will monitor the carbon footprint of the project, with the aim of monitoring our carbon expenditure to identify where carbon savings can be made.
- This carbon audit builds upon the original MoorLIFE carbon audit, by including additional activities (e.g. office energy use) that are both directly controlled by Moors for the Future Partnership (scope 1 and 2 activities), and indirectly controlled (scope 3).
- Including the travel figures for our associated beneficiaries (National Trust, Pennine Prospects, RSPB), total Carbon Dioxide Equivalents (CO₂e) produced in year 1 of the project was 12,435 kg CO₂e
- 100,638 kg of CO₂e was emitted during year 2 of the MoorLIFE 2020 project.
- 165,182 kg of CO₂e was emitted during year 3 of the MoorLIFE 2020 project.
- 195,760 kg of CO₂e was emitted during year 4 of the MoorLIFE 2020 project.
- The activities that contributed the most kg of CO₂e in year 4 were contractor travel – Helicopter and employee commute.

Graphical representation

A graph showing total kg of CO₂e emitted delivering ML2020 split by activity to date



Executive summary

Moors for the Future Partnership and our associated beneficiaries are undertaking a carbon audit of all actions (A1 – E7) associated with the MoorLIFE 2020 project. The carbon audit for MoorLIFE 2020 aims to expand on the carbon audit undertaken by Maskill *et al* (2015) in the original MoorLIFE project by expanding the number of activities included. The activities are split into scope 1 and 2 activities, which are defined as any activities controlled directly by Moors for the Future Partnership, whereas scope 3 activities are those activities not directly controlled by Moors for the Future Partnership.

Office energy use was only calculated for Moors for the Future Partnership primary office base (Moorland Centre). Additional offices, e.g. Aldern House, were not included because it was deemed too difficult and time consuming for this project to work out the split.

The activities associated with scope 1, 2 and 3 were calculated using the methodology set out in D5 Carbon audit guide (2016) produced by Benson, Crouch, Thorpe and Walker. Greenhouse gas emission data for our partner organisations (National Trust, RSPB and Pennine Prospects) was not included in the D5 update report 2016, because the data was unavailable at the time. With the additional year 1 data included, it is possible to determine that 12,435 kg of CO₂e (carbon dioxide equivalents) was used to deliver year 1 of the ML2020 project. This has increased to 195,760 kg of CO₂e emitted during year 4 of the MoorLIFE2020 project.

The primary activities that contribute to total greenhouse gas emissions in year 4 of the project are:

- Employee commute – 75,899 kg of CO₂e
- Contractor Travel – Helicopter – 30,014 kg of CO₂e
- Contractor Travel – Road – 23,145 kg of CO₂e

The reason for this is primarily since Year 1 the amount of conservation works and staff working on ML2020 has significantly increased, and therefore the number and scale of operations have also increased, which in turn increased the amount of CO₂e emitted.

As part of the MoorLIFE 2020 project, Moors for the Future Partnership and our associated beneficiaries are committed to reducing our carbon footprint through the following:

- Siting lift points as close to the working area as possible, where possible
- Specifying local helicopter take-off sites and the right helicopters for the job

- Accurately specifying areas using desk-based GIS and helicopter-mounted GPS
- Car sharing / use of public transport when and where logistically possible
- Purchase or lease of vehicles with the lowest CO₂/ km emissions (e.g. hybrid vehicles)

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1. Introduction

As part of the MoorLIFE 2020 (ML2020) project action D5, a carbon audit will be undertaken for all greenhouse gas (GHG) emissions (e.g. carbon dioxide (CO₂), methane (CH₄) & nitrous oxide (N₂O) used in delivering the project. As specified by Defra (2017), the different GHG emissions are then converted into carbon dioxide equivalents (CO₂e), allowing comparison between the different types of GHG emissions and a total emissions figure can be calculated (OECD Statistics, 2013).

