CLIMATE POSITIVE

Climate Positive Citizen

(Pilot Project Part I - Lifetime Carbon Footprint)

FINAL REPORT
for Craig Cohon
February 2022

by Fund Nature and MyCarbon

CONTENT

CLIMATE POSITIVE

CARBON FOOTPRINT CERTIFICATION

A Lifetime Lifestyle Carbon Footprint Inventory

For Craig Cohon by *MyCarbon* and *Fund Nature*

MyCarbon Formal Notes:

Project No:	A Lifetime Lifestyle Carbon Footprint Inventory - Craig Cohon
Title:	A Lifetime Lifestyle Carbon Footprint Inventory
Client:	Craig Cohon
Date:	17.02.2022
Reporting Period:	1963 - 2021

Reviewed by:

Dr. Toby Green
Co-Founder & Director at MyCarbon
17.02.2022

Toby Green

Michael Greenhough
Co-Founder & Director at MyCarbon
17.02.2022

M Greenhough

Michael Mathres
Director, Fund Nature
17.02.2022

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DATA DISCLOSURE

Data of appropriate quality to satisfy the scope of the lifetime, lifestyle carbon footprint will be used, inclusive of defining expectations in terms of the five main reporting principles of precision, completeness, representativeness, consistency and reproducibility.

Accuracy of a carbon footprint is directly related to the quality of the activity data provided from the client. This primary data representative of activities occurring during the reporting period will always be used where available. In certain circumstances, secondary data in the form of estimates, extrapolations and/or industry averages may be used when primary data is not available. Assessments based largely on secondary data should only be viewed as an estimate of potential impact, and actual emissions may vary significantly. It should be expected that all clients should aim to improve the proportion of primary data over time.

If **Craig Cohon** is satisfied the information provided meets the requirements above and the data provided is representative of authentic activities, please sign below:

Client's Name: Craig Cohon

Client Signature: ________________________________

Date: ________________________________

INTRODUCTION

The most recent UN Conference of the Parties in Glasgow COP26 has initiated a number of key market drivers that have given companies, and governments a new impetus to properly address the *Paris Agreement* and keep our world under, at minima, 2degrees. These include:

- **Article 6:** which provides the new rulebook for issuing and trading regulated carbon credits between countries and unlocks a multi-trillion carbon market.
- **Net-Zero:** giving a clear science-based framework for companies to measure, address and report their climate strategy to reach net-zero before 2050.
- **Zero Deforestation**: more than 100 leaders will commit to halt and reverse forest loss and land degradation by 2030.

In addition, several market drivers are forcing companies to address climate change in a proper way. This includes:

- **Activism**: youth movements such as the global climate strikes, and the institutional divestment movement which covers $39trn AUM.
- **Regulation:** new regulations from the EU, the UK Financial Conduct Authority and the upcoming US Securities Exchange regulation on climate disclosure.
- **Litigation:** there are currently more than 1,800 pending cases globally against companies (e.g.Shell) and governments (e.g. UK).

As such, proactive citizens who want to rebalance their carbon budget are not incentivised to do so, and the social economic and carbon inequality globally is getting larger. The average carbon footprint in the top 1% of emitters was more than 75-times higher than that in the bottom 50%. Carbon emissions of richest 1% are set to be 30 times the 1.5°C limit in 2030.

And yet, lifting hundreds of millions of people out of "extreme poverty" – where they live on less than US$1.90 per day – would drive a global increase in emissions of less than 1%, according to new research.

This is why we are introducing the Climate Positive standard. To allow any citizens, companies or governments to go beyond Net-Zero and help not only solve our climate crisis, but global inequality as well.

This is the first pilot project of a citizen's lifetime carbon footprint. In essence, this citizen, Craig Cohon, will become the world's first Climate Positive citizen. We sincerely hope that this will inspire other citizens to do the same so that the world has a chance of meeting the Paris Agreement targets.

Michael Mathres, Director, Fund Nature

CLIMATE POSITIVE CITIZEN

The aforementioned drivers and pressures have led CEOs, companies and governments to address these drivers and constraints in their own way.

1. **Climate Leaders:** those who want to go beyond net-zero and do what they can to address our climate crisis.
2. **Climate Neutral:** companies that want to just meet the net-zero standard.
3. **Climate Laggards:** those who for political, economical or technological reasons cannot meet Net-Zero targets.

As of January 2022, there are more than 2000 companies that have set Net-Zero targets. And within this group, more than 100 companies and governments are claiming to be Climate Positive or want to become so.

Unfortunately there is no common global definition and standard.

As such we are proposing a new certification, standard and label that will allow citizens, companies and governments to claim they are doing all they can to address climate change.

Climate Positive in its simplest form is a term to define going beyond Net-Zero and achieving that objective. It is based on 7 fundamental criteria:

1. **Account** and disclose all emissions (scope 1, 2, & 3)
2. **Calculate** footprint according to existing global standards.
3. **Set 1.5c targets** short and long term targets today.
4. **Compensate** at least 110% of emissions at the right carbon price.
5. **Finance** Carbon credits that are closely aligned with the Paris Agreement's science target. (Preference is given to nature based solutions)
6. **Report** your results publicly
7. **Communicate** and collaborate with others and do not lobby against Climate Positive.

In addition to Craig Cohon's pilot project, this year we would like to do pilot projects with companies and governments. We are currently in discussion with more than 12 companies to offer and apply the Climate Positive standard to them so that they can go beyond carbon neutrality and beyond Net-Zero.

EXECUTIVE SUMMARY

World's First Lifetime Carbon Footprint

To our knowledge this is the first time that a global citizen calculates and audits their lifetime (60 years) carbon footprint.

Existing Data, Global Standard, & New Model

To do so, we used historical and existing data from the.4 main countries he lived in (UK, USA, Sweden and Canada). Although the global standard existed, the model for an individual's's lifetime carbon footprint did not exist and the data to build the model was not available so we created it.

Lifetime Footprint: 8147 tCO2e or 136 tCO2e/yr

The total amount of carbon emissions from Craig's full lifetime footprint was 8147 tCO2e. Which means that over 60 years his footprint was 136 tCO2e/yr.

Global Comparison: 28x Global Average

To put it in perspective, this is more than 28 times the global average footprint of 4.8 tCO2e/yr. The average footprint for the 4 countries he has mainly lived in are

- **Sweden**: 3.83 t = 36x larger
- **United Kingdom:** 4.85t =28x larger
- **USA:** 14.2t = 9.5x larger
- **Canada:** 14.2t = 9.5x larger

Largest Carbon Emissions: Flights

According to our calculations, most of his emissions came from flights (78%).

Inclusion Scope 3 Kids Emissions - Travel

Although this is technically Scope 3 emissions. It was Craig's decision to include the travel emissions of his two children which were 17% of his total emissions.

Country variations are significant

Housing emissions varied greatly by a factor of 10 Canada vs UK. Purchases emissions also varied a lot by a factor of 4 in his early life. His diet emissions also varied a lot by.a factor of 3 from his food in North America vs UK.

Compensation: Science-based carbon price

Craig will also be the first person, to our knowledge, that will totally compensate his lifetime emissions with a Science Based price of $164/tCO2e instead of the current global average carbon price of $50/tCO2e. This will significantly increase the costs of his carbon compensations by a factor of >3x.

THE PILOT CITIZEN

Fund Nature, and **MyCarbon** have been approached by a global citizen to do this pilot. **Craig Cohon** is a 58 year-old London based Canadian businessman known for his role in bringing Coca-Cola and Cirque du Soleil to Russia. He has also worked with the World Economic Forum, London Business School. In 2023, he will be walking from London to Moscow or Istanbul as part of a fundraising effort to reverse his impact on climate and raise funds to finance carbon removal projects.

