Ricardo Energy & Environment

Kirkwall Airport Carbon Footprint 2019

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

Report for Highlands and Islands Airports Limited

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

Included Emissions Sources

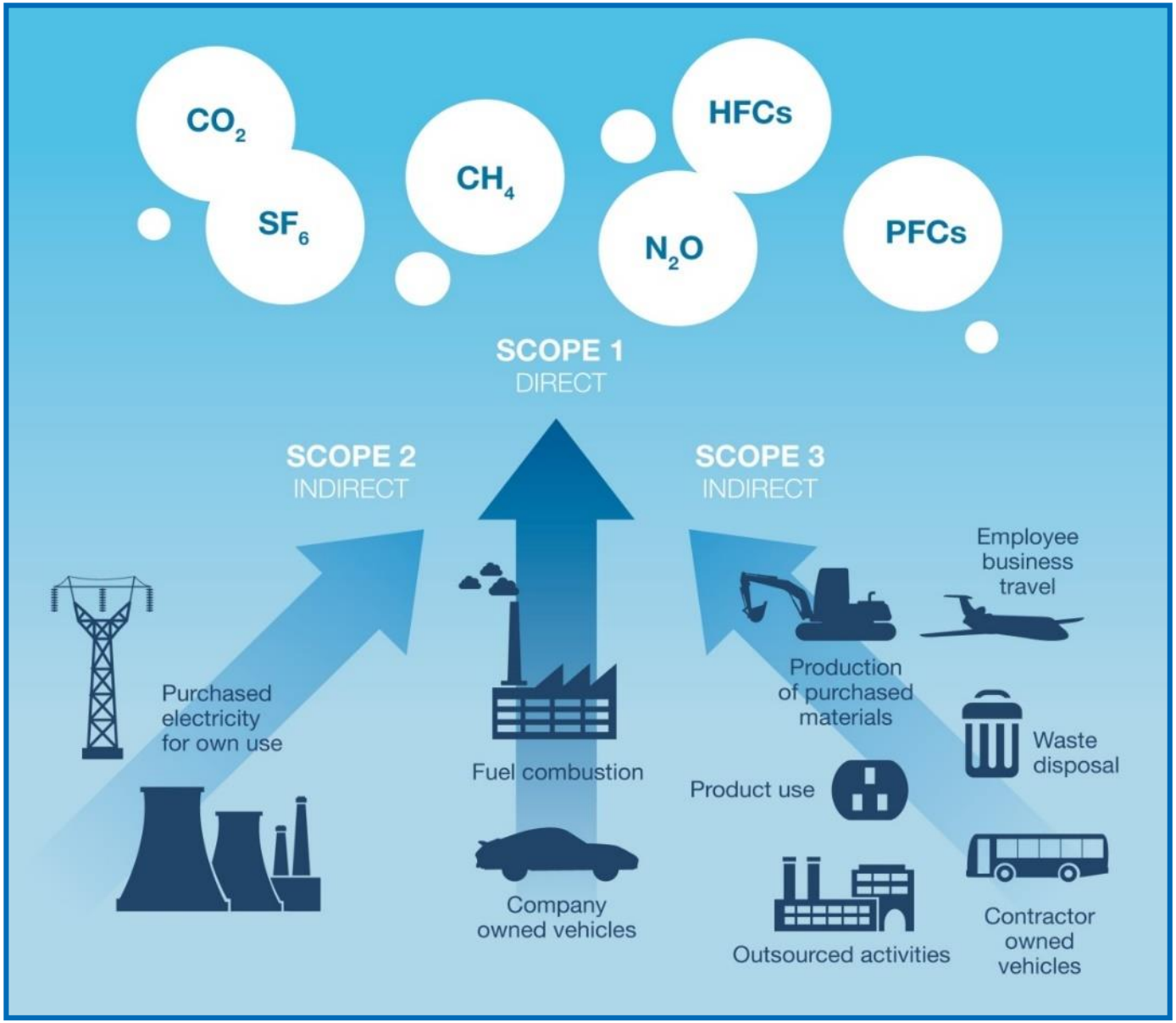
The following emissions sources are included in the 2019 carbon footprint for Kirkwall Airport:

Scope 1: Direct emissions:

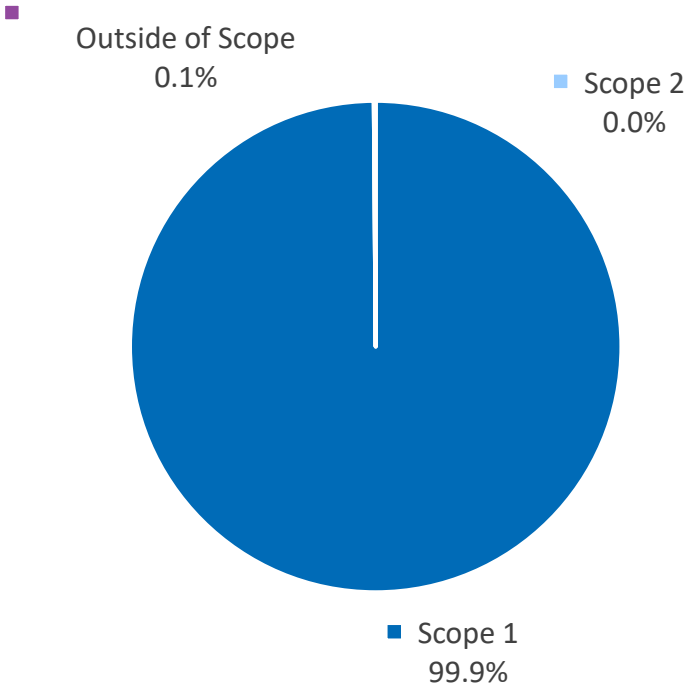
- Utilities: Diesel and kerosene combustion.
- Operational vehicles: Diesel, gas oil and petrol.
- Fire training: Wood, kerosene and CO_2.

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_2e)	% of total emissions
Scope 1	222.27	99.9
Scope 2	0.00	0.0
Outside of Scopes	0.27	0.1
Total	222.54	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 (CO_2) 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 (CO_2e) 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 tCO_2e/PAX (PAX = passenger) and tCO_2e/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), Kirkwall ranks 4th for aircraft movement emissions intensity and joint 1st (with Inverness and Islay) for passenger emissions intensity.

	2019
ATM (Air Traffic Movements)	14,601
PAX	195,945
Scope 1 & 2 (tCO_2e) Location Based Scope 2	313
$kgCO_2e$/ATM	28.3
$kgCO_2e$/PAX	2.1
Scope 1 & 2 (tCO_2e) Market Based Scope 2	222
$kgCO_2e$/ATM	15.2
$kgCO_2e$/PAX	1.1

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Background

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. Kirkwall served 195,945 passengers with a total 14,601 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

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

- 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 0tCO_2e.

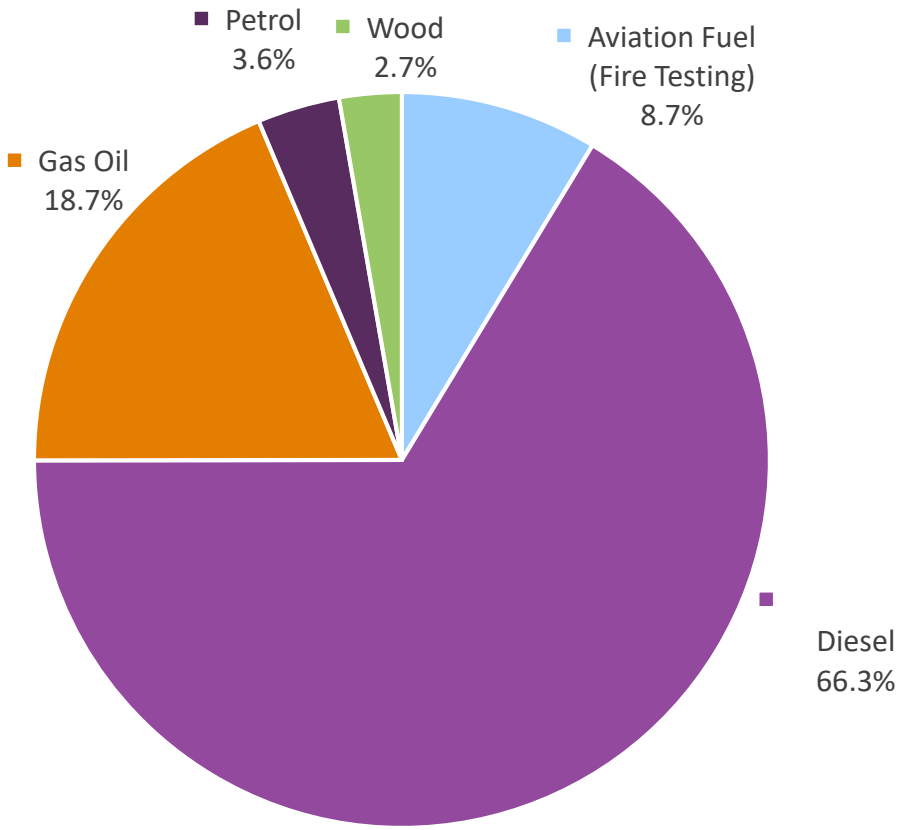
Emissions Source	Scope 1 (tCO_2e)	Scope 2 (tCO_2e)	Outside of Scope (tCO_2e)	Total (tCO_2e)	% of Total Emissions
Utilities	170.01	0.00	0.00	170.01	76.4
Operational vehicles	35.57	0.00	0.27	35.84	16.1
Fire training	16.70	0.00	0.00	16.70	7.5
Total	**222.28**	**0.00**	**0.27**	**222.54**	**100.0%**

Scope 1 Emissions Sources - 1

Scope 1 = 222.27 tCO_2e (99.9% 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.