The aim of this document is to report the full kg of CO₂e figures used to deliver year 1 (1st October 2015 – 31st March 2016) and the annual carbon expenditure figures for the subsequent years of the project including year 2 (1st April 2016 – 31st March 2017), year 3 figures (1st April 2017 – 31st March 2018) and year 4 (1st April 2018 – 31st March 2019).

This report does not include carbon intensity figures by activity or site, as further activities (e.g. cutting) will be undertaken on the ML2020 project sites in future years. It was therefore decided that these figures will be included in the final report when all conservation activities on all sites have been completed.

ML2020 is being delivered in partnership with a number of organisations, therefore emissions for our associated beneficiaries: National Trust (NT), RSPB and Pennine Prospects are also reported on, along with any contractor travel associated with delivering the conservation works have been included in the audit.

The different activities included within the carbon audit are identified in Table 1, along with the group or 'scope' of emission the activities relate to. Scope 1 and 2 activities relate to those actions which are controlled directly by Moors for the Future Partnership (MFFP) (e.g. driving works vehicles), whereas scope 3 activities are activities which are indirectly controlled by MFFP (contractors and partners' travel) (Carbon Trust, 2017).

Table 1 - Activity and scope reported on in the MoorLIFE 2020 Carbon Audit

Activity	Scope
Works vehicles use	1 and 3
Project staff commute	1 and 3
Contractor travel	3
Volunteer travel	3
Flying	3
Deliveries	3
Office energy use (Moorland Centre only)	2

Adapted from Benson, Crouch, Thorpe, Walker 2016

Since the original MoorLIFE carbon audit, the number of activities covered within the carbon audit has been expanded to produce a more comprehensive audit. The original audit can however still be used as a

guide for expected outcomes associated with the ML2020 carbon audit. Maskill *et al* (2015) identified that those activities involving helicopters and the delivery of materials produced the most carbon emissions.

An overview of the carbon released by partner is presented for our associated beneficiaries (see section 3.8), this is not intended for direct comparison due to the different work areas and requirements of the sites our associated beneficiaries work on. The information has been presented by partner to allow each organisation to put measures in place to reduce their carbon footprint where applicable.

2. Methodology

2.1. Conservation work and travel

The methodology used to calculate the carbon emission figures for all actions (office energy usage, travel and conservation work activities (e.g. brash spreading) is set out in the D5 update report 2016, produced by Benson, Crouch, Thorpe and Walker. As the methodology for these activities has not changed in the intervening period it will not be covered in this report.

2.2. Assumptions

A number of assumptions were made when calculating the GHG emissions figure. A full list of the assumptions made is presented in Appendix 1 of this report. Any further assumptions can be added to the master document found here - <N:\Projects\MoorLIFE 2020\Science\Data\D5 Carbon audit\Data\Carbon Audit Assumptions made.docx>

3. Results

3.1. MoorLIFE 2020

In total ML2020 emitted 195,760 kg of CO₂e during year 4 of the project (see Table 2 below). This represents a 15% increase in the amount of CO₂e emitted between years 3 and 4 (see Figure 1 below). The primary reason for this increase is because the amount of conservation work undertaken has increased year on year as forecasted. In addition to this the number of employees has increased since the project began.

Table 2 - Total CO₂e for all partners by activity per annum

Activity	Scope	Year 1	Year 2	Year 3	Year 4
		kg of CO ₂ e			
Casual Staff Vehicle Usage	1 + 3	129	980	1,938	3,475
Employee Commute	1 + 3	7,890	56,843	72,343	75,899
Pool Car Travel	1 + 3	222	2,591	8,708	8,830
Project Staff Travel	1 + 3	998	4,487	4,384	8,882
Volunteer Travel	3	0	715	1,613	4,225
Generator Usage (Bogtastic Van)	2	0	0	53	113
Office Energy Use	2	3,106	7,809	7,451	8,436
Contractor Travel Helicopter	3	0	3,379	27,867	30,014
Contractor Travel Road	3	0	1,414	10,151	23,145
Delivery Flying	3	0	18,483	21,944	22,463
Delivery Road	3	0	3,204	3,600	4,731
Cutting	3	0	733	6,163	5,546
Total CO₂e		12,435	100,638	165,182	195,760

