



Ricardo
Energy & Environment

Dundee Airport Carbon Footprint 2019

In accordance with the UK Government's Conversion Factors
for Company Reporting

Report for Highlands and Islands Airports Limited



Highlands and Islands
Airports Limited
Puir-adhair na Gàidhealtachd
is nan Eilean Earranta

Included Emissions Sources

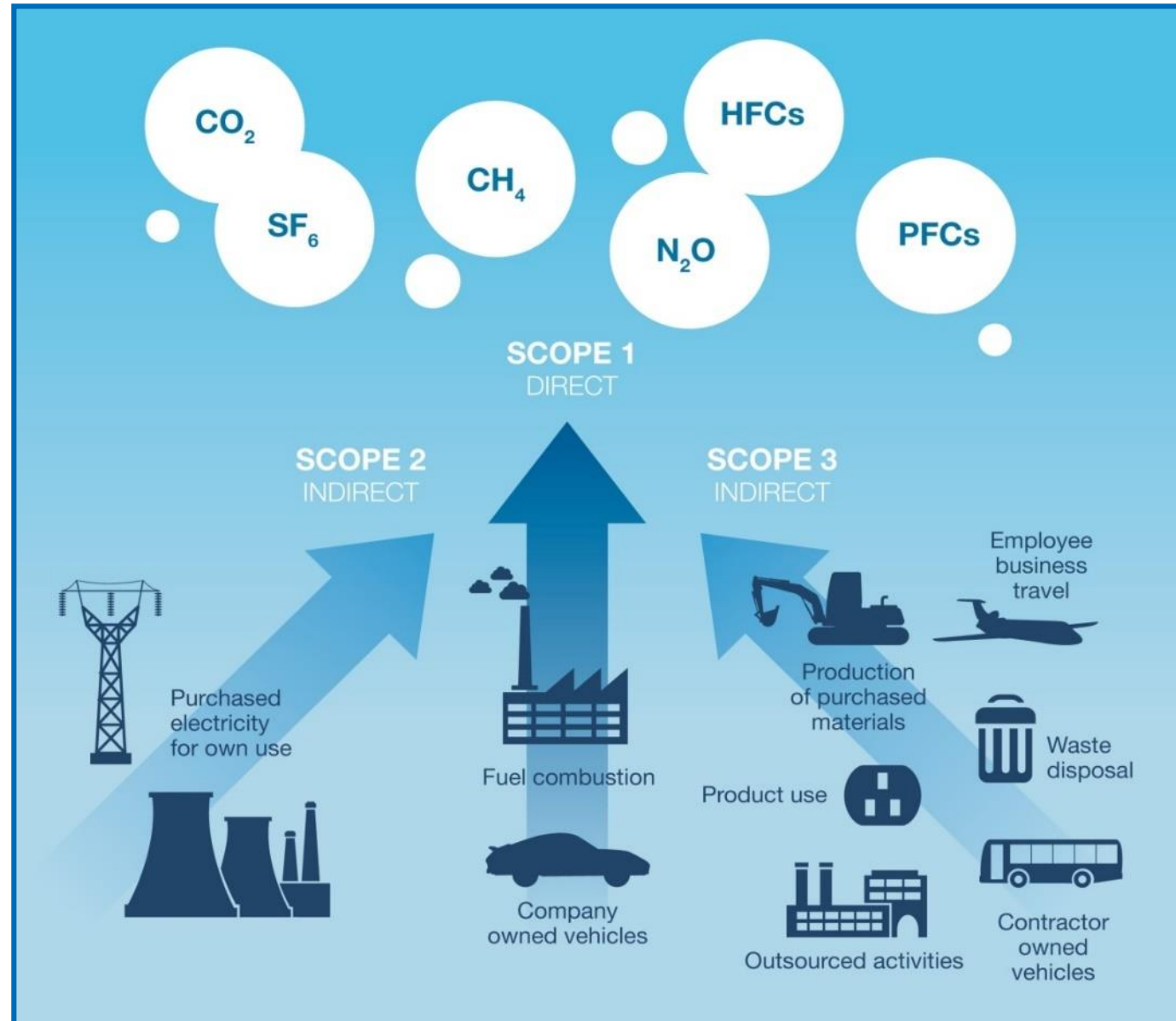
The following emissions sources are included in the 2019 carbon footprint for Dundee Airport:

Scope 1: Direct emissions:

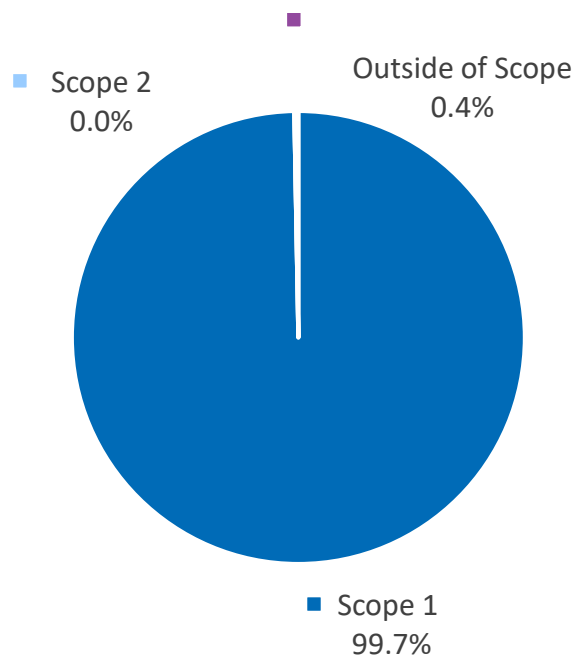
- Utilities: Gas oil combustion and refrigerant gas losses (those considered are R407c, R410a, R22 and R134a).
- Operational vehicles: Diesel and petrol.
- Fire training: Wood, diesel, LPG, kerosene, paper and CO₂.

Scope 2: Indirect emissions:

- Purchased electricity (in HIAL's case, purchased electricity is 100% supplied by renewable sources).



Key Stats - Carbon Emissions by Scope 2019



| | Total 2019 emissions (tCO ₂ e) | % of total emissions |
|-------------------|---|----------------------|
| Scope 1 | 93.57 | 99.7 |
| Scope 2 | 0.00 | 0.0 |
| Outside of Scopes | 0.27 | 0.4 |
| Total | 93.84 | 100.0% |

Scope 1:

Emissions on-site, or an associated process, from the combustion of fossil fuels, e.g. natural gas, oil, LPG and company-owned vehicles.

Scope 2:

Emissions associated with the use of electricity imported from the grid or from a third party supplier of energy in the form of heat or electricity.

Outside of scope emissions:

Outside of scope emissions account for the direct carbon dioxide (CO₂) impact of burning biomass and biofuels. The emissions are labelled 'outside of scope' because the Scope 1 impact of these fuels has been determined to be a net '0'.

Key Stats - Intensity Metrics



Intensity metrics demonstrate the emission rate of a given pollutant (CO₂e) in relation to a specific activity/process. This allows for a fair comparison of activities for airports of varying sizes, who may produce significantly different levels of absolute emissions.

For the HIAL airports, the intensity metrics calculated are tCO₂e/PAX (PAX = passenger) and tCO₂e/ATM (ATM = air traffic movement), for both location and market based Scope 2 methodologies.

When comparing the 11 HIAL airports' emissions intensity factors (market based Scope 2), Dundee ranks 1st for aircraft movement emissions intensity and 9th for passenger emissions intensity. Unlike the other airports, Dundee has more ATM's than PAX due to a resident flying school operating over 20 aircraft for pilot training purposes.

| | 2019 |
|------------------------------------|--------|
| ATM (Air Traffic Movements) | 42,857 |
| PAX | 22,202 |

| | |
|--|-----|
| Scope 1 & 2 (tCO₂e) Location Based Scope 2 | 212 |
| kgCO₂e/ATM | 4.9 |
| kgCO₂e/PAX | 9.5 |

| | |
|--|-----|
| Scope 1 & 2 (tCO₂e) Market Based Scope 2 | 94 |
| kgCO₂e/ATM | 2.2 |
| kgCO₂e/PAX | 4.2 |

