



NORTHUMBERLAND NATIONAL PARK
AUTHORITY

Carbon Footprint Report

FINAL.v1

GHG Protocol & Emission Scopes

Northumberland National Park Authority's footprint for the financial year 2019/20 has been measured according to the Greenhouse Gas (GHG) Protocol. The Protocol is the most widely used and accepted methodology for GHG accounting. It provides a framework for businesses, governments and entities to measure and report greenhouse gas emissions that support ongoing reduction efforts in a consistent manner. The standard has been developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

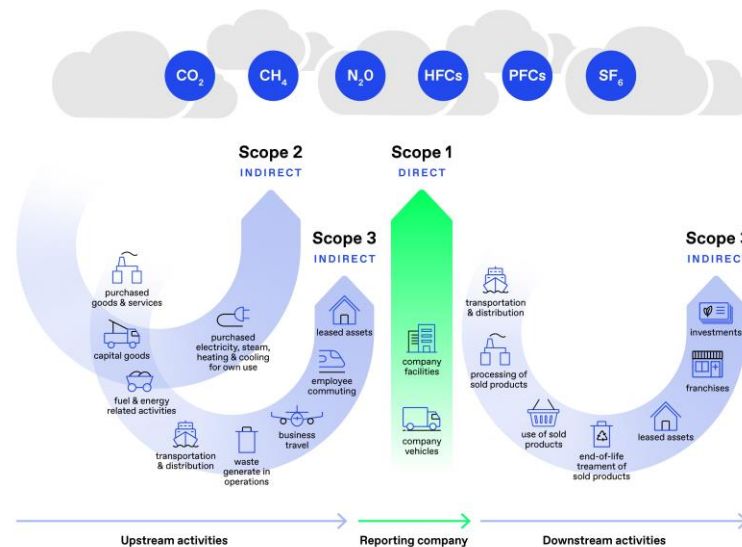
Accounting definitions and scope

This footprint aligns to the following GHG Protocol accounting definitions:

- **Direct GHG emissions** are emissions from sources that are owned or controlled by the reporting entity
- **Indirect GHG emissions** are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity

The GHG Protocol categorises these direct and indirect organisational emissions into three broad scopes (figure 1):

- **Scope 1:** All direct GHG emissions
- **Scope 2:** Indirect GHG emissions from consumption of purchased electricity, heat or steam
- **Scope 3:** Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. Transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc.



Source: <https://ghgprotocol.org/>

Greenhouse Gases

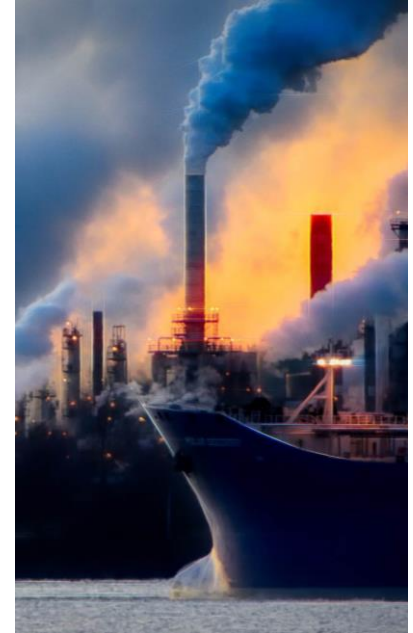
Greenhouse gases (GHGs) are gases in Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat from the sunlight leaving the atmosphere. Carbon dioxide is not the only greenhouse gas. There are six other principle greenhouse gases that contribute to global warming. Not all of these gases arise from combustion of fossil fuels, with some originating from refrigeration/cooling, agriculture, chemical production and electrical applications.

Key Green House Gases:

- Carbon Dioxide (CO₂)
- Methane (CH₄)
- Nitrous Oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur Hexafluoride (SF₆)
- Nitrogen Trifluoride. (NF₃)

Under the GHG Protocol, each gas has its own global warming potential (GWP). By comparing each gas's GWP to that of Carbon Dioxide (CO₂) it is possible to derive a Carbon Dioxide equivalent value (CO₂e). The next page shows the various GWPs for the key GHGs.