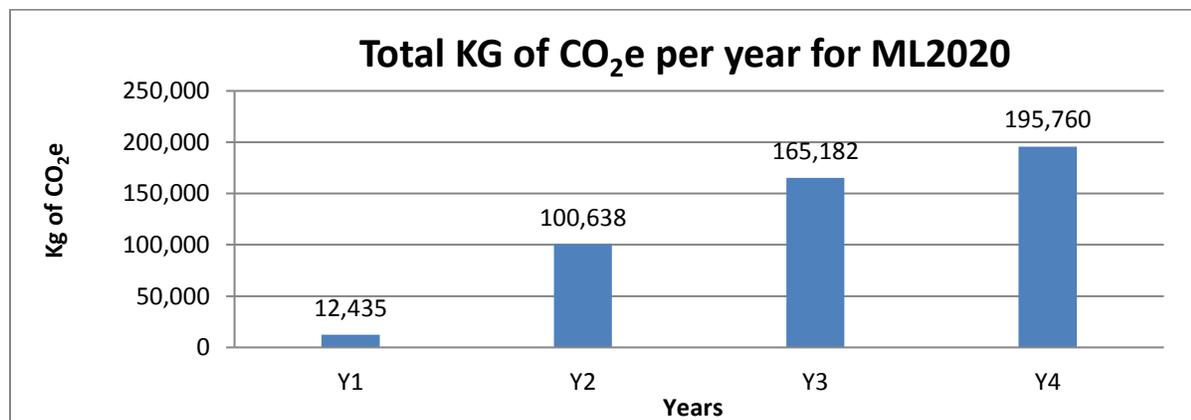


Figure 1 - Total CO₂e expenditure per annum by the MoorLIFE2020 project

3.2. Travel

Figure 2 below shows that the total Kg of CO₂e produced by staff members directly involved with ML2020 indicates a gradually increase year on year. This is because of the increase in the amount of work undertaken on all action codes as was initially programmed in. The largest contribution to Staff Travel is Employee Commute, which has the largest contributing factors every year with 75,899 kg of CO₂e in year 4, an increase of 14,838.35kg of CO₂e from year 3. The lowest contribution was from volunteer travel with a total contribution of 113kg of CO₂e per year, but again this is still an increase on the previous year's figure of 53kg of CO₂e.