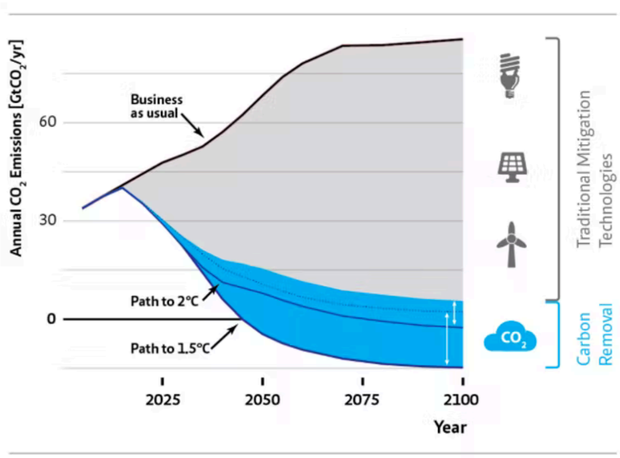
Craig intends to raise significant funds to start to draw down his lifetime's carbon footprint and support/ invest in the most promising carbon removal projects and businesses.

He wants to take the best global ideas and figure out how to aggregate them so we can get our collective carbon footprint off our personal balance sheets and clean up our carbon debt.

Working with a select group of aggregation technology partners and directly with a few new carbon drawdown companies we will be developing a blended rebalancing portfolio that is restorative and focused on regeneration possibilities. The balanced portfolio will include projects in several climate solution areas.

The idea is to have personal and bespoke carbon negative product portfolios for individuals/groups that can be customised based on pricing and interest.

Products will be positioned on overall carbon removal impact and a bespoke carbon pricing methodology.



SCOPE & BOUNDARIES

The scope of this project is to calculate the lifetime, lifestyle carbon footprint of an individual named Craig Cohon ,"the footprintee", for the years 1963 to 2021. This scope will also include the estimated carbon footprint for anyone who was the "footprintee's" direct responsibility including two children up to the age of 18.

The term lifestyle accounts for a range of activities including diet, housing, travel and purchases. Justifications for emissions sources not included in this scope can be found in table *GHG protocol emissions sources* and justification for assessments of specific greenhouse gases can be found in the *GHG justifications table* (APPENDIX).

Due to the impact of Craig's work on his lifestyle, he has chosen to include certain work related activities within the scope of his carbon footprint calculation. The specific activities relate to travel and include flights, hotels and other minor forms of transport where data is available.

Craig has also included his own childhood emissions within this calculation. This includes full ownership of any housing based emissions that he lived in across the full lifetime period without accounting for the allocation of these emissions to any other adults living in the properties.

GHG Protocol Emissions Sources:			
Emissions Source	**Description**	**Inclusion / Exclusion Justification**	**Scope**
Scope 3 travel	Emissions from travel in vehicles owned by someone else	**Included:** Travel	3
Purchased goods and services	The embodied emissions stored in the materials and services purchased for the production of the component	**Included:** Purchases	3
Scope 1 energy consumption	Burning of fuel	**Included:** Housing and travel	1
Scope 2 energy consumption	Use of electricity, district heat or steam	**Included:** Housing	2
Scope 1 travel	Direct emissions from travel in vehicles owned or leased	**Included:** Travel	1
Purchased capital equipment	Embodied emissions of high value capital equipment	**Partially Included:** Purchases	3
Upstream transportation	Transportation required in the distribution of goods	**Partially Included:** Travel	3
Waste Disposal	Transport and waste processing / biodegredation based emissions associated with any waste produced	**Included:** Housing	3
Leased Assets	Embodied emissions of high value leased equipment	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Scope 3 energy consumption	Transmission losses and extraction emissions	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Other direct emissions	Emissions associated to any direct release of greenhouse gases e.g. chemical processes	**Excluded:** No activities of percieved significant impact	1
Refrigeration	Refrigerants used in air conditioning and other cooling system have high global warming potentials	**Excluded:** Deemed negligible, highly complex to measure historic emissions	1
Downstream transportation	Transportation required in the supply chain responsible for providing goods	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Water consumption	Emissions associated to the sourcing and disposal of water	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Investments	Emissions associated to the ownership of turnover generating capital	**Excluded:** Not suitable for a lifestyle calculation and high likelihood of double counting due to the inclusion of items that were purchased using to the value gained from any potential investments	3
Franchises	Emissions associated to the licensing of a revenue generating franchise	**Excluded:** Not suitable for a lifestyle calculation and high likelihood of double counting due to the inclusion of items that were purchased using to the value gained from any potential franchises	3

METHODOLOGY

METHODOLOGY, ASSUMPTIONS & JUSTIFICATIONS

Multiple standards for greenhouse gas emissions reporting exist that can be used to calculate emissions for businesses, products and processes and allow for emissions offsetting with the goal of carbon neutrality:

- The Greenhouse Gas Protocol (corporate reporting and product life cycle assessment)
- ISO-14064 (corporate reporting)
- ISO-14040 (environmental life cycle assessment for products and processes - LCA)
- ISO-14067 (carbon footprint life cycle assessment for products and processes - LCA)
- PAS 2060 (carbon neutrality)

The key purpose of these standards is to allow greenhouse gas emissions reporting in line with fundamental carbon accounting principles including:

- Transparency
- Relevancy
- Accuracy
- Completeness
- Consistency

No significant standard currently exists for calculating the carbon footprint of an individual. Many online calculators allow users to calculate a basic carbon footprint for an individual year, in many cases allowing the user to offset their emissions. These calculators are difficult to justify as following the above principles with minimal consistency and availability of the underlying calculation methods. This is because they are only intended to provide the user with a simple estimate. A few examples of these carbon footprint calculators:

- https://www.carbonfootprint.com/calculator.aspx
- https://www.mycarbon.co.uk/calculator
- https://footprint.wwf.org.uk/
- https://www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/
- https://www.climatecare.org/calculator/

These calculators also only allow users to calculate their carbon footprints for a recent time period, using industry emissions factors recorded recently that cannot be used to accurately calculate historic emissions. This results in a lack of availability of a product in the market to accurately assess an individual's carbon footprint over a lifetime, making it difficult for individuals to understand and actively mitigate the historic emissions they have produced.

A key challenge in assessing historic emissions is the lack of data availability, both from a primary and secondary basis. In this instance primary data will be defined as the specific activity data from the individual and secondary data will be classed as the data required to convert the primary data into a valid carbon footprint e.g. industry data and emissions factors. The goal of this report is to propose a method and the beginning building blocks of a robust standard for assessing historic individual carbon footprints based on the specific lifestyle choices of that individual - "A Lifetime Lifestyle Carbon Footprint".

CARBON FOOTPRINT CALCULATION

This report will include a methodology for assessing the historic carbon footprint of an individual from birth to the present date, aligning as closely as possible to the corporate greenhouse gas protocol methodology and the PAS 2060 standard for carbon neutrality. The key requirement of a historic lifestyle carbon calculator that will differ from the pre-existing standards relates to the type of emissions sources and the time periods these emissions sources are assessed over.

The key focus of this methodology will be across the key lifestyle emissions sources; comparisons to pre-existing corporate emissions standards will be made to justify the calculation methods and additional steps required for a robust greenhouse gas inventory. The key lifestyle emissions sources to be assessed include:

- Housing:
    - Energy usage, number of homes, waste disposal and additional significant contributing factors e.g. a swimming pool
- Travel:
    - Flights, car travel, boat travel, flights, hotels, cruises, train, taxis, bus travel, subway travel
- Purchases:
    - Clothing, shoes, online purchases, smart phones, laptops, desktops computers, electronics, furniture, culture and sports activities, beauty and wellness activities and alcohol
- Diet

Primary data was provided by the footprintee in regards to the type of diet consumed on an annual basis. Secondary data was sourced from the EUs food emissions database.
showing food production emissions for all required countries over a 25 year period.

