Carbon Footprint Appraisal Report

Assessment Period:
1st April 2018- 31st March 2019

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Executive Summary

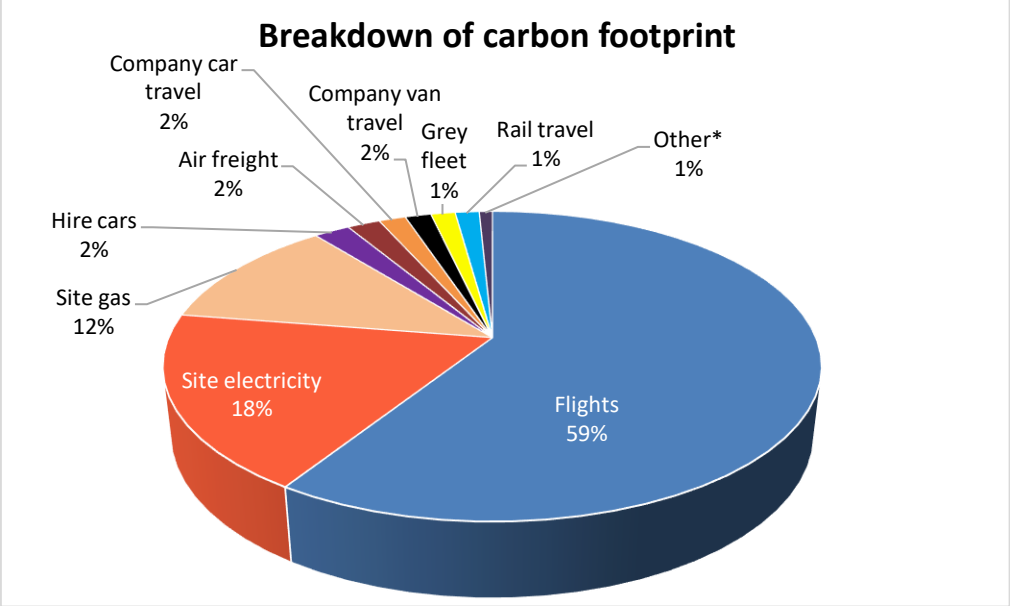
Carbon Footprint Ltd has assessed the greenhouse gas (GHG) emissions of EA Technology from 1st April 2018 to 31st March 2019, based on a dataset provided by the company. The majority of EA Technology's emissions are from flights, accounting for 59.1% of the total emissions.

Current Performance

- Air travel accounts for >59% of EA Technology's total carbon footprint.
- Site electricity and gas usage are also significant emission sources.

Future Implementations

→ Offset EA Technology's emissions by funding global climate change solutions.
→ Reduce air travel by installing and utilising teleconferencing devices.
→ Investigate the opportunity of installing telematic devices to company vehicles.
→ Expand the assessment scope to include global operations, not just UK sites/activities.