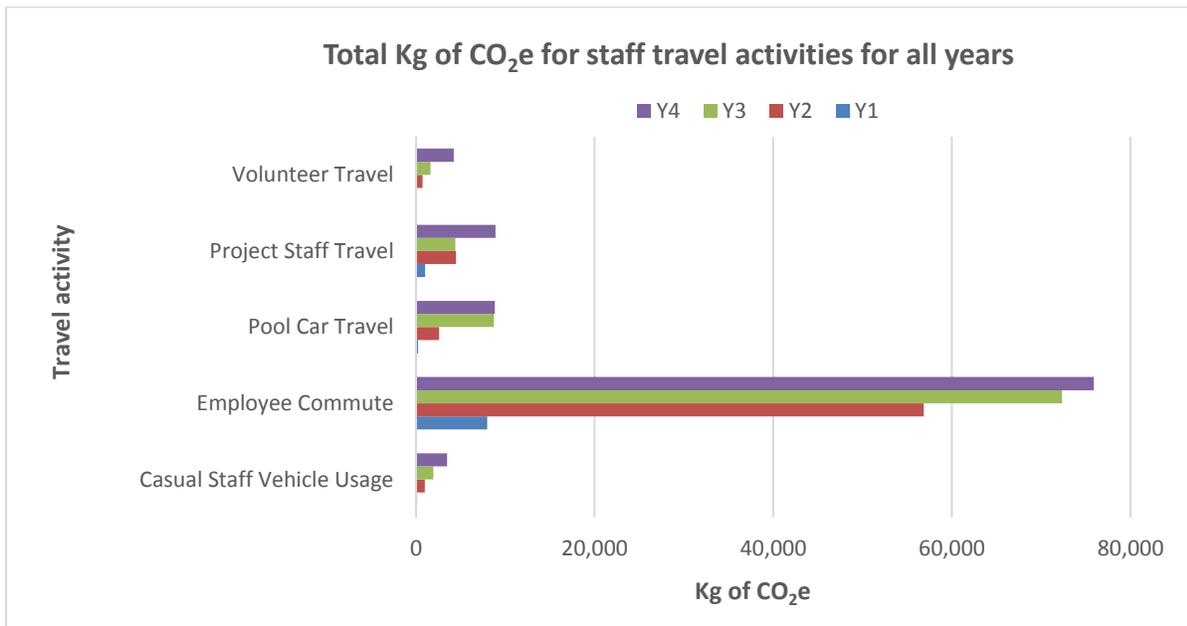


Figure 2 - Total Kg of CO₂e for staff travel activities for all years

3.3 Energy usage

Figure 3 below shows that the two main sources of scope 2 activities (Office energy usage and the generator on the bogtastic van). These are classed as source 2 emissions because it involves the production of energy using electricity, water, gas etc. The office energy use is the biggest producer within this category with 8,436 kg of CO₂e generated in year 4. This is an increase of 985kg of CO₂e on year 3 figures, see below, however the Kg of CO₂e generated remains consistent at approximately 8000kg of CO₂e generated each year, except year 1. The reason for this is that year 1 was a preparatory year, and therefore not all staff members were working on the project.