Values provided in this report are given in tCO₂e (tonnes) and therefore reflect the emissions resulting from all the above greenhouse gases where relevant to the emission source in question.



Greenhouse Gases

- We measure all gases in tCO₂e – tonnes of carbon dioxide equivalent; this reflects the global warming potential of each gas relative to CO₂.
- When a footprint is quoted in terms of CO₂e, this means that all gases under the [Kyoto protocol](#) are included.
- Although CO₂ has the lowest GWP, with other GHGs having a GWP's thousands of times higher, it is by far the most abundant GHG and is therefore the predominant focus when discussing emissions reduction and climate change.
- The image on the right shows the relativity of CO₂'s GWP to the other key GHGs

	GWP	Key Source
CO ₂	1	Fossil fuel combustion
N ₂ O	310	Agriculture and soil management
PFCs	~10,000	Aluminium and semi-conductor production
HFCs	1,500–15,000	Refrigeration and air conditioning
SF ₆	23,900	Electricity supply equipment
CH ₄	21	Agriculture and waste
NF ₃	16,100	Semi-conductor and electronics production

Quantifying Carbon Emissions from Activities



Emission Factors

To attribute a value of emissions released to individual activities, **emission factors** are applied. These are values that express the average emissions emitted per measurable variable related to a certain activity, validated in prior scientific research. Emissions are most commonly quantified in equivalent weight of Carbon Dioxide (tCO₂e), and emission factors are expressed in terms of tCO₂e per activity data variable (e.g. tCO₂e/litre of petrol fuel used). Emission factors also allow for emissions to be estimated from a wide variety of variables, such as £ spent or building floor area, although the most reliable and accurate calculations will be based on volumetric data directly related to the emission sources activity.

BEIS emission factors

Most emission sources in this report use emission factors produced by BEIS¹, specifically relating to emissions from UK/European activities. This database collates the most recent & relevant scientific studies into one dataset of emission factors that can be attributed to UK specific operations.

EEIO Factors

Environmentally Extended Input-Output factors (EEIO) are used as emission factors for Purchased Goods & Services (scope 3) in this report. These use the OPEN IO database² originally developed by the Sustainability Consortium at the University of Arkansas and further adapted by the Carbon Trust. The analysis is based on financial spend and Greenhouse Gas (GHG) emission factors, calculated per USD of economic value, and converted to GBP for quantification of UK markets.

¹ <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>

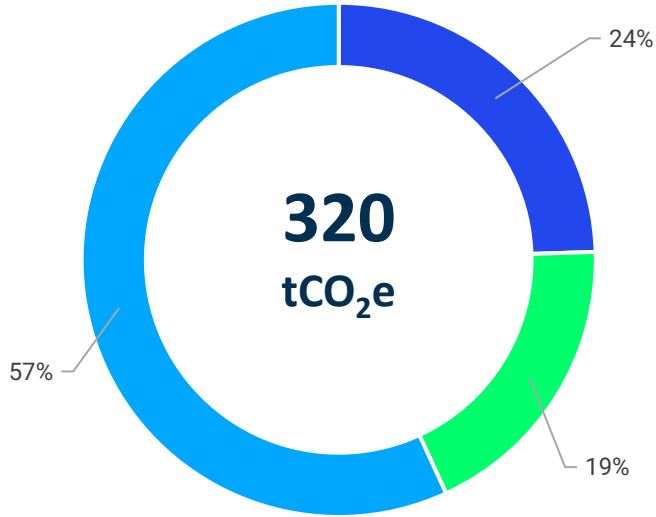
² <http://www.ghgprotocol.org/Third-Party-Databases/OPEN-IO>