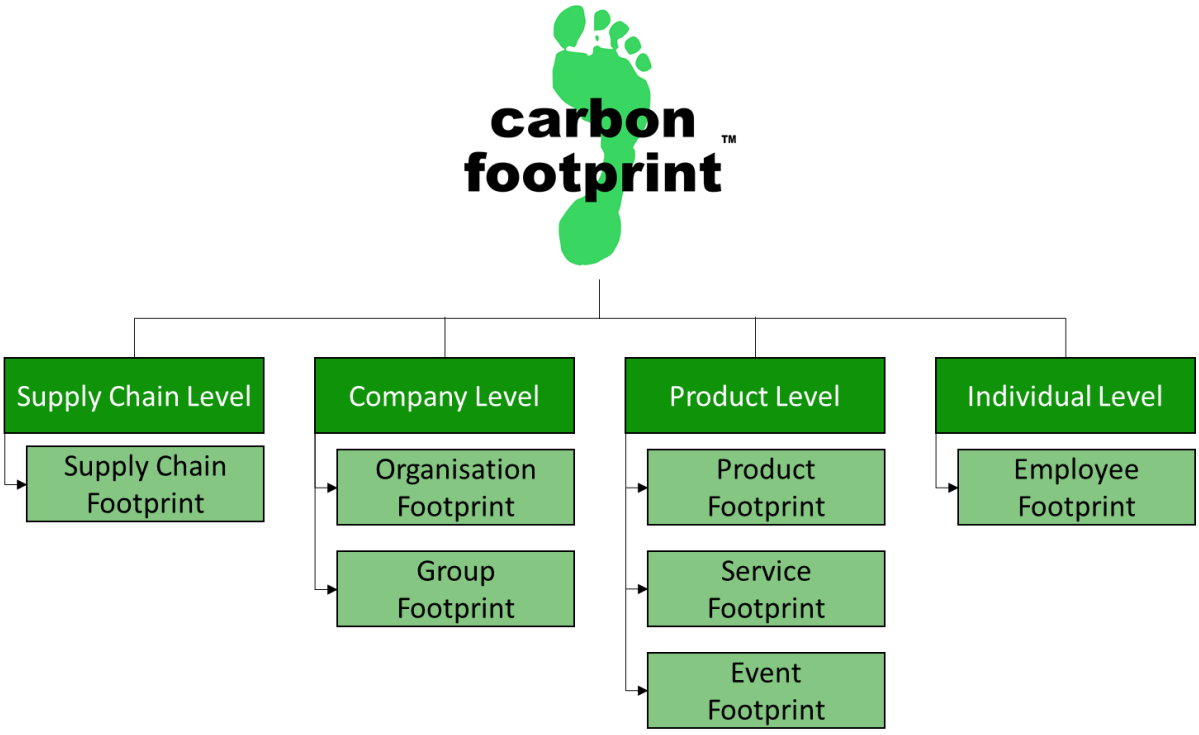


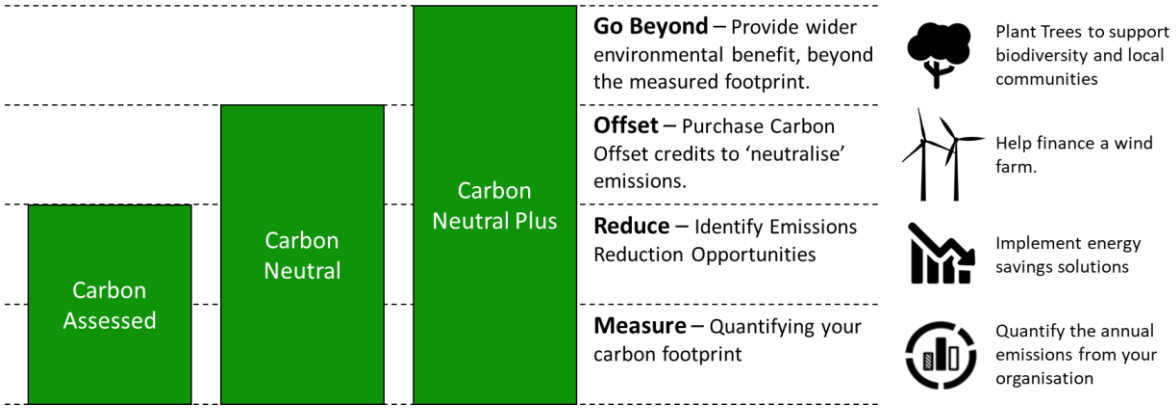
Other: Grey fleet, rail travel, water and wastewater and outsourced courier (road)

As this is the first carbon footprint appraisal EA Technology has carried out, it shall act as the baseline year for future assessments to be compared against. This will allow EA Technology to track its performance and progress towards reduction targets. To reduce emissions going forward, the primary focus should be on reducing air travel, as this is EA Technology's most significant emissions source.

Period of calculation	Total footprint (tCO_2e)	Tonnes of CO_2e per employee	Tonnes of CO_2e per £M turnover
1st April 2018 to 31st March 2019	695.10	3.97	23.17

We strongly recommend that EA Technology expands the scope of its footprint assessment to cover the organisation's global operations. To become an exemplar in the market, EA Technology should also consider offsetting its unavoidable emissions. Additionally, other companies are starting to provide tools to allow their staff to measure and offset the emissions they generate at preferential rates. Providing support to staff in such a manner, will raise the profile of your sustainability programme, generate more staff buy in, as well as allowing EA Technology to lead the way in Environmental and Social Governance in its sector.





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Quality Control

Report issue number:	1.0
Date:	05 November 2019
Calculations completed by:	Jenny Webb
Calculations reviewed by:	Georgina Whitlock
Report produced by:	Jenny Webb
Report reviewed by:	Georgina Whitlock
Director approval:	Dr. Wendy Buckley

1. Introduction

1.1. EA Technology's carbon management journey

Carbon Footprint provides a simple six step annual journey to enhance your sustainability credentials whilst complying to best practice and differentiating your brand. EA Technology has completed the first step of its carbon management journey.

The purpose of this report is to:

- Summarise the results of your carbon footprint assessment.
- Recommend realistic aims for your carbon reduction target.
- Provide practical recommendations to enhance your sustainability programme and reduce your emissions.
- Provide advice on how carbon offsetting may enhance your programme.

1.2. What is a carbon footprint?

A carbon footprint is a measure of the impact our activities have on the environment in terms of the amount of greenhouse gases produced, measured in units of carbon dioxide equivalents (CO_2e). A carbon footprint is made up of two parts, direct and indirect emissions.

1. **Direct emissions:**
   Direct emissions are produced by sources which are owned or controlled by the reporting organisation and include electricity use, burning oil or gas for heating, and fuel consumption as a result of business travel or distribution. Direct emissions correspond to elements within scopes 1, 2 and 3 of the World Resources Institute GHG Protocol, as indicated in Table 1.

Table 1: Direct emissions sources

Footprint	Activity	Scope
Direct	Electricity, heat or steam generated on-site	1
	Natural gas, gas oil, LPG or coal use attributable to company owned facilities	1
	Company owned vehicle travel	1
	Production of any of the six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6)	1
	Consumption of purchased electricity, heat steam and cooling	2
	Employee business travel (using transport not owned by the company)	3

2. **Indirect emissions:**
   Indirect emissions result from a company's upstream and downstream activities. These are typically from outsourced/contract manufacturing, and products and the services offered by the organisation. Indirect emissions correspond to scope 3 of the World Resources Institute GHG Protocol excluding employee business travel as indicated in Table 2.

Table 2: Indirect emissions sources

Footprint	Activity	Scope
Indirect	Employee commuting	3
	Transportation of an organisation's products, materials or waste by another organisation	3
	Outsourced activities, contract manufacturing and franchises	3
	GHG emissions from waste generated by the organisation but managed by another organisation	3
	GHG emissions from the use and end of life phases of the organisation's products and services	3
	GHG emissions arising from the production and distribution of energy products, other than electricity, steam and heat, consumed by the organisation	3
	GHG emissions from the production of purchased raw or primary materials	3
	GHG emissions arising from the transmission and distribution of purchased electricity	3

For businesses, the assessment focuses on direct emissions, as these lie under the control of the organisation. However, we ask companies to recognise that there is an indirect emissions footprint and select suppliers based on their environmental credentials alongside price and performance.

1.3. Why is it important?

Over the past two decades the effects of climate change have accelerated. Considerable evidence exists proving climate change has been exacerbated by human activity. Changes in our post-industrial lifestyles have altered the chemical composition of the atmosphere, generating a build-up of greenhouse gases – primarily carbon dioxide, methane, and nitrous oxide levels – raising the average global temperature.

The consequences of inaction will be disasterous. Sea level will continue to rise and local climate conditions to be altered causing an increase in extreme weather events, affecting forests, crop yields, and water supplies. It will also affect human health, accelerate species extinction, and disrupt many ecosystems.

Climate change is a global threat which will impact the lives of everyone on the planet. Hence, it is vital that all individuals, businesses, organisations and governments work towards the common goal of reducing greenhouse gas emissions. This carbon footprint assessment will enable EA technology to begin doing their bit by monitoring, reducing and offsetting their emissions.

1.4. BS ISO 14064-1:2006

This GHG report has been prepared in accordance with Part 1 of BS ISO 14064: 2006. The GHG inventory, report, or assertion has not been verified.

1.5. Calculation methodology

The carbon footprint appraisal is derived from a combination of client data collection and data computation by Carbon Footprint's analysts.