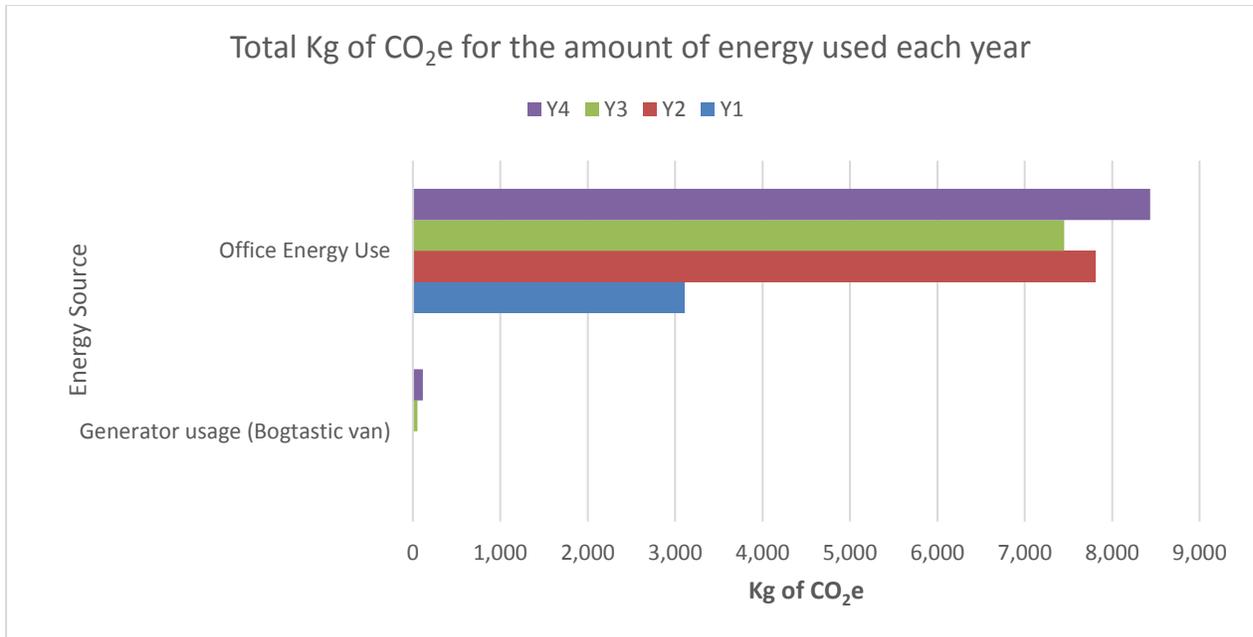


Figure 3 - Kg of CO₂e produced by different energy sources

3.4 Contractor travel

Figure 4 below identifies that the total Kg of CO₂e increase year on year, from 0 in year 1 to 23,145 and 30,014kg of CO₂e for Contractor Travel – Road and Contractor Travel – Helicopters (respectively). The reason there is 0 kg of CO₂e in year 1 for both attributes, is that this was a preparatory year and no conservation activities were undertaken.

The reason contractor travel – helicopter is always higher than contractor travel – road is because of the amount of carbon used in aviation fuel when compared to motor vehicle fuel.

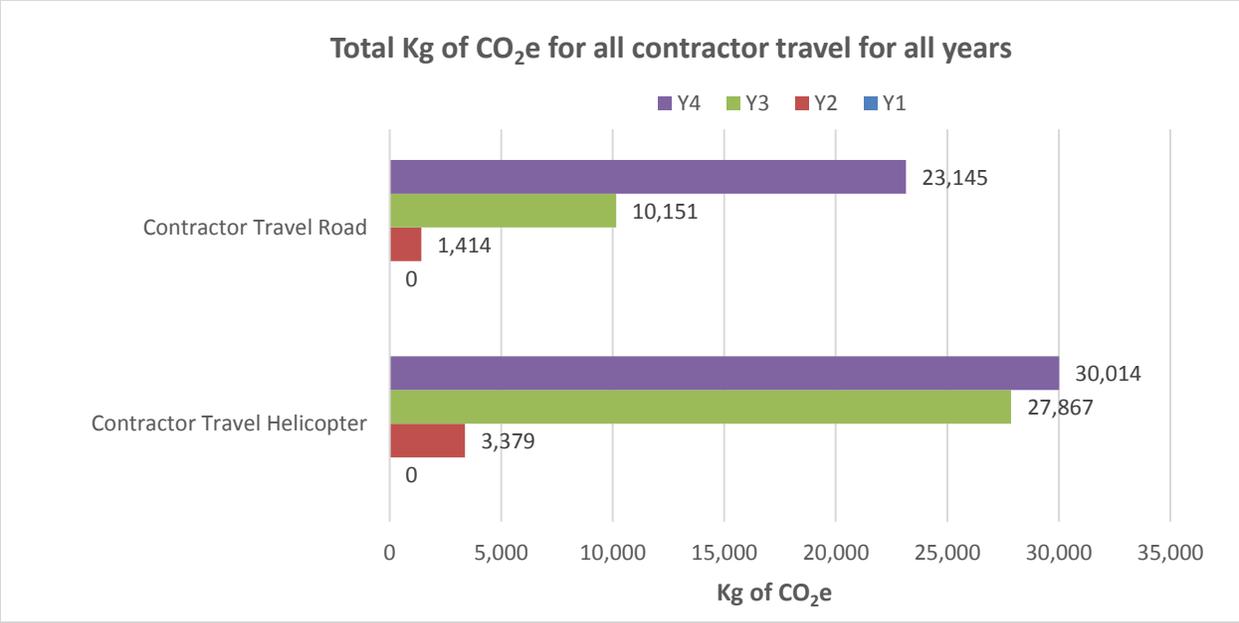


Figure 4 - Total Kg of CO₂e for all contractor travel

3.5 Deliveries of materials

Figure 5 below identifies that the amount of material delivered by road and that has been delivered by helicopter has increased year on year, which is a direct result of the amount of works delivered as part of the project.