An initial interview was conducted with the "footprintee" to define the sub-categories of emissions sources within the categories of housing, travel, purchases and diet. The selection of these sub-categories was based on the lifestyle of the individual, the availability of data and the perceived impact on the carbon footprint.

The "footprintee" was able to provide the data for the selected emissions sources based on financial records, memory, receipts and interviews with individuals of significant involvement in the "footprintee's" lifetime. The "footprintee" has signed a statement in the client formal note sections indicating the accuracy of this data to the best of their knowledge.

Each of these emissions sources will be assessed in a fashion that optimizes the following data quality requirements against a realistic availability of resource and data to conduct the assessment:

- Lifestyle (technological) representativeness - The degree to which the data reflect the actual lifestyle of the individual.
- Geographical representativeness - The degree to which the data reflects actual geographic location of the activities of the individual.
- Temporal representativeness - The degree to which the data reflect the actual time (e.g., year) of the activities of the individual.

- <u>Completeness</u> - The degree to which selected emissions sources represent the true carbon footprint of the individual.
- <u>Reliability</u> - The degree to which the calculation can be reproduced to a similar quality and result.

This report does not intend to act as a standard for calculating a lifetime, lifestyle carbon footprint but instead acts as a pilot project for how a robust certification standard could be developed.

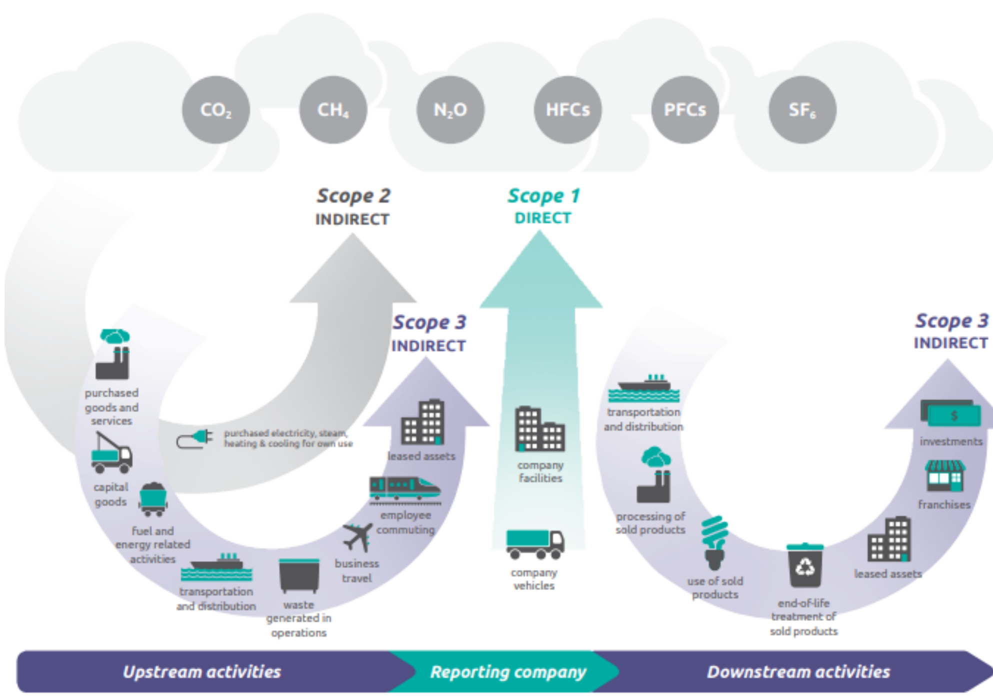
The method, assumptions and justifications for the carbon footprint calculation can be found in the method table (APPENDIX).

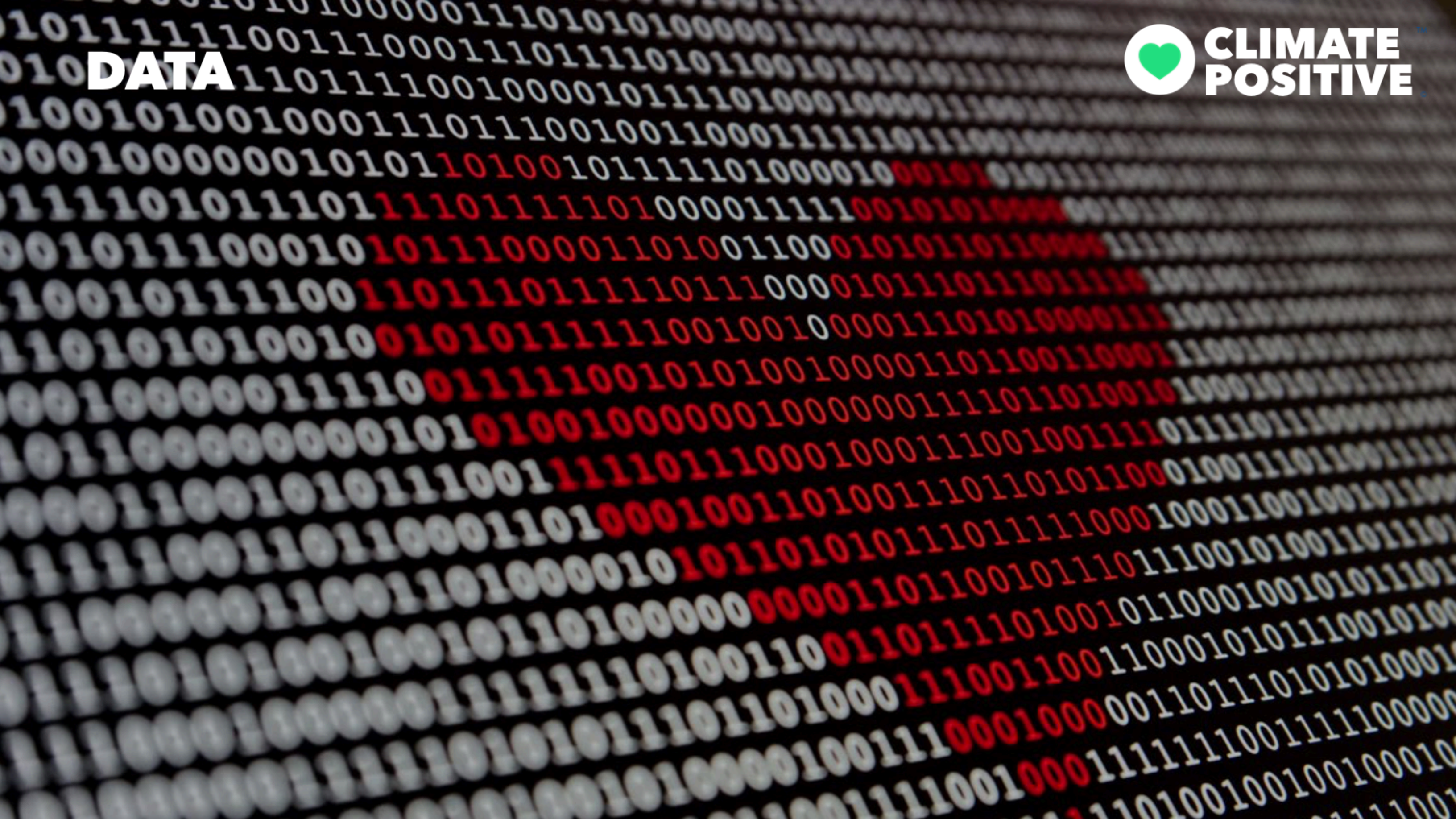
EXCLUSIONS

Corporate carbon footprint standards assess carbon emissions across three scopes. Scope 1 includes direct emissions from fuel burned, chemical reactions, industrial processes and travel in owned vehicles. Scope 2 includes purchased energy such as electricity heat and steam. Scope 3 covers a wide range of indirect emissions sources.