Carbon Footprint's analysts have calculated EA Technology's footprint using the 2018 conversion factors developed by the UK Department for Environment, Food and Rural Affairs (Defra) and the Department for Business, Energy & Industrial Strategy (BEIS). These factors are multiplied with the company's GHG activity data. Carbon Footprint has selected this preferred method of calculation as a government recognised approach and uses data which is realistically available from the client, particularly when direct monitoring is either unavailable or prohibitively expensive.

Additional methodology information is presented in Annex A.

1.6. Data supplied for the carbon footprint appraisal

A summary of the data supplied by EA Technology for the appraisal is presented in a separate spreadsheet called "2019_10 EA Technology Annex B.xls".

1.7. Abbreviations

BEIS	Department for Business Energy & Industrial Strategy
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organisation
km	Kilometres
kWh	Kilowatt Hours
PR	Public Relations
UN	United Nations

2. Calculation Scope and Accuracy

2.1. Scope of this work

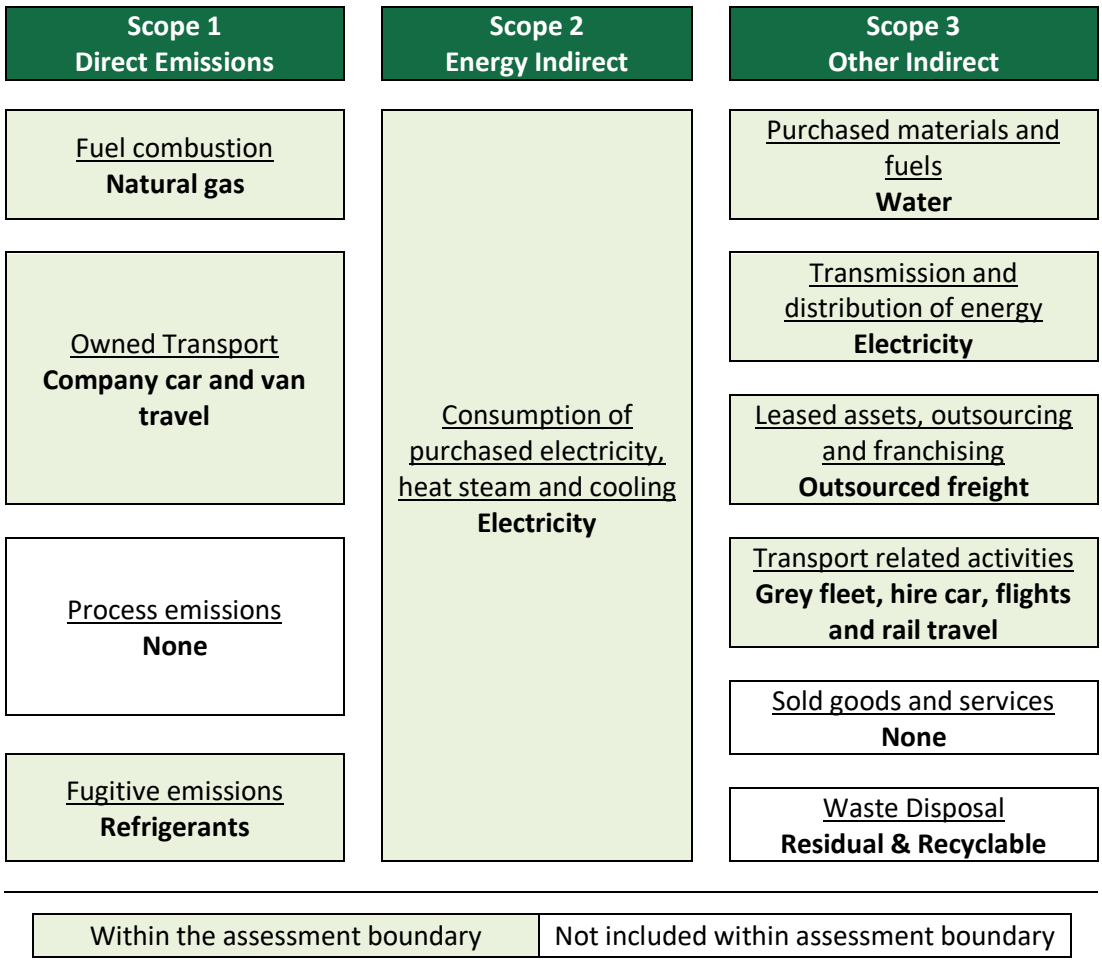
Carbon Footprint has assessed the GHG emissions from 1st April 2018 to 31st March 2019 resulting from the energy consumption at EA Technology's facilities and its business transport activities.

This report will set the base year for all further reporting emissions to be compared to.

2.2. Organisational & operational boundaries

The organisation has accounted for all quantified GHG emissions and/or removals from facilities over which it has financial control. **This assessment covers UK operations only.** The following operational boundaries are within the scope:

Figure 1: Assessment boundary



Indirect GHG sources that are outside the assessment boundary have been excluded from quantification as it is not technically feasible or cost effective, to include these in the GHG assessment.

2.3. Calculation accuracy & materiality

The result of a carbon footprint calculation varies in accuracy depending on the data set provided. The more accurate the data supplied, the more accurate the final result which will subsequently allow for better targeting of areas where improvements can be made. Materiality is determined by the percentage contribution of each element to the overall footprint.

The data provided is derived from energy bills, expenses claims and data collected by EA Technology. Further information and an overview of the expected accuracy provided per element for this assessment is shown in Table 3.

Table 3: Assessment accuracy & materiality

Dataset	Source of data and comments	Accuracy	Materiality
Flights	Data sourced from external travel company.	Excellent	Very High (40%+)
Site electricity	Data sourced from utility bills. Submitting bills for verification will improve data accuracy.	Very Good	Medium (5 - <20%)
Site gas	Data sourced from utility bills. Submitting bills for verification will improve data accuracy.	Very Good	Medium (5 - <20%)
Company car travel	Data sourced from business mileage claims.	Excellent	Low (1 - <5%)
Hire cars	Data sourced from external travel account.	Excellent	Low (1 - <5%)
Employee owned car travel (grey fleet)	Data sourced from mileage claimed from expenses.	Excellent	Low (1 - <5%)
Rail travel	Data sourced from external travel company.	Excellent	Low (1 - <5%)
Company van travel	Data sourced from internal records/expense system.	Excellent	Low (1 - <5%)
Air freight	Data estimated based on average weight and transport routes. **See below for more information.*	Good	Low (1 - <5%)
Outsourced courier (road)	Data estimated based on average weight and transport routes. **See below for more information.*	Good	Very Low (<1%)
Water (and wastewater)	Data sourced from bills/internal records. Submitting bills for verification will improve data accuracy.	Good	Very Low (<1%)
Refrigerants	Data was not supplied and therefore emissions from refrigerants have not been included within this assessment.	N/A	N/A

*Freight calculations were estimated based on the average weight of products, as well as the average distance of which products are transported.