Table of Contents

- [Included Emissions Sources](#)
- [Key Stats - Carbon Emissions by Scope 2019](#)
- [Key Stats - Intensity Metrics](#)
- [Background](#)
- [Carbon Emissions by Source and Activity 2019](#)
- [Scope 1 Emissions Sources](#)
- [Scope 2 Location and Market Based Emissions](#)
- [Recommendations](#)
- [Other Environmental Initiatives to be Considered](#)

HIAL is a public corporation owned by the Scottish Ministers and subsidised by the Scottish Government in accordance with Section 34 of the Civil Aviation Act 1982. HIAL operates and manages 11 airports in total; Barra, Benbecula, Campbeltown, Dundee, Inverness, Islay, Kirkwall, Stornoway, Sumburgh, Tiree and Wick. Dundee served 22,202 passengers with a total 42,857 aircraft movements in the 2018/2019 year.

The calculation of the annual carbon footprint will help HIAL Airports Limited and the individual airports understand the different areas which contribute to their overall carbon footprint and monitor changes on a yearly basis. This process will help identify improvement opportunities, which will ultimately reduce HIAL Airports' carbon footprint and associated costs. In addition, the success of any management strategies previously implemented can be evaluated.

Carbon Emissions by Source and Activity 2019



Dundee Airport's emissions can be broken down by activity as seen in the table below:

- All vehicle use was assumed as operational vehicle usage.
- Utilities includes electricity consumption (Scope 2) as well as heating fuels and refrigerant usage (Scope 1).
- The HIAL group provided a supplier statement that determines all electricity is supplied from renewable sources. This results in Scope 2 emissions of 0tCO₂e.

| Emissions Source | Scope 1 (tCO ₂ e) | Scope 2 (tCO ₂ e) | Outside of Scope (tCO ₂ e) | Total (tCO ₂ e) | % of Total Emissions |
|----------------------|------------------------------|------------------------------|---------------------------------------|----------------------------|----------------------|
| Utilities | 52.59 | 0.00 | 0.00 | 52.59 | 56.0 |
| Operational vehicles | 6.67 | 0.00 | 0.22 | 6.89 | 7.4 |
| Fire training | 34.31 | 0.00 | 0.05 | 34.36 | 36.6 |
| Total | 93.57 | 0.00 | 0.27 | 93.84 | 100.0% |

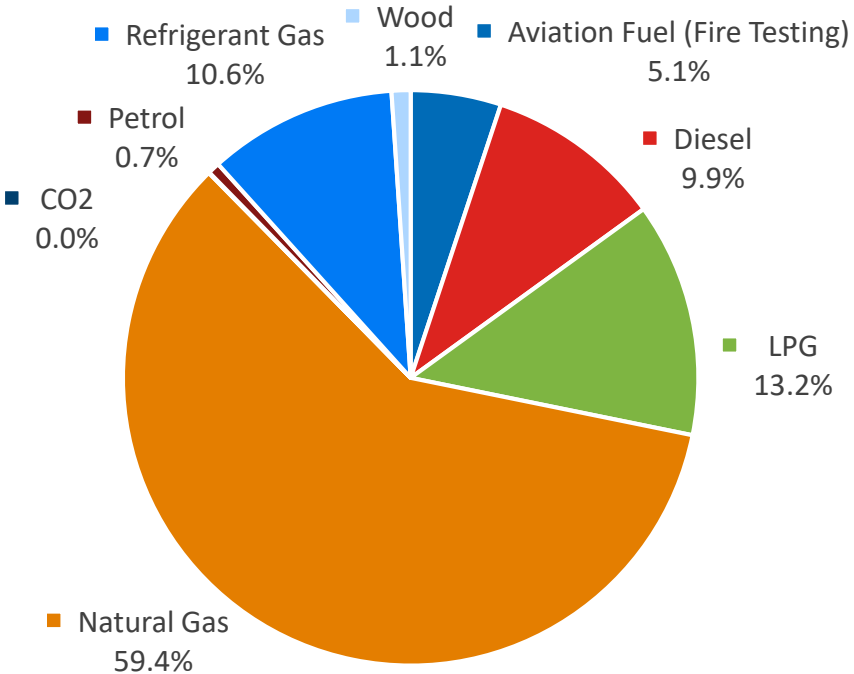
Scope 1 Emissions Sources - 1



Scope 1 = 93.57 tCO₂e (99.7% of Total)

Scope 1 emissions are under the direct control of the airport, such as: Heating fuels for combustion, refrigerant gas use and wood for fire training.