Category	Sub-Category	Method & Justification
Housing	Home energy	A baseline data set for the home energy requirements for UK properties was acquired from British Gas heating calculator [4]. This data accounts for the number of rooms, the insulation quality and type of a house; predicting the electricity and gas usage in kWh. An assumption was made that the year is a good indicator of the insulation quality of a house, therefore the insulation quality was modelled linearly against the year that data was provided with the oldest year benchmarked against the poorest insulation quality and the most recent year benchmarked against the best quality. A factor for average outdoor temperature was also used to indicate the energy requirements for heating and cooling against the UK benchmark data. Average temperatures for each location were sourced from [18] and the Carnot efficiency formula was used to upgrade or downgrade energy requirements based on average outdoor temperatures vs the UK benchmark ((T1-T2)/T1) [19]. Emissions factors from [x] were used to model the fuel emissions required for heating based on the modelled kWh requirements.
	Home extra	A swimming pool was present at one of the properties. An emissions factor for average heating requirements for a swimming pool were sourced from literature [20] totalling 1400 kgCO2e / year. Due to the minimal impact on total carbon footprint no adjustments were made for date and location so the emissions factor alone was applied to the carbon footprint for the years with the swimming pool present.
	Waste disposal	A score was produced from 1-4 representing 0-75% of total waste recycled based on the primary data provided in regards to what type of materials were recycled. UK government data was used to build a model based on average weight of waste produced per person and the emissions factors for recycled waste vs waste sent to landfill [12]. Due to the minimal impact waste has on total carbon footprint, no adjustments were made for date or location of data provided; only uk data for 2021 was used during collection of emissions factors. This is reasonably justified as emissions from landfil and recycled waste have not changed substantially over time and any error should be easily adjusted for in the uncertainty coefficient [12].
Travel	Car travel	Average behavoural modelling was used to calculate emissions associated to car travel in vehicless owned by the footprintee. Location was not accounted for in this model. Average fuel efficiencies in kgCO2e / km based on EPA data [3] was used to assess efficiency for each year. The data sample provided by the EPA was for the years 1975 and 2015 with linear extrapolation used to expand the model to the full lifetime. Data from the US department for transportation [15] was then used to model average km travelled for an individual and this was multiplied by the corresponding yearly efficiency factor to result in an emissions figure. Both sets of data used were not location dependent, instead a location was used that is traditionally known to have high emissions from car use due to the average size of car and the number of km travelled by an average person, therefore the results are likely over reported with minimal risk of under reporting. The data provided by the footprintee was in terms of number of cars owned per year. The number was multipled by the annual emissions per car calculated in the model.
	Boat travel	The data provided for this emissions source was in terms of average annual fuel consumption for the boat, the year it was operated and the percentage of time the footprintree has access to the boat. The fuel consumption was multipled by the footprintees annual utilisation of the equipment and the corresponding emissions factor [12 for the fuel used.
		Due to the high percieved impact of this emissions source on the footprintees total carbon footprint a detailed model was built for this emissions source. The primary data was provided in number of journeys taken (return), ticket class, year in which the travel took place and then the number of hours the one way flight took (split into four buckets). The first step in this model converts the travel time buckets into average distances by multiplying the average time associated with each bucket and multiplying by average commercial aircraft speed [16]. This calculation didn't need to be time or location dependent due to the minimal change in commercial aircraft speed within the scoped time limits and the international nature of the air travel industry meaning minimising the need for location based data [16]. To calculate the emissions associated to the flights, the average distances were converted into emissions figures by multplying

Figure [1.1] Overview of GHG Protocol scopes and emissions across the value chain





DATA QUALITY

Data quality is of key concern due to the historical nature of the carbon footprinting process. It is recommended that an audit of an individual year be conducted to assess the primary data in more detail and adjust the calculation methodology for any error identified. This would be an effective data quality management tool if a certification standard is produced. The following statements refer to assessments against the 5 data quality categories as highlighted in the method section:

- **Lifestyle (technological) representativeness:** The emissions sources accounted for were highly representative of the lifestyle activities of the "footprintee".
- **Geographical representativeness:** The majority of lifestyle categories account for the location the activities were conducted in. Housing accounted for the varying energy requirements for home heating based on the average temperature at the location. The diet calculation accounts for the average food production emissions for the individual countries highlighted. The purchases data did not need to account for location due to the unknown nature of where the specific purchases were manufactured. The travel data did not fully account for the specific location of the activities but this was unnecessary for flights which were the primary source of emissions across all categories.
- **Temporal representativeness:** The year in which the activity occurred was accounted for across the majority of emissions sources. In housing, an adjustment was made for insulative properties of the housing based on the year the data was taken from. In diet the food production data accounted for the specific year. For travel the air travel and car travel both accounted for travel efficiency based on the year the travel occurred in. For purchases a grid efficiency and production energy intensity factor was used based on the year the purchase was made to adjust the emissions data.
- **Completeness:** The emissions sources selected reflect a complete lifestyle assessment of the "footprintee". The justification for the selection of these emissions sources can be found in the emissions sources table (APPENDIX).
- **Reliability:** A third party verification of the report and calculation methodology has been completed with the details available in the Audit section.

UNCERTAINTY

Due to the historic nature of this carbon footprint calculation process, a key focus has been made on overestimation to ensure a reduced risk of underestimation. Judgements have been made based on the perceived impact of different emissions sources to justify the level of accuracy required for the calculation methods. An overview of the risk management approach can be found in the method table highlighting which emissions sources are likely to be under or over estimated. (APPENDIX)

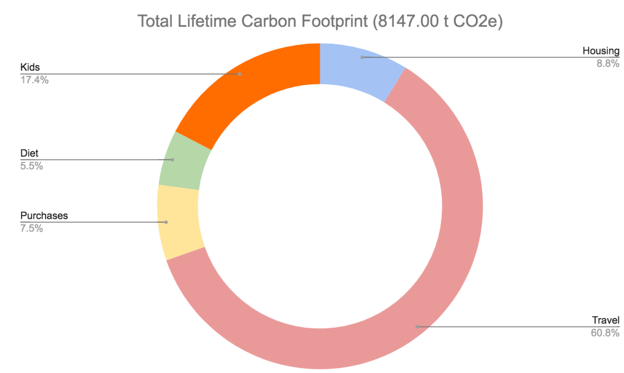
As standard in many corporate greenhouse gas accounting standards a risk buffer of 5% is often added to the total carbon footprint to account for uncertainty in the data and calculations. Due to the historic nature of the calculation additional risk buffers were added for calculations of earlier years with 10% added to the first year (1963) working down to the standard 5% in the most recent year (2023). The risk factors by specific year can be found in the uncertainty table. (APPENDIX)

Baseline	105%
Historic	110%
Annual Rate	0.08%

Year	Uncertainty
1963	110.00%
1964	109.92%
1965	109.84%
1966	109.75%
1967	109.67%
1968	109.59%
1969	109.51%
1970	109.43%
1971	109.34%
1972	109.26%
1973	109.18%
1974	109.10%
1975	109.02%
1976	108.93%
1977	108.85%
1978	108.77%
1979	108.69%
1980	108.61%
1981	108.52%
1982	108.44%
1983	108.36%
1984	108.28%
1985	108.20%
1986	108.11%
1987	108.03%
1988	107.95%
1989	107.87%
1990	107.79%