3. Carbon Footprint Results

3.1. Summary of results

The total carbon footprint for EA Technology for the period ending 31st March 2019 was 695.10 tonnes CO_2e. The following table and graphs provide a summary of results for EA Technology's carbon footprint calculation by scope and source activity.

Table 4: Results of EA Technology's carbon footprint assessment by scope and source activity

Scope	Activity	Tonnes CO_2e
Scope 1	Site gas	81.78
	Company car travel	10.95
	Company van travel	10.56
	Refrigerants	0
Scope 1 Sub Total		**103.30**
Scope 2	Electricity generation	117.96
Scope 2 Sub Total		**117.96**
Scope 3	Flights	410.62
	Hire cars	14.66
	Air freight	13.42
	Electricity transmission & distribution	10.06
	Employee owned car travel (grey fleet)	9.90
	Rail travel	9.79
	Water (and wastewater)	5.23
	Outsourced courier (road)	0.16
Scope 3 Sub Total		**473.85**
Total tonnes of CO_2e		**695.10**
Tonnes of CO_2e per employee		**3.97**
Tonnes of CO_2e per £M turnover		**23.17**

Figures 2 and 3 show the breakdown of the total GHG emissions produced by EA Technology. It can be seen that 59.1% of the total emissions is produced from flights. The other two significant factors are electricity and gas consumption, contributing to 18.4% and 11.8% of the total emissions respectively. In comparison, the amount of CO_2e caused by outsourced courier transport is negligible at 0.16%.

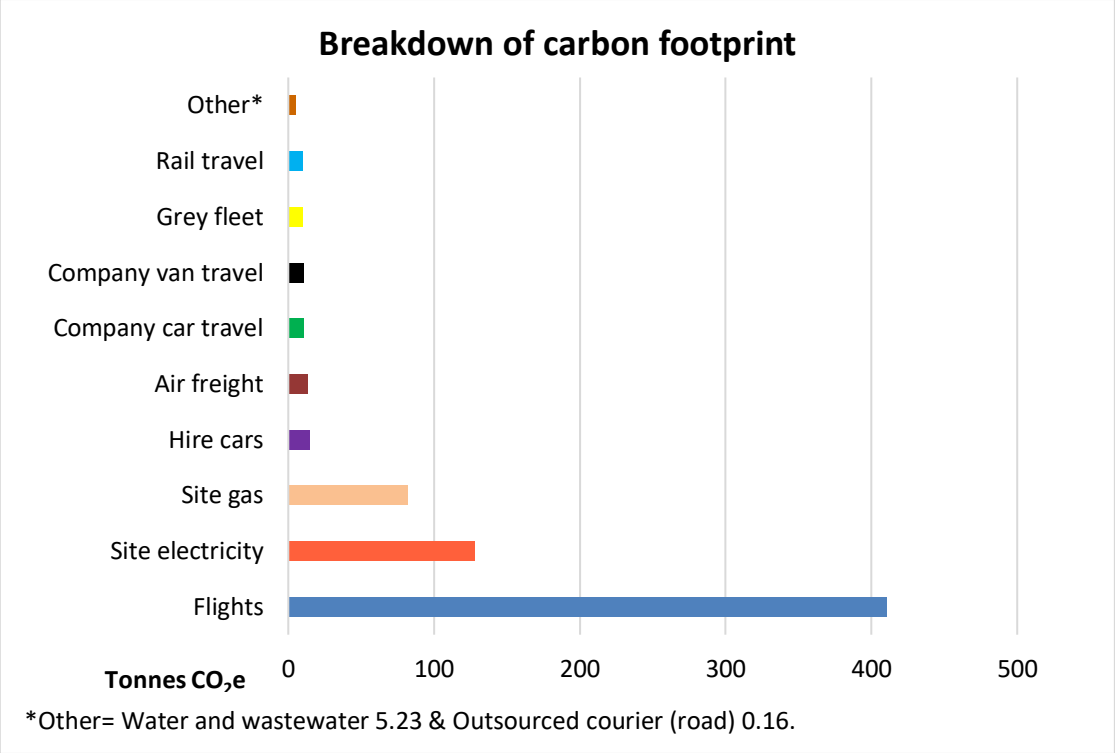


Figure 2: Contribution in tonnes of CO_2e of each element of EA Technology's carbon footprint