Dundee's Scope 1 emissions are derived from natural gas use and refrigerant leakage, petrol and diesel use for operational vehicles and wood, diesel, LPG, Kerosene, CO₂ and paper for fire training.



Scope 1 Emissions Sources - 2

The table below shows a full breakdown of all emissions sources at the airport.

| Emissions Source | Scope 1 (tCO ₂ e) | Scope 2 (tCO ₂ e) | Outside of Scope (tCO ₂ e) | Total (tCO ₂ e) | % of Total Emissions |
|-----------------------------------|------------------------------|------------------------------|---------------------------------------|----------------------------|----------------------|
| Natural gas (utilities) | 44.63 | 0.00 | 0.00 | 44.63 | 47.5 |
| R410a refrigerant gas (utilities) | 7.97 | 0.00 | 0.00 | 7.97 | 8.5 |
| Diesel (operational vehicles) | 6.17 | 0.00 | 0.21 | 6.38 | 6.8 |
| Petrol (operational vehicles) | 0.50 | 0.00 | 0.02 | 0.52 | 0.6 |
| Wood (fire training) | 0.80 | 0.00 | 0.00 | 0.80 | 0.9 |
| Diesel (fire training) | 1.30 | 0.00 | 0.04 | 1.34 | 1.4 |
| LPG (fire training) | 9.90 | 0.00 | 0.00 | 9.90 | 10.5 |
| Kerosene (fire training) | 3.81 | 0.00 | 0.00 | 3.81 | 4.1 |
| CO2 (fire training) | 0.03 | 0.00 | 0.00 | 0.03 | 0.0 |
| Paper (fire training) | 18.47 | 0.00 | 0.00 | 18.47 | 19.7 |
| Total | 93.57 | 0.00 | 0.27 | 93.84 | 100.0% |

Scope 2 = 0 tCO₂e (0.0% of Total)

Scope 2 emissions relate to the electricity consumption at the airport. These can be calculated as:

- Location-based method; this reflects the average emissions intensity of macro-scale (regional/national) electricity grids where energy consumption occurs. Companies reporting using this method should use the regional/National Grid average emission factor. In the UK, this would be sourced from the Defra/DECC UK Government conversion factors for Company Reporting.
- Market-based method; this reflects the emissions from the electricity that a company is purchasing. Energy suppliers in the EU are already required, by law, to disclose to consumers the fuel mix and GHG emissions associated with their portfolio or tariffs. This airport selects to purchase energy that is greener than the National Grid average emissions factor. The advantage of procuring energy that is higher in renewable energy sources than that of the National Grid average emissions factor is outlined in the table below.

| | Location-based (tCO ₂ e) | Market-based (tCO ₂ e) |
|--|-------------------------------------|-----------------------------------|
| Airport Electricity Emissions (Scope 2) | 117.92 | 0 |

- Here, market-based emissions are zero because the airport purchased 100% green electricity from its energy suppliers. A supplier statement provided for the year April 2018 – March 2019 states that all electricity purchased is from renewable sources and is supplied by REGO's.

Recommendations for improving your GHG footprint



| Recommendation | Benefit |
|---|---|
| <p>Review why the performance metrics are so different for each of the airports. Investigate or consider if other performance metrics or additional metrics would give better clarity</p> | <p>The intensity metrics for each of the HIAL airports vary significantly and, to the untrained eye, might lead someone to think that one airport is performing better/worse than another. By considering additional metrics or combination of metrics a greater transparency and reasoning for the differences in performance data can be achieved. Suggested metrics are:</p> <ul style="list-style-type: none"> • Taking into account degree days • Include floor area to create a kgCO₂e/PAX/m² or kgCO₂e/ATM/m² metric that will show trends relevant to the size of the airport |
| <p>Develop infographic of carbon emissions</p> | <p>Infographics can be used to increase staff awareness of HIAL's carbon footprint and drive internal engagement, or be used to demonstrate to the public the good work being carried out to address the airport's carbon emissions.</p> |
| <p>Improve data collection processes & accuracy</p> | <p>Devise a uniform data collection process for all airports to accurately track and monitor emissions sources (e.g. fire training fuel use).</p> |
| <p>Increase scope of emissions being reported</p> | <p>Include Scope 3 – at least include emissions as outlined in requirements for ACA Level 3 such as; LTO cycle to a height of 3,000 feet (emissions from taxi and ground idle in/out, take off and climb); APU's and engine testing; GSE (e.g. ground power units, conveyer belts, cargo loaders etc); Surface access emissions (staff and passengers travelling to and from the airport); Tenant energy use.</p> |
| <p>Look to achieve higher levels of ACA</p> | <p>Aim to achieve higher levels of ACA scheme to increase internal engagement in carbon reduction initiatives as well as wider stakeholder engagement to address Scope 3 emissions. Level 3+ grants "Carbon Neutral" status and will be beneficial for public perception of the airport's operations.</p> |