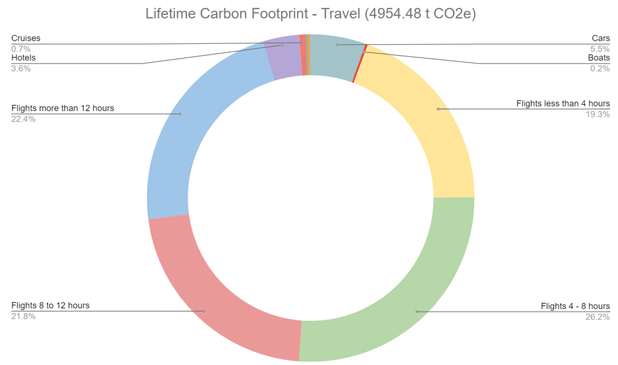
ANALYSIS

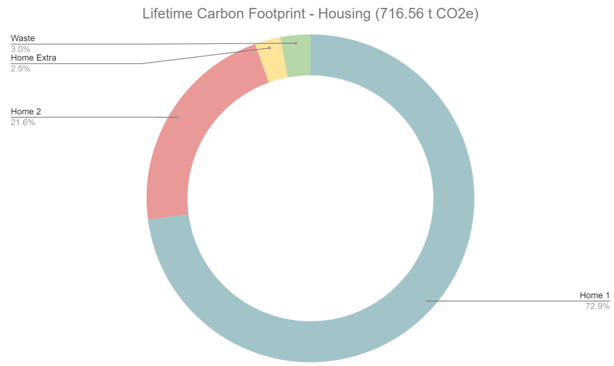
Craig Cohon's Lifetime Lifestyle carbon footprint is 6729.53 tonnes of carbon dioxide equivalent (t CO2e). Here is a breakdown of all his emissions.



TRAVEL: 78% of this footprint (>6300t CO2e) was associated with travel. Flights accounted for the large majority of this (>4955t CO2e).

- This travel carbon footprint peaked in the 90s at 256 tonnes per year due primarily to work related activities.
- In the 2000's the number of flights reduced but moved to more emitting ticket classes e.g. business class.
- A model was built to calculate historic emissions based on average efficiency per passenger mile. This was scaled up to account for different flight classifications using data from DEFRA based on modern aircraft (see appendix table 3 for more info). An algorithm was developed that converted the specific year into a predicted flight efficiency per km traveled for economy and business class tickets.
- Between 1960 and 2020 the emissions of aircraft (kg CO2e / km) reduced by more than 90%.



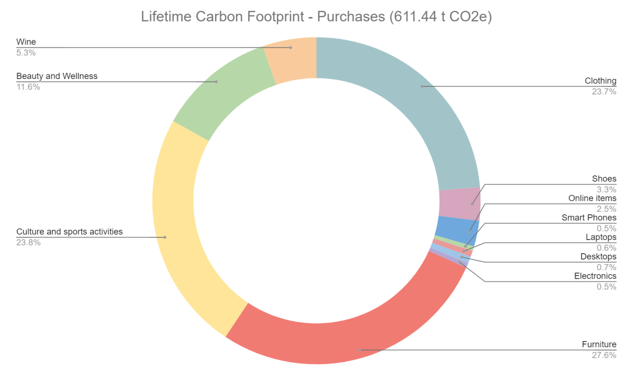


HOUSING: 10.6% of Craig's emissions (716.56 t CO2e) are associated within housing. This includes Craigs primary homes (522.53 t CO2e), secondary homes (154.63 t CO2e), swimming pools (18.2 t CO2e) and home waste disposal (21.2 t CO2e).

- Energy use at home was modeled using average behavioral data for a modern house based in the UK accounting for size of home, quality of insulation and type of home. To account for the age of the home the insulation variable was modeled based on age of home with the assumption that an older home has worse insulation.
- Additional thermodynamic modeling was used to predict energy usage based on the average temperature of the country the home was located (see appendix table 3).
- The highest carbon footprint was recorded in the 70's in a large family home based in Canada with a carbon footprint of 26.1 t CO2e per year.
- The lowest carbon footprint was recorded in a modern London flat in the early 2000's with an average yearly footprint of 2.5 t CO2e per year.

PURCHASES: 9.1% of Craig's emissions (611.44 t CO2e) were associated with purchase goods and services.

- Average emissions vs spend data from the UK's ONS was used to model recently purchased goods and services.
- Historic emissions data for specific purchased goods and services is not readily available so a historic model was built using secondary data (see appendix table 3):
- Energy consumption vs GDP vs year was used to account for changes in production energy efficiency with the assumption that in time, we use less energy to produce goods and services.
- Global grid intensity vs year was used to account for the difference in carbon emissions per kWh of energy produced with the assumption that national grids become a lot more carbon efficient with time.
- The model highlighted 4.336 times more carbon was emitted per purchase in 1960 vs 2020. It is advised that a spot audit is conducted on specific purchases to validate this method.

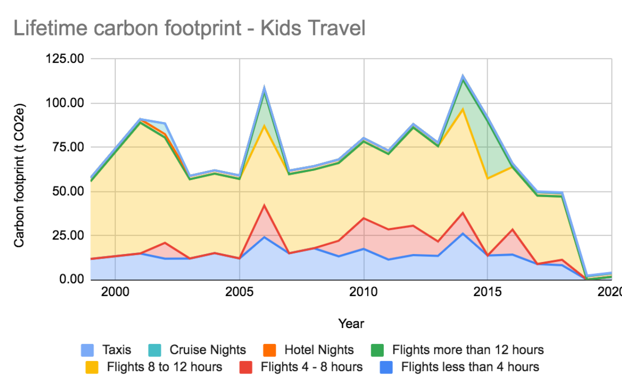


DIET: 6.6% of Craig's carbon footprint (447.05 t CO2e) was associated with diet.