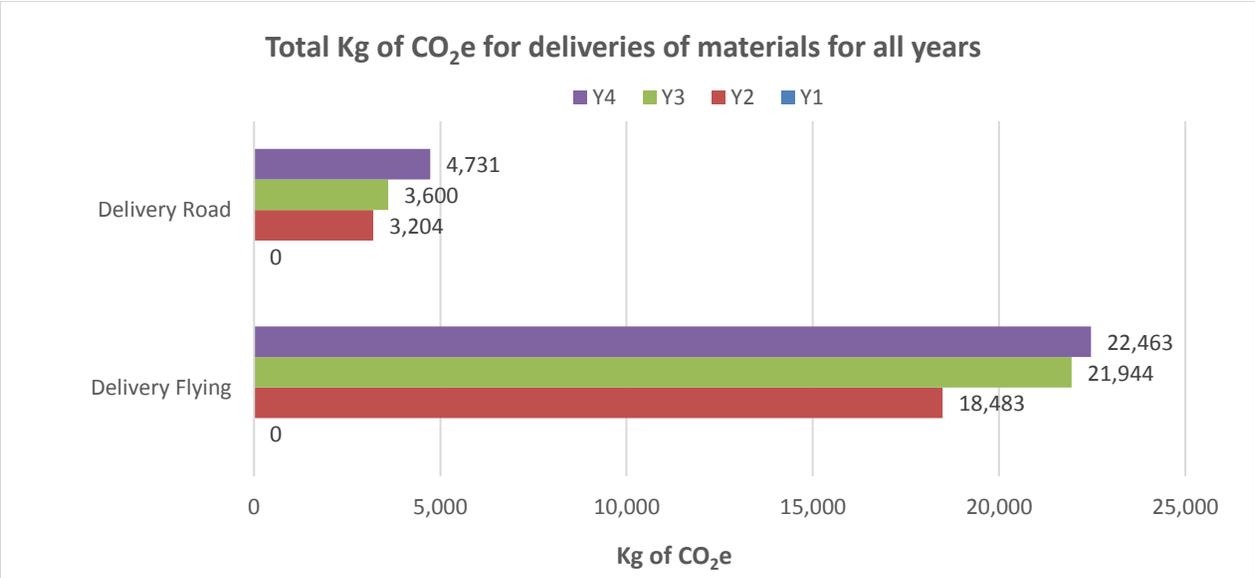


Figure 5 - Total Kg of CO₂e for all deliveries for all years of the project

3.6. Cutting

When looking at the amount of cutting of all sorts (e.g. Molinia, heather) we can see a year on year increase, see Table 3 below, which is in keeping with all of the other variables recorded. This is because the amount of deliverables associated with the project has also increased. The reason there is 0Kg of CO₂e because this was a preparatory year and no conservation activities were undertaken.

Table 3 - Total Kg of CO₂e for cutting of all habitats for all years

	Year 1	Year 2	Year 3	Year 4
Cutting	0	733	5,131	5,546

3.8 Partners CO₂e contributions

Figure 6 below identifies the split by partners and has been included to allow our associated beneficiaries to identify where they can reduce the amount of carbon used on the project.