Other Environmental Initiatives to be Considered

- Engage third parties and on-site tenants to explore further carbon management opportunities and improve benefits of carbon management measures across the airport site
- Investigate the reduction in operational carbon on local air quality
- Change airside vehicles to electric vehicles in order to optimise use of lower carbon fuels
- Incorporate green procurement policies in all aspects of airport purchasing policy
- Incentivise alternative/sustainable aviation fuel use by aircraft
- Water management and water treatment
- Resource efficiency for food waste and recycling services
- Site development considerations to reduce environmental impacts



Ed Bovill

ed.bovill@ricardo.com

ED12358

This report is the Copyright of HIAL. It has been prepared by Ricardo Energy & Environment, a trading name of Ricardo-AEA Ltd, under contract dated 14/10/19. The contents of this report may not be reproduced in whole or in part, nor passed to any organisation or person without the specific prior written permission of HIAL. Ricardo Energy & Environment accepts no liability whatsoever to any third party for any loss or damage arising from any interpretation or use of the information contained in this report, or reliance on any views expressed therein.

Appendix – Outside of Scope Emissions

As per UK Government GHG Conversion Factors for Company Reporting guidance, Outside of Scope factors should be used to account for the direct carbon dioxide (CO₂) impact of burning biomass and biofuels. The emissions are labelled 'outside of scope' because the Scope 1 impact of these fuels has been determined to be a net '0' (since the fuel source itself absorbs an equivalent amount of CO₂ during the growth phase as the amount of CO₂ released through combustion). As a result, full reporting of any fuel from a biogenic source should have the 'outside of scope' CO₂ value documented to ensure complete accounting for the emissions created.

2019 = **0.27tCO₂e** (0.3% of total emissions)

The following sections provide a summary of the methodology adopted by Ricardo Energy & Environment to calculate the 2019 carbon footprint for the Airports.

The standard approach to carbon footprinting is to use the Greenhouse Gas (GHG) Protocol Corporate Accounting and Reporting Standard developed by World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI); this sets out a corporate accounting and reporting methodology for GHGs.

Scope 1 emissions are defined as direct GHG emissions arising from sources that are owned or controlled by the company. The emissions result from activities that the company can have direct influence on through its actions. Airports' emissions that are included are: natural gas use, company owned vehicles fuel use, fuel use for business travel, refrigerant gas use (from leaks during maintenance or malfunction), wood pallets and diesel use for fire training, propane combustion and kerosene combustion.

Scope 2 emissions are associated with the use of electricity imported from the grid or from a third-party supplier of energy in the form of heat or electricity. These indirect GHG emissions are due to upstream emissions from the production and delivery of fuel to power stations. Airports can influence the amount of electricity it uses; however, it has little control over the generation of the electricity and these emissions are therefore classed as Scope 2.

Scope 3 emissions are defined as those arising as an indirect consequence of the use of goods or services provided by the company. Airports do have some influence over Scope 3 emissions but the activities are not under its control. Sources included by Airports include aircraft (all aircraft movements up to a height of 1,000m above aerodrome level), employees commuting to the airport, passenger surface access to the airport, airside vehicle activities by third party operators, waste disposal (including production of the virgin materials), water (supply and treatment) and airport business travel. For this years assessment, HIAL did not consider the role of Scope 3 emissions.