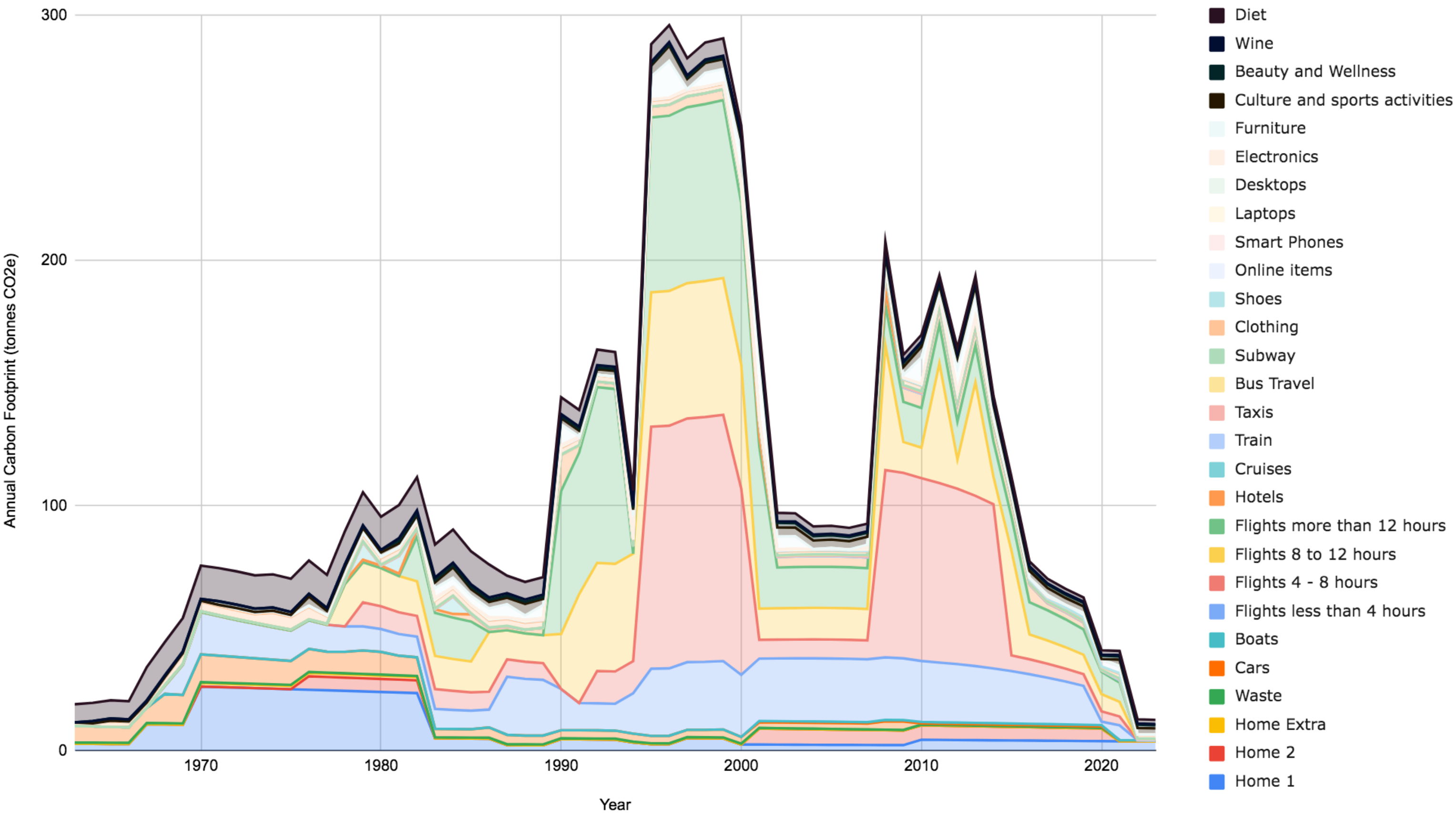
- A model was built to account for historic changes in diet based emissions accounting for location, year and diet type.

KIDS: 17% of Craig's carbon footprint (1418 t CO2e) was associated with the travels of Craig's kids.

- Although not required, Craig decided to include his Scope 3 Emissions from the travel of his 2 children, as he felt full responsibility for these emissions. - Total Kids carbon footprint from travel equates to 1417.5 tonnes (703.1 from Boy, 714.4 from girl).



CONCLUSIONS



CONCLUSIONS & NEXT STEPS

In total the "footprintee's" total carbon footprint between the years 1963 and 2023 was equal to **8147 tonnes of CO2e** including the additional uncertainty factors. The primary source of emissions was due to air travel, accounting for >6000 tonnes of CO2e.

A breakdown of the total carbon footprint by emissions sources can be found in the graph above and the results table. The raw data used for these calculations can be found in the raw data table. **(upon request).**

A few areas for further work are proposed:

- **Audit** of an individual year in more detail to assess data quality and adjust the calculation methodology to account for any error.
- **Additional auditing** of calculation methodologies picking out individual years across the different lifestyle emissions categories.
- **Third party verification** of the report and calculation methodology.
- **Compensating** of the lifetime carbon footprint using socially costed carbon removal projects.
- **Scope 3 emissions** - Although Craig included the scope 3 emissions of his kids travel, to what extent should we include his total Scope 3 emissions?
- Development of a **robust certification standard** for lifetime, lifestyle carbon footprinting.

CARBON COMPENSATION

Carbon Compensation

A carbon compensation is a fairly new concept, and we do not have historical carbon pricing data from 1960. Therefore we propose to use two scientific benchmarks to calculate a proper scientific carbon price for the compensation part.

Atmospheric CO2 PPM

Carbon dioxide in our atmosphere is measured by its concentration in parts per million (ppm) of our air. Data for CO2 ppm exists for more than 100 years, and therefore it is a credible dataset to use.

Carbon Budget

Our global carbon budget has been calculated also over the last 100 years. It measures how much carbon we have emitted since the industrial revolution and how much carbon budget humanity has left before we reach the critical threshold of 1.5c.

Carbon Pricing

A carbon price represents the financial value of one ton of carbon dioxide equivalent (tCO2e). Carbon pricing varies greatly around the world between the voluntary and regulated markets. This is because there is no globally accepted carbon price between all countries. However, there are 65 different carbon price regimes around the world. There are also several price points for the voluntary carbon markets.

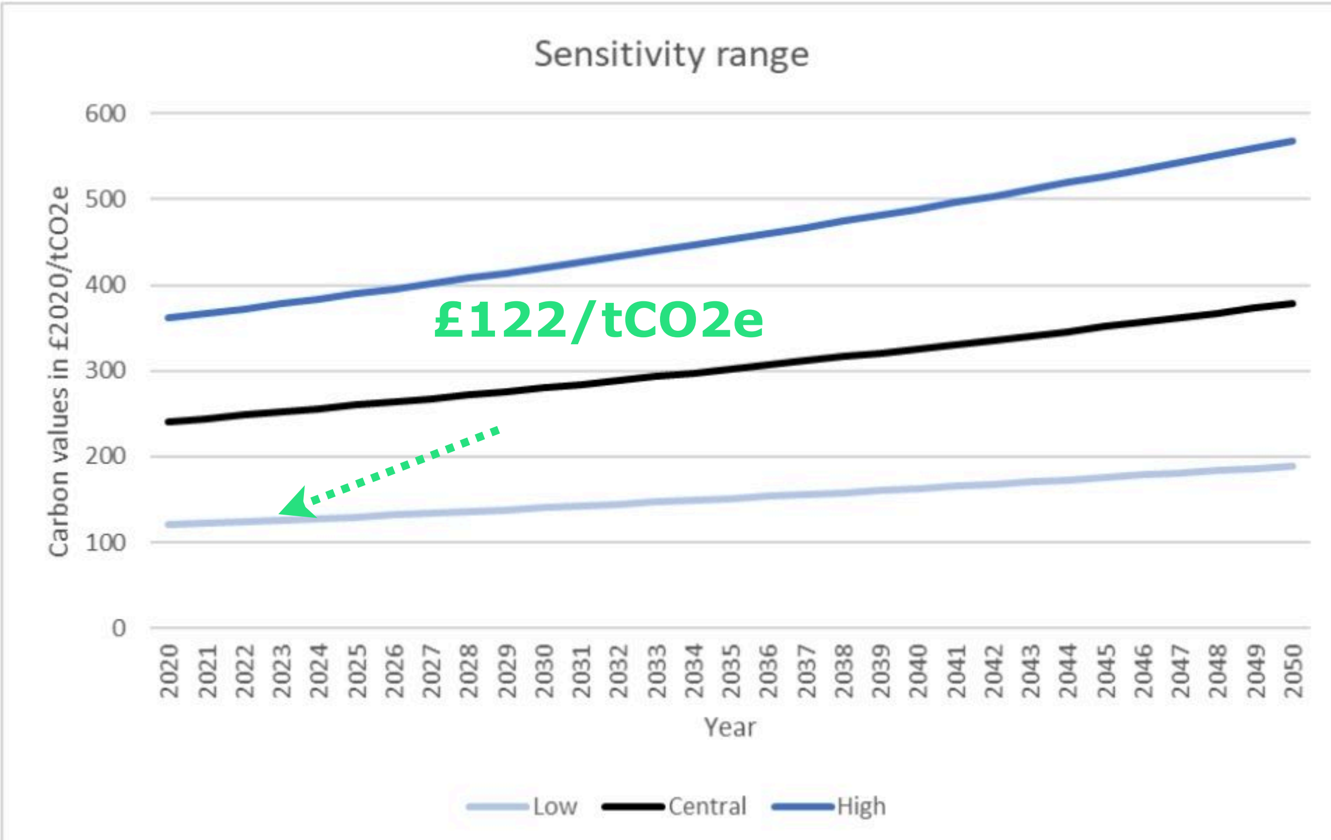
Carbon Compensation Price

We have decided to use as our carbon price reference, the scientific based carbon price social cost of carbon used by the British government (BEIS) to calculate the carbon compensation used by Craig Cohon for his lifetime carbon compensations. We will use the lower bound of this valuation which is at **£122/tCO2e** this year.