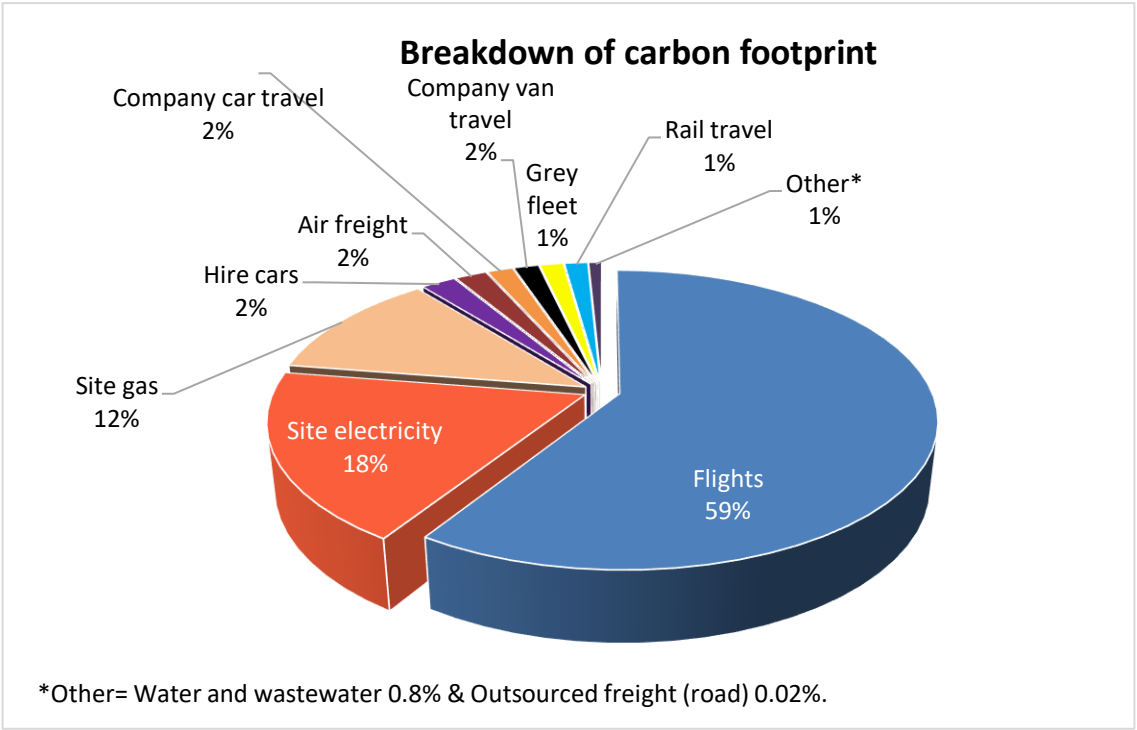


Figure 3: Percentage contribution of each element of EA Technology's carbon footprint

3.2. Emissions from energy usage at site facilities

EA Technology has multiple offices around the world including in Australia, USA, Singapore and the UK. This carbon footprint includes UK operations only – three sites with a total of 175 employees. To date, EA Technology has already replaced all lamps within the units with LED light bulbs.

Table 5 and Figure 4 show the breakdown of emissions from on-site energy usage at each of EA Technology's UK units, all of which are located within the same site. It can be seen that Unit 4 produces the highest amount of site emissions, whilst Unit 6 produces the lowest amount. When comparing the emissions per employee, Unit 7 has the highest tCO_2e/employee ratio, whilst Unit 6 presents the lowest ratio.

Table 5: CO_2e emissions as a result of site energy consumption and per employee

Site	Number of employees	Electricity tCO_2e	Gas tCO_2e	Total tCO_2e	Emissions per employee (tCO_2e)
Unit 4	130	77.32	76.22	153.54	1.18
Unit 7	30	39.38	0.00	39.38	1.31
Unit 6	15	11.32	5.56	16.88	1.13
Total	**175**	**128.01**	**81.78**	**209.80**	

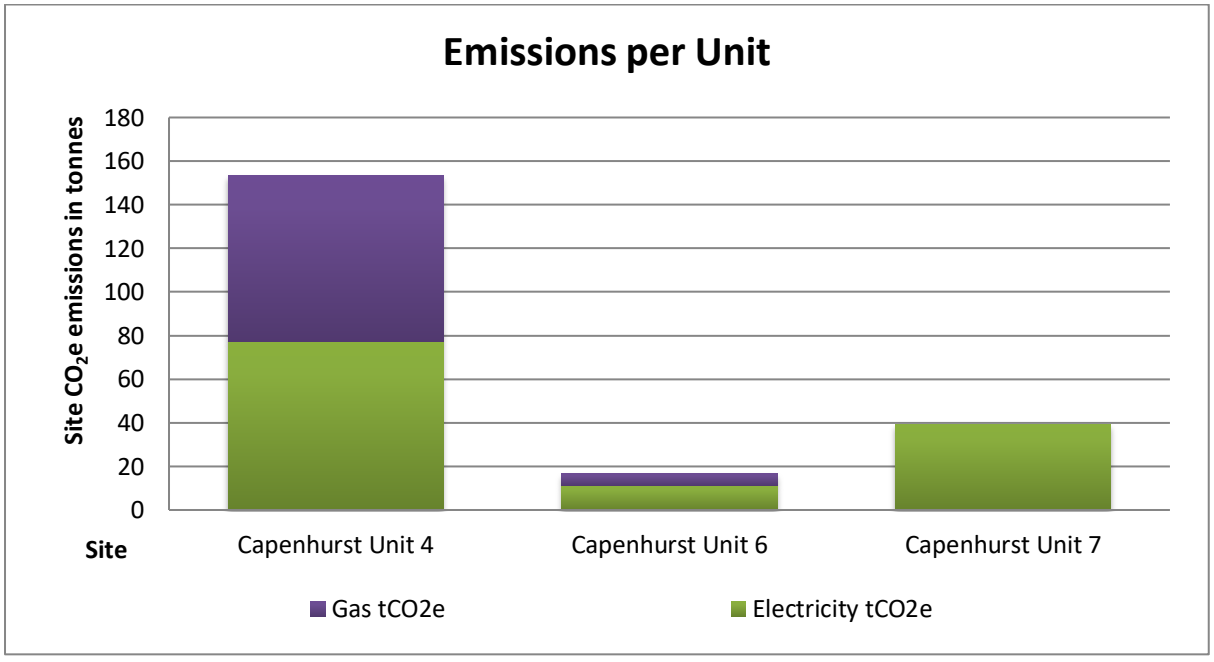


Figure 4: CO_2e emissions on a per site and per energy basis

3.3. Emissions from water

EA Technology provided details of water use within each of the three UK sites. Table 6 and figure 5 show a breakdown of the water use, estimated wastewater and associated emissions from each site.

It can be seen that unit 4 has the highest water demand, and therefore accounts for the highest emissions for water and wastewater use.