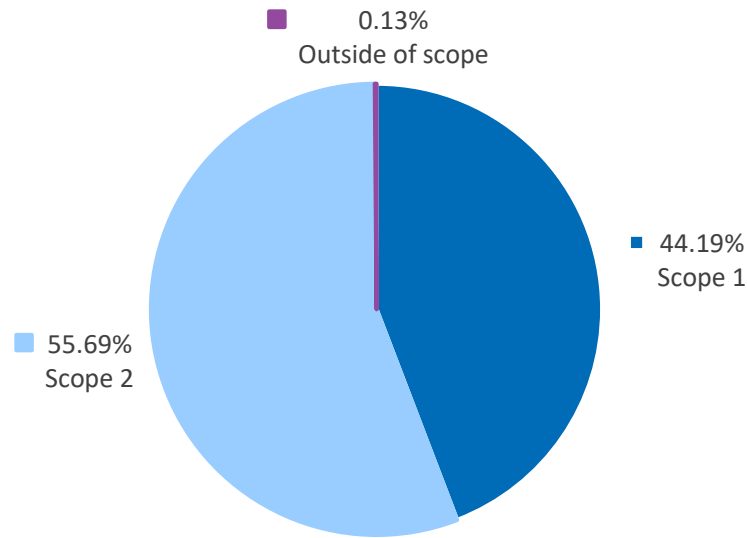
Market-based method: As all of the 461,348 kWh of electricity consumption was supplied to Dundee Airport by a single supplier, HIAL contacted the supplier and asked for the details of the fuel mix for all airports. The following breakdown was provided for the year-ending 31st March 2019 for the entire HIAL group (Source of Electricity, Percentage):

- **Renewables - 100%**

REGO certificates have been provided for electricity consumed between Apr 18 – Mar 19, indicating the electricity supply is derived solely from renewable energy sources.

The weighted emission factor was provided as 0 gCO₂/kWh (or 0 kgCO₂/kWh). Multiplying the electricity consumption of 461,348 kWh by the emission factor of 0 kgCO₂/kWh calculates the emissions as 0 tCO₂e.

Key Stats - Carbon Emissions by Scope 2019 (location based)



| | Total 2019 emissions (tCO ₂ e) | % of total emissions |
|-------------------|---|----------------------|
| Scope 1 | 93.57 | 44.2 |
| Scope 2 | 117.92 | 55.7 |
| Outside of Scopes | 0.27 | 0.1 |
| Total | 211.76 | 100.0% |

Scope 1:

Emissions on-site, or an associated process, from the combustion of fossil fuels, e.g. natural gas, oil, LPG and company-owned vehicles.

Scope 2:

Emissions associated with the use of electricity imported from the grid or from a third party supplier of energy in the form of heat or electricity.