To be able to calculate this price from 1963 until now, we will use a formula that fairly represents the weighted carbon price from 1963 until today. The carbon price of our choice above will be multiplied by a discounted percentage of today's carbon budget.

Formula

CP x **%CB = Climate Positive Carbon Price**



Carbon Price x Percentage of Today's Carbon Budget

The total amount of money spent to compensate is proprietary and can be asked upon request.

ABOUT US

ABOUT

This report was written by a team with a combined experience of more than 50 years in sustainability, climate change and finance.

MY CARBON

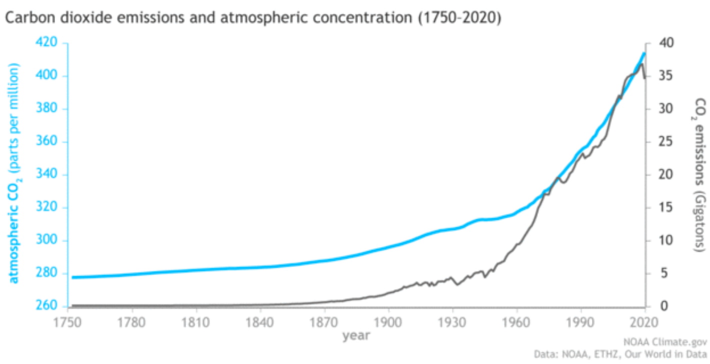
MyCarbon - enables people who wish to help the environment to do so through a cost effective, simple to use platform. Our aim is for every person and organisation in the UK to offset their greenhouse gas emissions and eliminate their contributions to global warming.

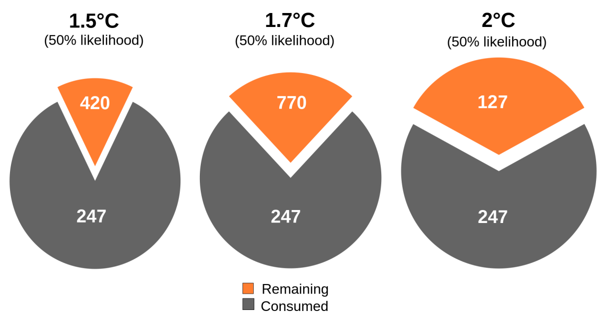
FUND NATURE

Fund Nature - values, protects and restores nature globally. It does so by creating, structuring, and funding new financial products for nature.

CLIMATE POSITIVE

Climate Positive - aims to be a certifying organisation and a global label, for any individuals, organisations or governments that want to go beyond net-zero.





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AUDIT (TBD)

This confirms that we ___________________________ have audited this report, its methodologies, data and analysis to the best of our knowledge.

We conclude that:

APPENDIX

GHG protocol emissions sources - Table 1

GHG Protocol Emissions Sources:			
Emissions Source	**Description**	**Inclusion / Exclusion Justification**	**Scope**
Scope 3 travel	Emissions from travel in vehicles owned by someone else	**Included:** Travel	3
Purchased goods and services	The embodied emissions stored in the materials and services purchased for the production of the component	**Included:** Purchases	3
Scope 1 energy consumption	Burning of fuel	**Included:** Housing and travel	1
Scope 2 energy consumption	Use of electricity, district heat or steam	**Included:** Housing	2
Scope 1 travel	Direct emissions from travel in vehicles owned or leased	**Included:** Travel	1
Purchased capital equipment	Embodied emissions of high value capital equipment	**Partially Included:** Purchases	3
Upstream transportation	Transportation required in the distribution of goods	**Partially Included:** Travel	3
Waste Disposal	Transport and waste processing / biodegredation based emissions associated with any waste produced	**Included:** Housing	3
Leased Assets	Embodied emissions of high value leased equipment	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Scope 3 energy consumption	Transmission losses and extraction emissions	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Other direct emissions	Emissions associated to any direct release of greenhouse gases e.g. chemical processes	**Excluded:** No activities of percieved significant impact	1
Refrigeration	Refrigerants used in air conditioning and other cooling system have high global warming potentials	**Excluded:** Deemed negligible, highly complex to measure historic emissions	1
Downstream transportation	Transportation required in the supply chain responsible for providing goods	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Water consumption	Emissions associated to the sourcing and disposal of water	**Excluded:** Deemed negligible, highly complex to measure historic emissions	3
Investments	Emissions associated to the ownership of turnover generating capital	**Excluded:** Not suitable for a lifestyle calculation and high likelihood of double counting due to the inclusion of items that were purchased using to the value gained from any potential investments	3
Franchises	Emissions associated to the licensing of a revenue generating franchise	**Excluded:** Not suitable for a lifestyle calculation and high likelihood of double counting due to the inclusion of items that were purchased using to the value gained from any potential franchises	3

GHG justifications - Table 2

GHG Description	Inclusion / Exclusion Justification
CO_2 Carbon dioxide	**Included:** Emissions factors used will account for this gas
CH_4 Methane	**Included:** Emissions factors used will account for this gas
N_2O Nitrous oxide	**Included:** Emissions factors used will account for this gas
HFC Hydro fluorocarbon	**Partially Included:** Deemed negligible, highly complex to measure historic emissions
PFC Perfluorocarbons	**Partially Included:** Deemed negligible, highly complex to measure historic emissions
SF_6 Sulphur hexafluoride	**Partially Included:** Deemed negligible, highly complex to measure historic emissions
NF_3 Nitrogen trifluoride	**Partially Included:** Deemed negligible, highly complex to measure historic emissions