Table 6: CO_2e emissions as a result of site water and wastewater use

Site	Water supply (m^3)	Water Supply (tCO_2e)	Estimated wastewater %	Wastewater treatment (tCO_2e)	Total emissions from water consumption (tCO_2e)
Unit 4	2,928	1.01	100%	2.07	3.08
Unit 6	738	0.25	100%	0.52	0.78
Unit 7	1,305	0.45	100%	0.92	1.37

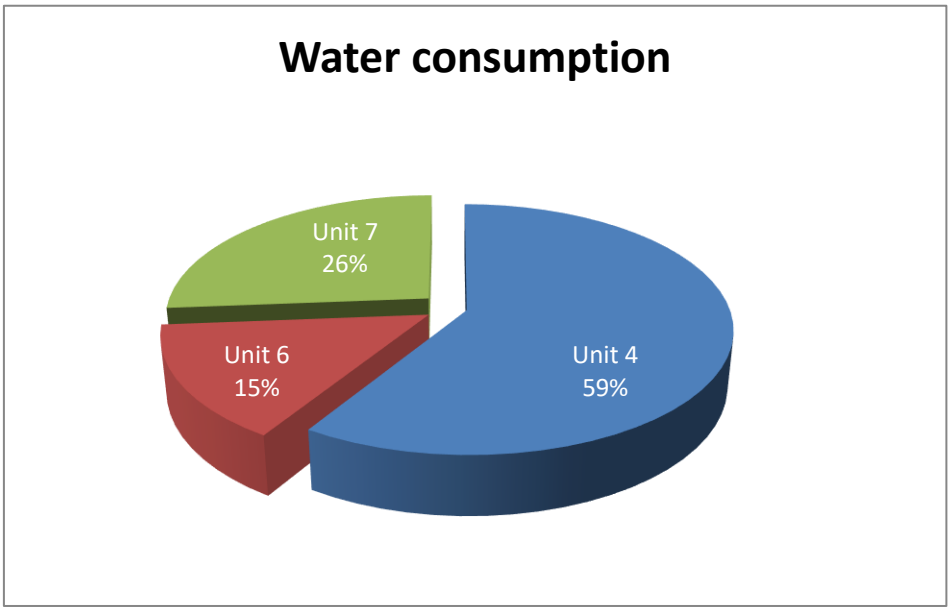


Figure 5: Water consumption at each of EA Technology's three UK sites

3.4. Emissions from refrigerants

Details of refrigerant top-ups were not included by EA Technology and therefore have not been accounted for within this assessment.

3.5. Emissions from travel

The next graph and table show the GHG emissions resulting from EA Technology's business travel. It can be seen that the largest contributor is air travel, accounting for 88.0% of the total transport emissions. This indicates that EA Technology should focus its efforts on reducing emissions associated with this element as it is where the most savings can be achieved.

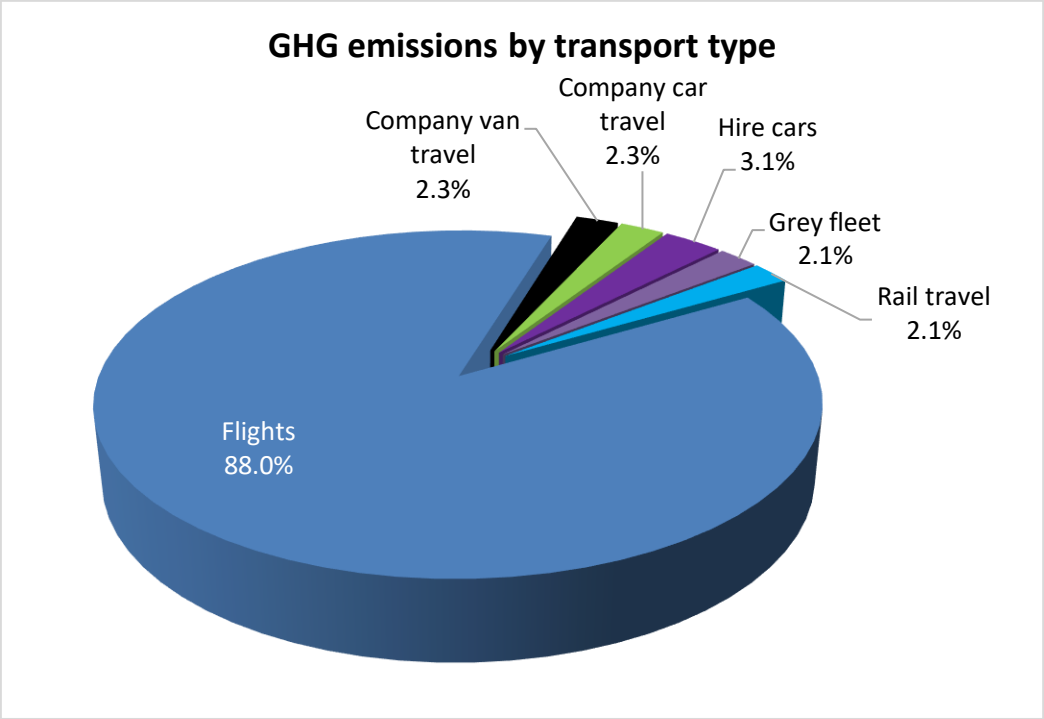


Figure 6: Percentage contribution of each element to transportation emissions

Table 7: CO_2e emissions due to transportation

Type of Travel / Transport	Tonnes of CO_2e
Flights	410.62
Hire cars	14.66
Company car travel	10.95
Company van travel	10.56
Employee owned car travel (grey fleet)	9.90
Rail travel	9.79
Total	**466.49**

The detailed results are given in Annex B.

3.6. Emissions from outsourced freight

EA Technology transports its products from its UK sites by lorry (outsourced), with the majority of shipments only going a short distance to a distribution warehouse. A small portion of products are transported by road to Manchester airport, where they are mainly shipped by air to either China or Singapore. Despite only a small proportion of products being transported abroad (5% of product shipments), the high carbon intensity of flying means that emissions associated with air freight are much higher.

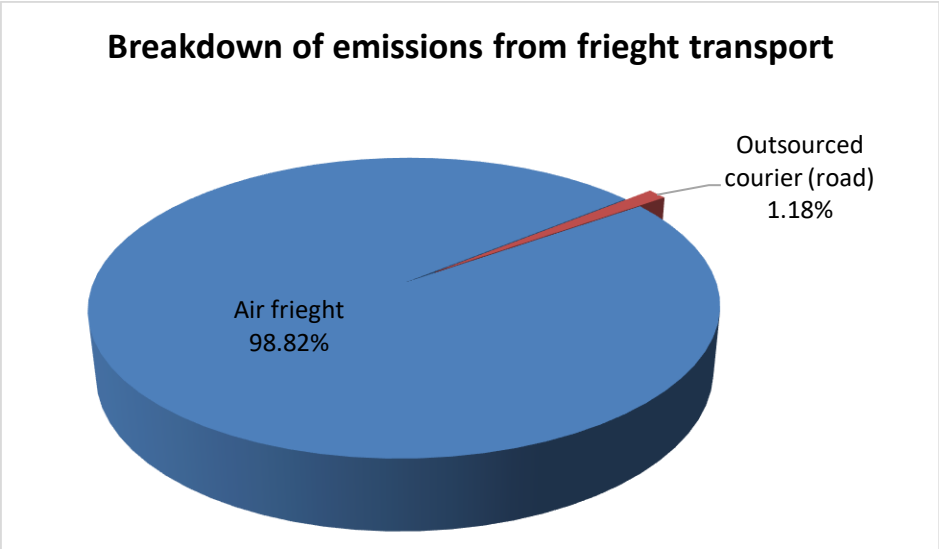


Table 8: CO_2e emissions due to freight transportation

Table 9: CO_2e emissions from outsourced freight

Type of Travel / Transport	Tonnes of CO_2e
Air freight	13.42
Outsourced courier (road)	0.16
Total	**13.58**