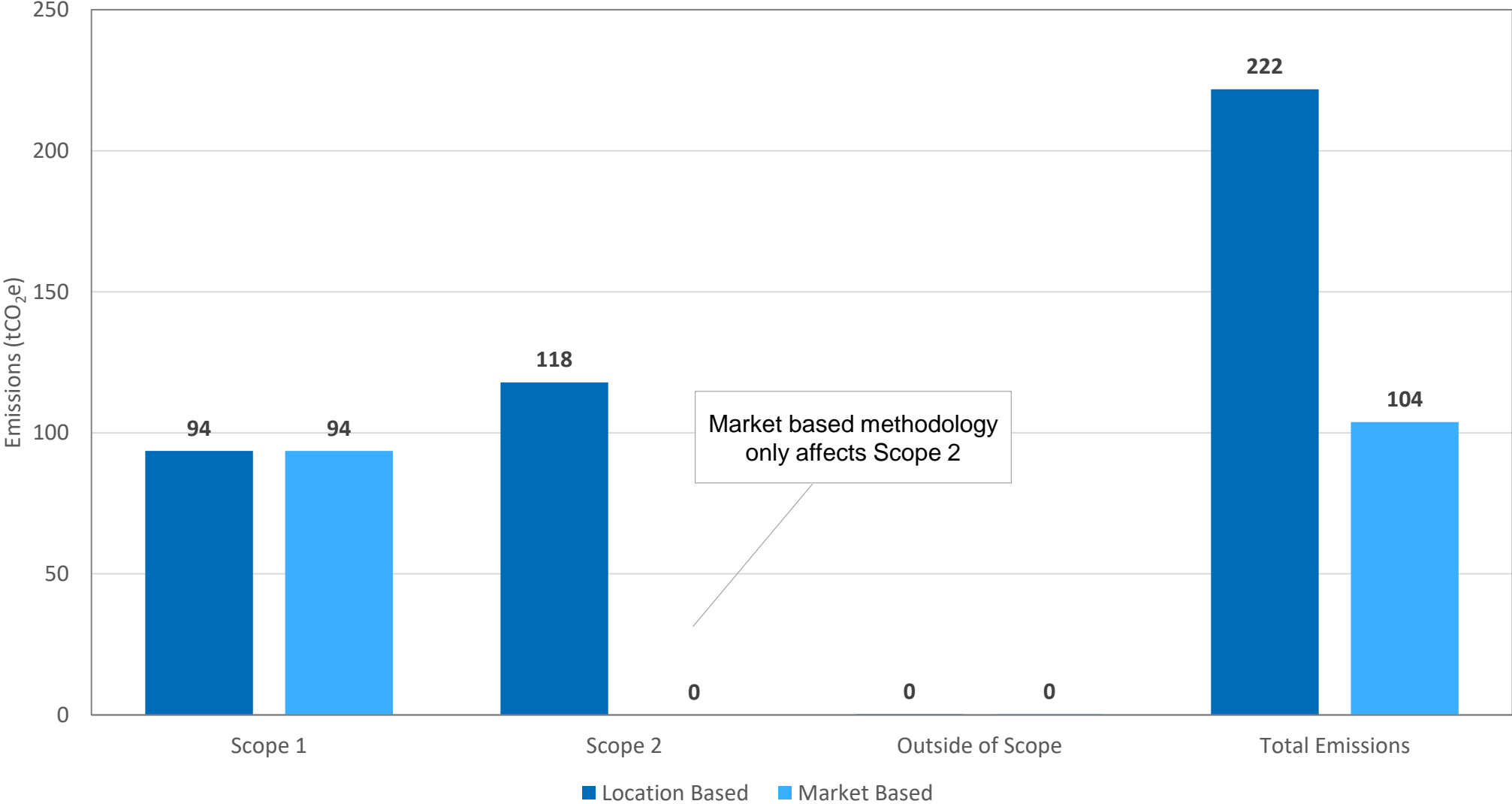
Outside of scope emissions:

Outside of scope emissions account for the direct carbon dioxide (CO₂) impact of burning biomass and biofuels. The emissions are labelled 'outside of scope' because the Scope 1 impact of these fuels has been determined to be a net '0'.

Location vs Market Based Emissions 2019: All Scopes



Emissions totals by scope calculated using either the location or market based emissions factors.



| Term | Definition |
|--|--|
| ATM | Air traffic movements – an aircraft take-off or landing at an airport. For airport traffic purposes one arrival and one departure is counted as two movements. |
| Carbon dioxide equivalent (CO₂e) | The carbon dioxide equivalent (CO ₂ e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO ₂ . CO ₂ e is calculated by multiplying the emissions of each of the six greenhouse gases by its 100-year global warming potential (GWP). |
| Carbon footprint | A carbon footprint measures the total greenhouse gas emissions caused directly and indirectly by a person, organisation, event or product. A carbon footprint is measured in tonnes of carbon dioxide equivalent (tCO ₂ e). |
| Degree days | A unit used to determine the heating or cooling requirements of buildings, representing a fall or increase of one degree below a specified average outdoor temperature for one day. |
| Emission factor | An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. |
| GHG | Greenhouse gas – a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, and ozone. |
| Outside of Scope | <p>All fuels with biogenic content (e.g. 'Diesel and petrol (average biofuel blend)') should have the 'Outside of Scope' emissions reported to ensure a complete picture of an organisations' emissions are created.</p> <p>The emissions are labelled 'Outside of Scope' because the Scope 1 impact of these fuels has been determined to be a net '0' (since the fuel source itself absorbs an equivalent amount of CO₂ during the growth phase as the that CO₂ is released through combustion).</p> |
| PAX | Number of passengers. |