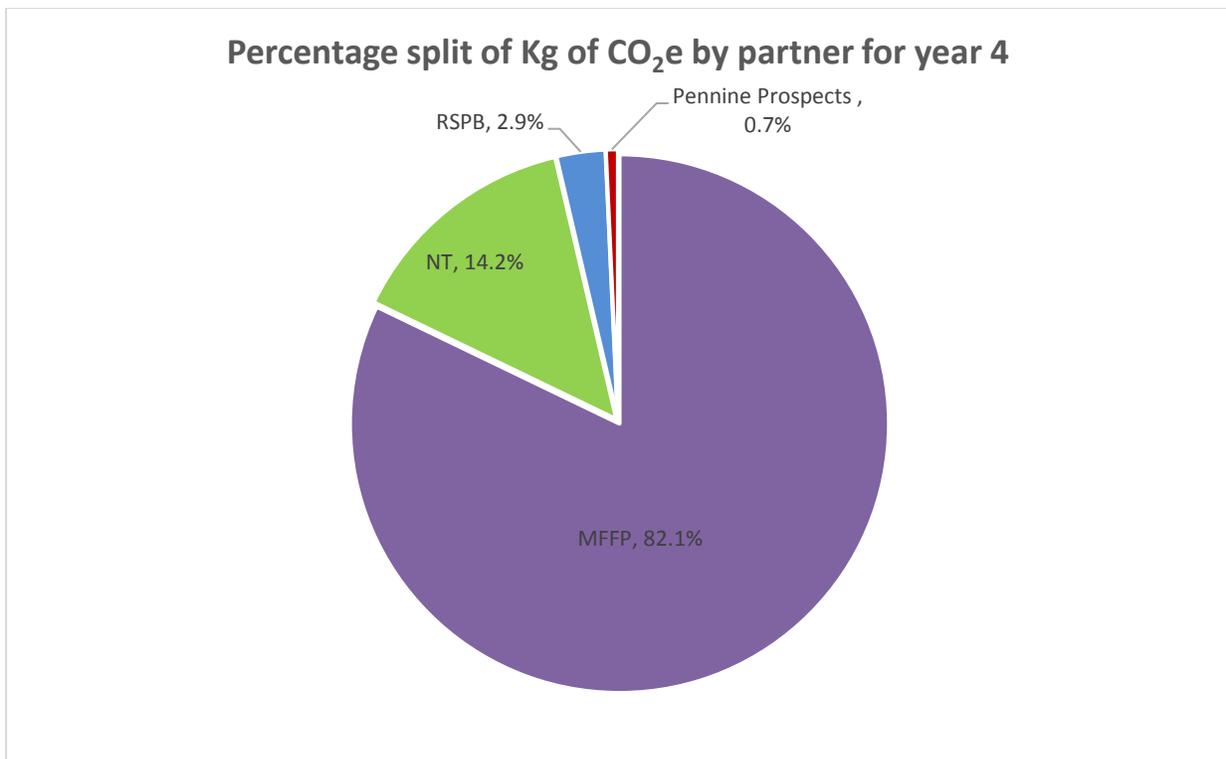


Figure 6 - Total CO₂e contributions by partner for year 4 of the ML2020 project

5. Impacts

Research undertaken by Worrell *et al.* (2011) identifies that restoration of state 2 (bare peat) (MFFP, 2012) active blanket bog sites produces a significant overall positive carbon benefit; it is therefore expected that the ML2020 work will be carbon neutral. Despite this, MFFP and our partners are committed to reducing the carbon footprint associated with the project through a number of key areas.

Applying the outcome of the carbon audit data indicates that the greatest saving could be achieved in areas relating to staff travel / employee commute, as this contributes the most to total GHG emissions in 3 out of the 4 years and includes actions such as:

- Car sharing / use of public transport when and where logistically possible.
- Purchase or lease of vehicles with the lowest CO₂/ km emissions (e.g. hybrid vehicles).
- Optimise/ reduce number of meetings - use of remote meeting facilities / telephone and video conferences.
- Work from home days.

Additionally the greatest individual carbon emissions are in relation to helicopter journeys, therefore undertaking actions such as those identified below will also help reduce our carbon footprint.

- Specifying local helicopter take-off sites and the right helicopters for the job, where appropriate.
- Accurately specifying areas using desk-based GIS and helicopter-mounted GPS.
- Siting lift points as close to the working area as possible.

6. Conclusion

This report utilises the methodology presented by Benson, Crouch, Thorpe and Walker (2016) to calculate the kg of CO₂e used in all years of the project for MFFP, NT, RSPB Pennine Prospects. With the additional year 1 figures included, it is possible to determine that **12,435 kg of CO₂e** was used to deliver year 1 of the ML2020 project. This as expected increased, to **195,760 kg of CO₂e** in year 4 due to a number of factors including:

- Start of the on-site conservation works.
- Longer timescales being monitored in subsequent years, as year 1 was not a full year.
- Additional staff resource required to deliver the ML2020 project.

Analysis of the data indicates that the 3 largest contributors to total kg CO₂e emitted to deliver the project are:

- Employee commute – **75,899 kg of CO₂e**.
- Contractor Travel Helicopters – **30,014 kg of CO₂e**.
- Contractor Travel Road – **23,145 kg of CO₂e**.