4. Comparison and Benchmarking

4.1. Comparison to base year emissions

This is the first carbon footprint assessment EA Technology has carried out and, therefore, it will serve as a base year for future carbon footprint assessments. The table below summarises the results.

Air travel is EA Technology's most significant emissions source. As such, EA Technology should focus its efforts on avoiding unnecessary air travel as this will be where the biggest emissions reductions can be achieved. This could be achieved, for example by taking advantage of teleconferencing devices to reduce the number of flights taken.

Table 8: EA Technology's carbon footprint results

Element of Footprint	Tonnes of CO_2e
Flights	410.62
Site electricity	128.01
Site gas	81.78
Hire cars	14.66
Air freight	13.42
Company car travel	10.95
Company van travel	10.56
Employee owned car travel (grey fleet)	9.90
Rail travel	9.79
Water (and wastewater)	5.23
Outsourced courier (road)	0.16
Total tonnes of CO_2e	**695.10**
Tonnes of CO_2e per employee	**3.97**
Tonnes of CO_2e per £M turnover	**23.17**

4.2. External benchmarking

The following table summarises your results to enable you to compare your performance with other organisations.

Table 9: EA Technology's benchmarked GHG emissions

Element of Footprint	Tonnes of CO_2e
Total number of employees	175
Annual turnover (£M)	30
Tonnes of CO_2e	695.10
Tonnes of CO_2e per employee	23.17
Scope 1 & 2 emissions	
Scope 1 & 2 tonnes CO_2e	**221.26**
Scope 1 & 2 tonnes CO_2e per employee	**1.26**
Scope 1&2 tonnes CO_2e per £M turnover	**23.17**

The following table is a summary of scope 1 and 2 emissions for selected companies who operate in your sector. The data is derived from publicly disclosed annual reports. This enables you to compare your performance with respect to these specific organisations in your market sector.

Table 10: Comparison of benchmarked GHG emissions

Metric	EA Technology (2019)	First Solar Inc (2014)
Scope 1 & 2 tonnes CO_2e	221	322,313
Scope 1 & 2 tonnes CO_2e per employee	1.26	57.56
Scope 1 & 2 tonnes CO_2e per £ million	23.17	97.40

Note: Carbon Footprint Ltd also offers a specialist sustainability competitor assessment service. Please ask if you would like us to provide a more detailed comparison of your sustainability credentials / performance alongside a selection of your key competitors/peers.

5. Key Recommendations

The following recommendations are designed to help you build upon the results of the appraisal and your carbon management over the coming year.

5.1. Carbon & sustainability targets

5.1.1. Improving the accuracy of future carbon footprint assessments

To improve the accuracy of future assessments, we recommend the following:

- Increase scope of carbon footprint to include global operations/activities.
- Develop an internal system for recording taxi journeys in order to include this data in future assessments (e.g. cost or mileage data).
- Record fuel type and gCO_2/km rating of hire cars.
- Continue to monitor the frequency and weight of products being transported as freight.

5.2. Reducing emissions

To reduce emissions moving forward, we recommend the following:

- Develop and implement a sustainable travel policy.
- Reduce unnecessary travel where possible by combining trips and encouraging the use of tele-/video-conferencing.
- If flying is deemed necessary, try to group flights wherever possible to reduce the total number of miles travelled and stipulate that 'economy' flight class should be chosen unless prior authorisation is provided.
- Investigate the opportunity of installing telematic devices to company vehicles. These systems monitor driver behaviour and enable issues such as continuous idling, excessive braking and acceleration to be identified.

5.2.1. Setting carbon reduction budgets based on emissions

Having an agreed and defined system for investing in future carbon reduction activities helps drive carbon reduction and cost savings in a business. Many leading organisations are doing this through setting an "Internal Carbon Tax" or an "Internal Carbon Price" within their organisation (see http://www.carbonfootprint.com/internal_carbon_pricing.html for more information).
We suggest starting by setting a price of £20-25 per tonne of CO_2e, as this typically relates to 1-6% of the cost of causing emissions (as shown in the table below). You may wish to collect the "taxation"

by each functional group (depending on their emissions), or simply account for this at the top-level company budgeting.

Table 10: Carbon price compared to energy and travel costs

Emissions Source	Electricity	Natural Gas	Car Miles	Flights
1 tonne CO_2e is equivalent to	2400 kWh	5500 kWh	3300 miles	5200 km
Cost to produce 1 tonne CO_2e	£335	£220	£1485*	£400
£20 carbon price represents	6%	9%	1%	5%

**assumes a rate of 45p per mile*

We recommend allocating this defined budget to help both internal and external carbon reduction activities. For example, it could be split:

- 75% on internal carbon reduction measures
- 25% on external carbon offsetting activities

Investments in internal carbon reduction activities should be made based on the level of carbon savings and the associated cost savings. Good carbon reduction investments usually pay for themselves and give a return on investment to the business within 3 years. Carbon offsetting return on investment is primarily measured through access to tenders, brand enhancement and PR (use marketing return on investment techniques).