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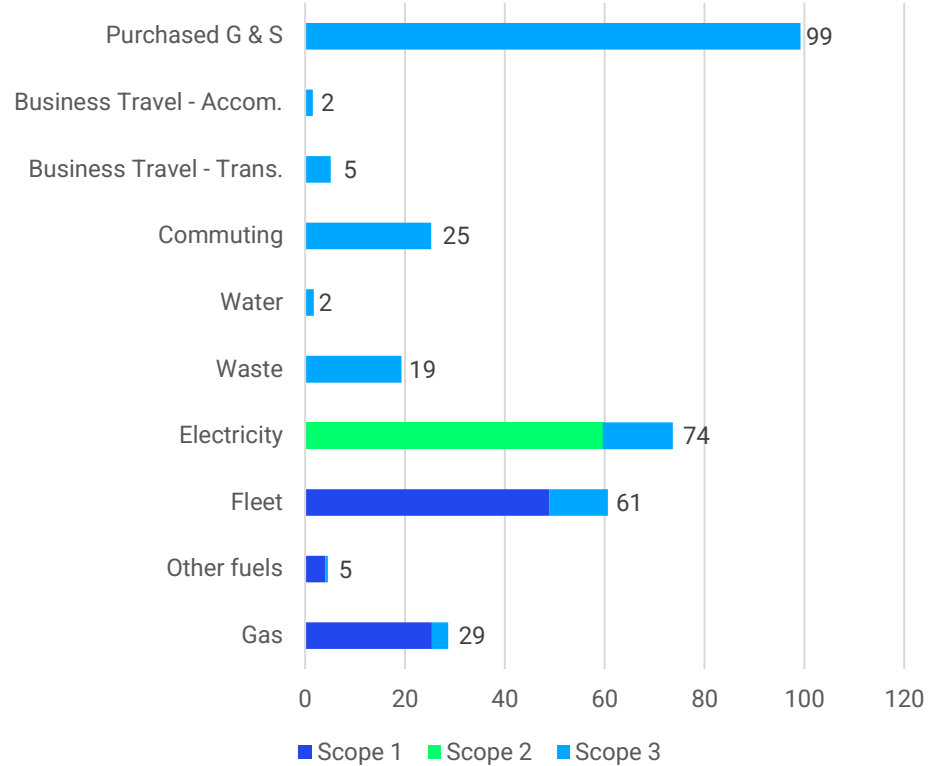
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■ Scope 1 ■ Scope 2 ■ Scope 3

5.34
tCO₂e per
FTE



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Emissions Category	Data Source	Received Data Units
Gas	Data Collection Form	kWh
Electricity	Data Collection Form	kWh
Other Fuels	Data Collection Form	litres
Fleet	Data Collection Form	km
Refrigerant	Not Applicable (Assumed)	-
Heat and steam	Not Applicable (Assumed)	-
Water	Proxy	FTE
Waste	Proxy	FTE
Business Travel - Transport	Data Collection Form	km
Commuting	Proxy	FTE
Business Travel - Accommodation	Proxy	FTE
Purchased G&S	Proxy	FTE
Leased Buildings	Not Applicable (Assumed)	-

Emissions Source	Scope 1	Scope 2	Scope 3	Total
Gas	25	-	3	29
Other Fuels	4	-	1	5
Fleet	49	-	12	61
Electricity	-	60	14	74
Waste	-	-	19	19
Water	-	-	2	2
Commuting	-	-	25	25
Business Travel - Transport	-	-	5	5
Business Travel - Accommodation	-	-	2	2
Purchased goods and services	-	-	99	99
Total	78	60	182	320

Breakdown of all emissions values are in tCO₂e

Northumberland National Park



Methodology Specifics

- Electricity usage was split up into “brown” and “green” electricity in GGC reporting, but due to the nature of this analysis a location-based only (UK grid) emissions factor was applied.
- Refrigerant, Heat & steam, and Leased buildings were assumed to be unapplicable to Northumberland NPA’s operations
- Commuting emissions were calculated using a proxy based on NNPA’s FTE number.
- Waste, Water, Business Travel – Accommodation, and Purchased G & S emissions were estimated using the average tCO₂e per FTE, scaled to NNPA’s FTE figure.

Breakdown of all emissions values are in tCO₂e