Whilst operations involving flying were expected to contribute a significant amount of kg of CO₂e based upon the findings of the original MoorLIFE carbon audit, employee commute was not expected to be such a significant contribution. This could be due to a number of factors including, a significant increase in the number of staff delivering the project especially compared to the original MoorLIFE project.

With employee commute contributing the most to total kg of CO₂e emitted for each year of the project, it suggests that implementing / encouraging staff to undertake the following measures, see below, would have the greatest impact in reducing the carbon footprint of ML2020:

- Car sharing / use of public transport when and where logistically possible,
- Optimise/ reduce number of meetings - use of remote meeting facilities/telephone and video conferences,
- Purchase or lease of vehicles with the lowest CO₂/ km emissions (e.g. hybrid vehicles)

Whilst the largest individual GHG emissions are produced from helicopter use, other ways to reduce the emissions would be to:

- Specify local helicopter take-off sites and the right helicopters for the job,
- Accurately specify areas using desk-based GIS and helicopter-mounted GPS.
- Siting lift points as close to the working area as possible

7. References

Benson, J., Crouch, T., Thorpe, K., and Walker, J.S. (2016) MoorLIFE 2020: D5 Update Report 2016: A guide to the project carbon audit processes and protocols, including a presentation of Year 1 project audit figures

Carbon Trust. (2017). What are scope 3 emission [online]. Carbon Trust. Available at <https://www.carbontrust.com/resources/fags/services/scope-3-indirect-carbon-emissions/>

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Appendix 1 – Assumptions made

Conservation works

1. For helicopter flights from base to site it is assumed that a straight line is flown. Fuel consumption multiplied by km flown.
2. Stone wagons are 100 % laden if delivering 20 tonnes.
3. Tractor and trailer uses 0.24 litres of diesel per km.
4. Heather Cutting – Cutting tractor travels 12.5 m per bag / bale and collecting vehicles travel 50 m per bag on average. Assume one cutting tractor and one collecting tractor per job.

Helicopter works

1. Helicopter base to site flights – Assumed that a straight line is flown from base to site. Fuel consumption multiplied by km flown.
2. Helicopter Fuel is calculated as Aviation Turbine Fuel – Scope 1 as there is no option on Scope 3
3. MoorLIFE carbon audit did not include flights from base to site eg. AH flying from Devon to Glossop. ML2020 audit includes these journeys and also the ground crew journeys.

Travel

1. All notes for individual entries are noted on the relevant spreadsheet using the comments function.

Commute

1. A commute is defined either as a person's journey from home to base or home to a meeting point (where there may be an onward journey to site).
2. The estimation does not take account of holidays.
3. If an employee walks / cycles / car shares to work then the total number of days worked on ML2020 is reduced to take account of this change.
4. If an employee only undertakes, on average 0.25 days or less than this on ML2020 then the figure is rounded down to 0 and they are excluded from the calculation.
5. The number of weeks worked on ML2020 is dependent on when the employee started, and only includes full weeks, if an employee started mid-week, this week is discounted, to take account of any inductions they would be required to take.
6. Only full weeks are taken account of, therefore if a person started part-way through a week, this is not included within the calculation.

7. If an employee commutes to two bases regularly, the commute to the second base (e.g. Aldern house) is included as a separate entry.

Pool Cars

1. We are only interested in number of miles, not the number of people within the car.

Working from home

1. It is better to use an accurate figure is included within the calculations, but if this isn't possible then an estimate is fine, because days spent working from home can be ad-hoc.

Volunteer Travel

1. Only those volunteers that submit a travel claims are captured within the data, if they do not submit a travel claim we cannot prove the journey for audit purposes.

Office Energy Use

1. We are not expecting co-beneficiaries to report on office energy use.
2. As it is difficult to calculate the weekly energy usage for ML2020, the campsite electricity figure for February 2017 has not been separated out from total energy usage.