5.3. Carbon Footprint Standard

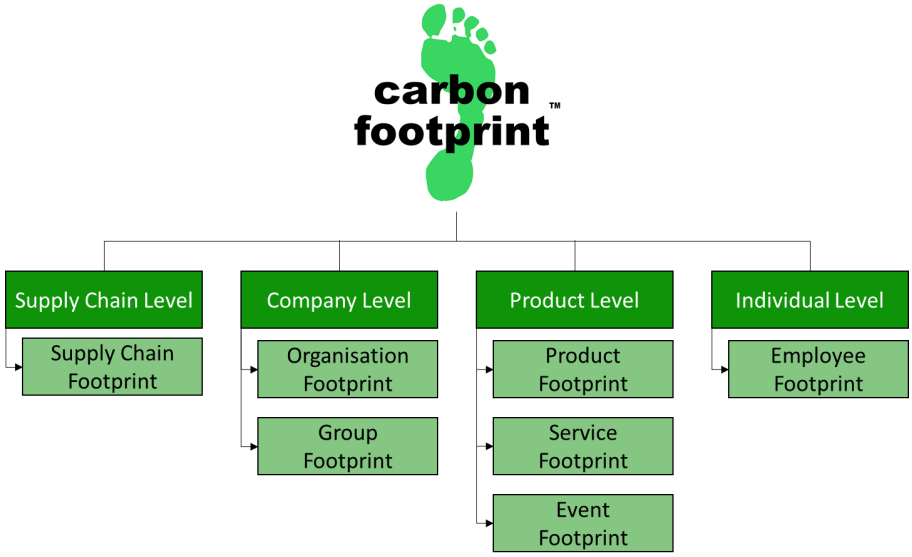
5.3.1. Brand endorsement

EA Technology in conjunction with Carbon Footprint Ltd, has assessed its carbon footprint and has therefore qualified to use the Carbon Footprint Standard branding. This can be used on all marketing materials, including website and customer tender documents, to demonstrate your carbon management achievements.

The Carbon Footprint Standard is recognition of your organisation's commitment to carbon management. The text to the right-hand side of the logo demonstrates what level you have achieved in line with international best practice.

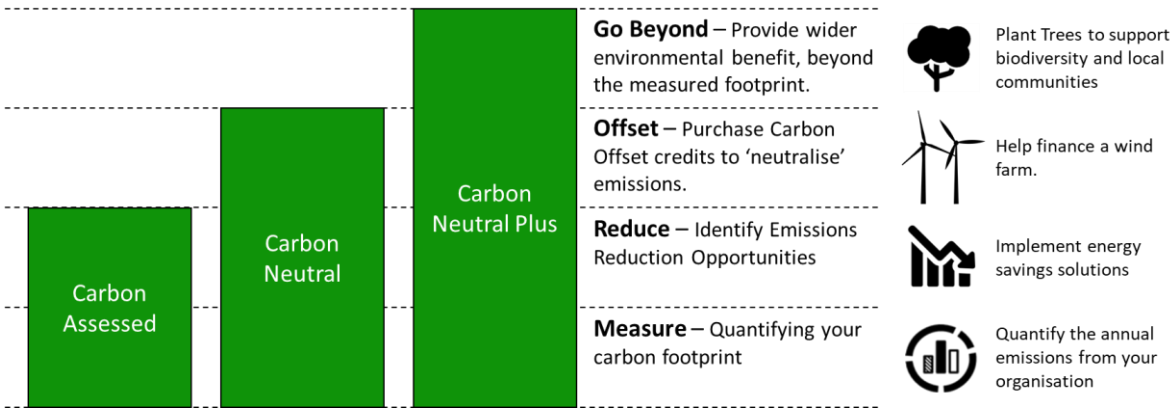
5.3.2. Scope

As you are at the beginning of your Carbon Footprint Journey, you have decided to focus on the carbon footprint at the organisational level. This is a great start. Over time, you can progress your carbon footprinting to increase the scope and encompass your products, supply chain and your employees. By doing so you will be able to receive the Carbon Footprint Standard for these categories, thus standing out amongst your competitors and truly driving the sustainability or your brand.



Once the scope has been identified, the Carbon Footprint Standard will allow EA Technology develop from a novice to an exemplar in the market. You can progress from a Carbon Assessed Organisation to a Carbon Neutral or a Carbon Neutral Plus Organisation by supporting a range of environmental projects that come with wider CSR and PR opportunities.

Alongside the sustainability rationale, this will allow you to leverage the Carbon Footprint Standard to truly stand out in your market. Progressing will resonate with like-minded customers and will help your business grow.



5.3.3. Communicate

Make sure you communicate your actions and achievements effectively, both within your organisation, to help develop your culture, and externally to help improve your brand image.

When promoting your actions, be sure to utilise all marketing channels available to you, such as website, newsletters, brochures, press releases, conferences/events and social media etc.

You should:

- Explain why climate change matters to you (for more information visit: www.carbonfootprint.com/warming.html)
- Tell the story of where you have come from, the progress you have made and what your commitment is for the future (e.g. targets).
- Be clear and accurate about what you have achieved – take care not to exaggerate.
- Use the Carbon Footprint Standard branding, certificates, images of offset projects you are supporting and graphs of your carbon performance to help communicate your point in a clear and enticing manner.

6. References

1. BEIS GHG Conversion Factors for Company Reporting for 2018 v1.1 (July 2018)
2. Guidelines to Defra's Greenhouse Gas (GHG) Conversion Factors for Company Reporting – annexes (June 2013)
3. The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition (March 2004)

A. Annex A – Calculation Methodology (Additional Notes)

A.1 How is the carbon footprint calculated?

Carbon Footprint confirms that the methodology used to quantify the carbon footprint meets the following principles:

a) The subject and its boundaries have been clearly identified and documented.
b) The carbon footprint has been based on primary activity data unless the entity could not demonstrate that it was not practicable to do so, in which case an authoritative source of secondary data relevant to the subject was used.
c) The methodology employed minimised uncertainty and yielded accurate, consistent and reproducible results.
d) Emission factors used are germane to the activity concerned and current at the time of quantification.
e) Conversion of non-CO_2 greenhouse gases to CO_2e has been based upon the 100-year Global Warming Potential figures published by the IPCC or national (Government) publication.
f) Carbon footprint calculations have been made exclusive of any purchases of carbon offsets.
g) All carbon footprints have been expressed as an absolute amount in tCO_2e.

A.2 Biomass

There are no CO_2 emissions from the combustion of biomass to be considered within this report.

A.3 Annex B

A summary of the data supplied by EA Technology for this appraisal is presented in a separate spreadsheet called “2019_10 EA Technology Annex B.xls”.