Method - Table 3

Category	Sub-Category	Method & Justification
Housing	Home energy	A baseline data set for the home energy requirements for UK properties was acquired from British Gas heating calculator [4]. This data accounts for the number of rooms, the insulation quality and type of a house; predicting the electricity and gas usage in kWh. An assumption was made that the year is a good indicator of the insulation quality of a house, therefore the insulation quality was modelled linearly against the year that data was provided with the oldest year benchmarked against the poorest insulation quality and the most recent year benchmarked against the best quality. A factor for average outdoor temperature was also used to indicate the energy requirements for heating and cooling against the UK benchmark data. Average temperatures for each location were sourced from [18] and the Carnot efficiency formula was used to upgrade or downgrade energy requirements based on average outdoor temperatures vs the UK benchmark ((T1-T2)/T1) [19]. Emissions factors from [x] were used to model the fuel emissions required for heating based on the modelled kWh requirements.
	Home extra	A swimming pool was present at one of the properties. An emissions factor for average heating requirements for a swimming pool were sourced from literature [20] totalling 1400 kgCO2e / year. Due to the minimal impact on total carbon footprint no adjustments were made for date and location so the emissions factor alone was applied to the carbon footprint for the years with the swimming pool present.
	Waste disposal	A score was produced from 1-4 representing 0-75% of total waste recycled based on the primary data provided in regards to what type of materials were recycled. UK government data was used to build a model based on average weight of waste produced per person and the emissions factors for recycled waste vs waste sent to landfill [12]. Due to the minimal impact waste has on total carbon footprint, no adjustments were made for date or location of data provided; only uk data for 2021 was used during collection of emissions factors. This is reasonably justified as emissions from landfil and recycled waste have not changed substantially over time and any error should be easily adjusted for in the uncertainty coefficient [12].
Travel	Car travel	Average behavoural modelling was used to calculate emissions associated to car travel in vehicless owned by the footprintee. Location was not accounted for in this model. Average fuel efficiencies in kgCO2e / km based on EPA data [3] was used to assess efficiency for each year. The data sample provided by the EPA was for the years 1975 and 2015 with linear extrapolation used to expand the model to the full lifetime. Data from the US department for transportation [15] was then used to model average km travelled for an individual and this was multiplied by the corresponding yearly efficiency factor to result in an emissions figure. Both sets of data used were not location dependent, instead a location was used that is traditionally known to have high emissions from car use due to the average size of car and the number of km travelled by an average person, therefore the results are likely over reported with minimal risk of under reporting. The data provided by the footprintee was in terms of number of cars owned per year. The number was multipled by the annual emissions per car calculated in the model.
	Boat travel	The data provided for this emissions source was in terms of average annual fuel consumption for the boat, the year it was operated and the percentage of time the footprintree has access to the boat. The fuel consumption was multipled by the footprintees annual utilisation of the equipment and the corresponding emissions factor [12 for the fuel used.
	Flights	Due to the high percieved impact of this emissions source on the footprintees total carbon footprint a detailed model was built for this emissions source. The primary data was provided in number of journeys taken (return), ticket class, year in which the travel took place and then the number of hours the one way flight took (split into four buckets). The first step in this model converts the travel time buckets into average distances by multiplying the average time associated with each bucket and multiplying by average commercial aircraft speed [16]. This calculation didn't need to be time or location dependent due to the minimal change in commercial aircraft speed within the scoped time limits and the international nature of the air travel industry meaning minimising the need for location based data [16]. To calculate the emissions associated to the flights, the average distances were converted into emissions figures by multplying distance (km) by average aircraft efficiency (kgCO2e / km) which was modelled on an annual basis used data from source [1,2]. This data provided fuel efficiency factors in five year buckets so a 3rd degree polynomial model was fitted to allow interpolation and extrapolation of the data into an annual basis across the entire scope time period. Additional data from DEFRA [12] was used to validate this model across the most recent years. This model could predict aircraft efficiency across the entire industry (all ticket classes) so an additional model was built to allow for the additional calculation of different ticket classes. Data from DEFRA [12] was used to compare the ratio between economy and business class flights and this ratio was then multiplied to the previous efficiency model to produce a business class efficiency model. This approach assumes that the emissions ratio between economy and business class flights remained similar throughout the entire scope time period which will likely result in slight over reporting of the total lifetime emissions from flights.

	Hotels	The primary data was provided in nights spent per year. Global average emissions data on hotel nights is available for 2021 from DEFRA [12]. This was multiplied by the number of nights spent per year to calculate the footprint. No accounting was made for the year due to lack of high quality secondary data and the specific location was not accounted for due to lack of primary data. It is expected that the total uncertainty applied to all emissions sources will acount for any potential underreporting for this emissions source.
	Cruises	Due to the minimal percieved impact (<1% combined) from the remaining travel types a simpler modelling approach was taken with no accounting for location and time based adjustments. For cruises a fixed emissions factor was used from [17] (kgCO2e / night). For the other forms of transport all primary data was converted into an annual distance and multiplied by UK 2021 emissions factors [12] to calculate the total footprint.
	Train	
	Taxis	
	Bus travel	
	Subway travel	
Purchases	Clothing	All purchases followed a similar calculation approach. Primary data was provided in terms of number of purchases per year and a benchmark 2020 average cost of each item. ONS data from source [11] was used to predict emissions for each purchase catagory based on the amount spent. This raw data is in the form of total national annual spend on the specific type of item and the total national carbon footprint associated. This can be used to predict the emissions (kgCO2e) per £ spent on each item. Due to the high average spend of the footprintee on each item this is likely to over estimate the carbon footprint associated to each purchase when using average data. Its worth noting that location is not taken into account due to the international supply chains used for most purchases, therefore location of purchase has minimal impact on the product carbon footprint. Due to the lack of emissions data for historic emissions vs amount spend, a model was built using global average adjustments for global production energy intensity [10] (kWh per unit GDP) and average global grid emissions factors (kgCO2e / kWh) [12, 13, 14] with the expectation that production energy intensity and grid emissions factors improve over time. This data was used to produce an annual energy coefficient that extrapolated the 2020 emissions across the scoped time period resulting an emissions ratio of 4.147x between the years 2020 and 1963 (an equivalent item purchased in 1963 produced 4.147x the carbon footprint than it did in 2020). The limitation with this approach is the lack of accounting for technological changes to the products themselves e.g. they are likely to be much less complex at earlier dates and therefore might not require the same levels of production effort. This approach will likely overestimate the carbon footprint of earlier purchases. The model could be adjusted in the future through an audit process of specific products at specific years to assess the accuracy of the model used.
	Shoes	
	Online Purchases	
	Smart phones	
	Laptops	
	Desktops	
	Electronics	
	Furniture	
	Cultural & sports	
	Beauty & wellness	
	Alcohol	
Diet	Food consumption	Primary data was provided by the footprintee in regards to the type of diet consumed on an annual basis. Secondary data was sourced from the EUs food emissions database [6] showing food production emissions for all required countries over a 25 year period. A linear extrapolation was used to fit this dataset to the full scoped time period. The data was then divded by the population of the country in each year using the worlds banks population data [7] to calculate food production emissions per capita. An additional multiplier was then applied based on the type of food consumed using data sourced from [7].

Uncertainty - Table 4

Baseline	105%
Historic	110%
Annual Rate	0.08%

Year	Uncertainty
1963	110.00%
1964	109.92%
1965	109.84%
1966	109.75%
1967	109.67%
1968	109.59%
1969	109.51%
1970	109.43%
1971	109.34%
1972	109.26%
1973	109.18%
1974	109.10%
1975	109.02%
1976	108.93%
1977	108.85%
1978	108.77%
1979	108.69%
1980	108.61%
1981	108.52%
1982	108.44%
1983	108.36%
1984	108.28%
1985	108.20%
1986	108.11%
1987	108.03%
1988	107.95%
1989	107.87%
1990	107.79%
1991	107.70%
1992	107.62%
1993	107.54%
1994	107.46%
1995	107.38%
1996	107.30%
1997	107.21%
1998	107.13%
1999	107.05%
2000	106.97%
2001	106.89%
2002	106.80%
2003	106.72%
2004	106.64%
2005	106.56%
2006	106.48%
2007	106.39%
2008	106.31%
2009	106.23%
2010	106.15%
2011	106.07%
2012	105.98%
2013	105.90%
2014	105.82%
2015	105.74%
2016	105.66%
2017	105.57%
2018	105.49%
2019	105.41%
2020	105.33%
2021	105.25%
2022	105.16%
2023	105.00%

Emission Factors - Table 5

Emissions from energy usage at primary home		
	Total	Average
Canada	377.2104581	18.86052291
Norway	3.423880831	3.423880831
Russia	18.81116886	4.702792215
UK	83.59841715	3.483267381
USA	39.48346342	3.290288618
Grand	522.5273884	8.56602276
Emissions from diet		
	Total	Average
Canada	270.4128881	13.5206444
Norway	6.209787322	6.209787322
Russia	25.96443606	6.491109016
UK	58.37032337	§
USA	86.09058726	7.174215605
Grand	447.0480221	7.3286561