Kirkwall's Scope 1 emissions are derived from kerosene and diesel combustion for utilities, petrol, diesel and gas oil use for operational vehicles and wood,CO_2 and kerosene 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_2e)	Scope 2 (tCO_2e)	Outside of Scope (tCO_2e)	Total (tCO_2e)	% of Total Emissions
Diesel (generators)	93.83	0.00	0.00	93.83	42.2
Kerosene (utilities)	76.18	0.00	0.00	76.18	34.2
Diesel (ops vehicles)	3.03	0.00	0.10	3.13	1.4
Petrol (ops vehicles)	5.29	0.00	0.17	5.46	2.5
Gas oil (ops vehicles)	27.25	0.00	0.00	27.25	12.2
Wood (fire training)	4.01	0.00	0.00	4.01	1.8
Kerosene (fire training)	12.66	0.00	0.00	12.66	5.7
CO_2 (fire training)	0.02	0.00	0.00	0.02	0.0
Total	**222.27**	**0.00**	**0.27**	**222.54**	**100.0%**

Scope 2: Location and Market Based Emissions

Scope 2 = 0 tCO_2e (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_2e)	Market-based (tCO_2e)
Airport Electricity Emissions (Scope 2)	190.76	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
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	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: • Taking into account degree days • Include floor area to create a $kgCO_2e/PAX/m^2$ or $kgCO_2e/ATM/m^2$ metric that will show trends relevant to the size of the airport
Develop infographic of carbon emissions	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.
Improve data collection processes & accuracy	Devise a uniform data collection process for all airports to accurately track and monitor emissions sources (e.g. fire training fuel use).
Increase scope of emissions being reported	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**.
Look to achieve higher levels of ACA	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.

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

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 (CO_2) 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 CO_2 during the growth phase as the amount of CO_2 released through combustion). As a result, full reporting of any fuel from a biogenic source should have the 'outside of scope' CO_2 value documented to ensure complete accounting for the emissions created.

2019 = **0.27tCO_2e** (0.00009**%** of total emissions)

Methodology

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.

Location v Market Based

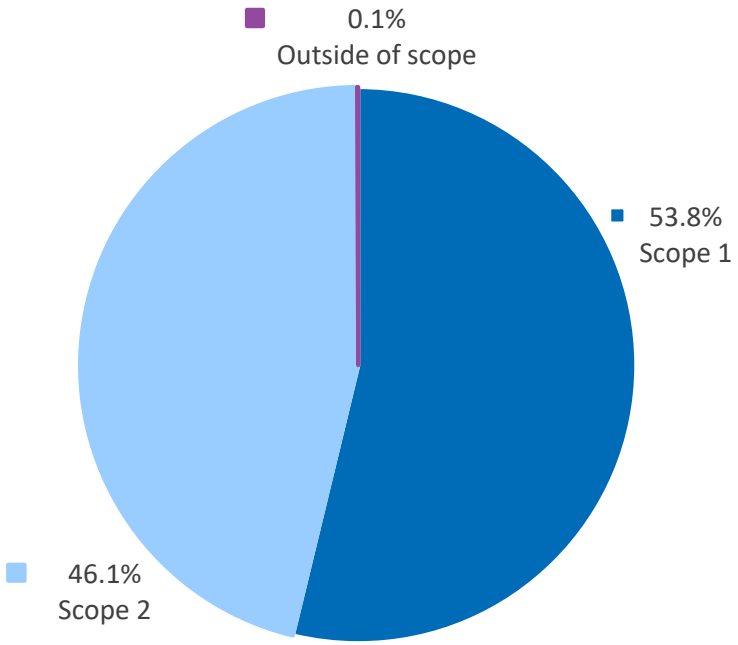
Market-based method: As all of the 746,309 kWh of electricity consumption was supplied to Kirkwall Airport by a single supplier, HIAL contacted the supplier and asked for the details of the fuel mix for all airports. The following breakdown was provided for the year-ending 31st March 2019 for the entire 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 gCO_2/kWh (or 0 $kgCO_2$/kWh). Multiplying the electricity consumption of 746,309 kWh by the emission factor of 0 $kgCO_2$/kWh calculates the emissions as 0 tCO_2e.

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



	Total 2019 emissions (tCO_2e)	% of total emissions
Scope 1	222.27	53.8
Scope 2	190.76	46.1
Outside of Scopes	0.27	0.1
Total	413.30	100.0%

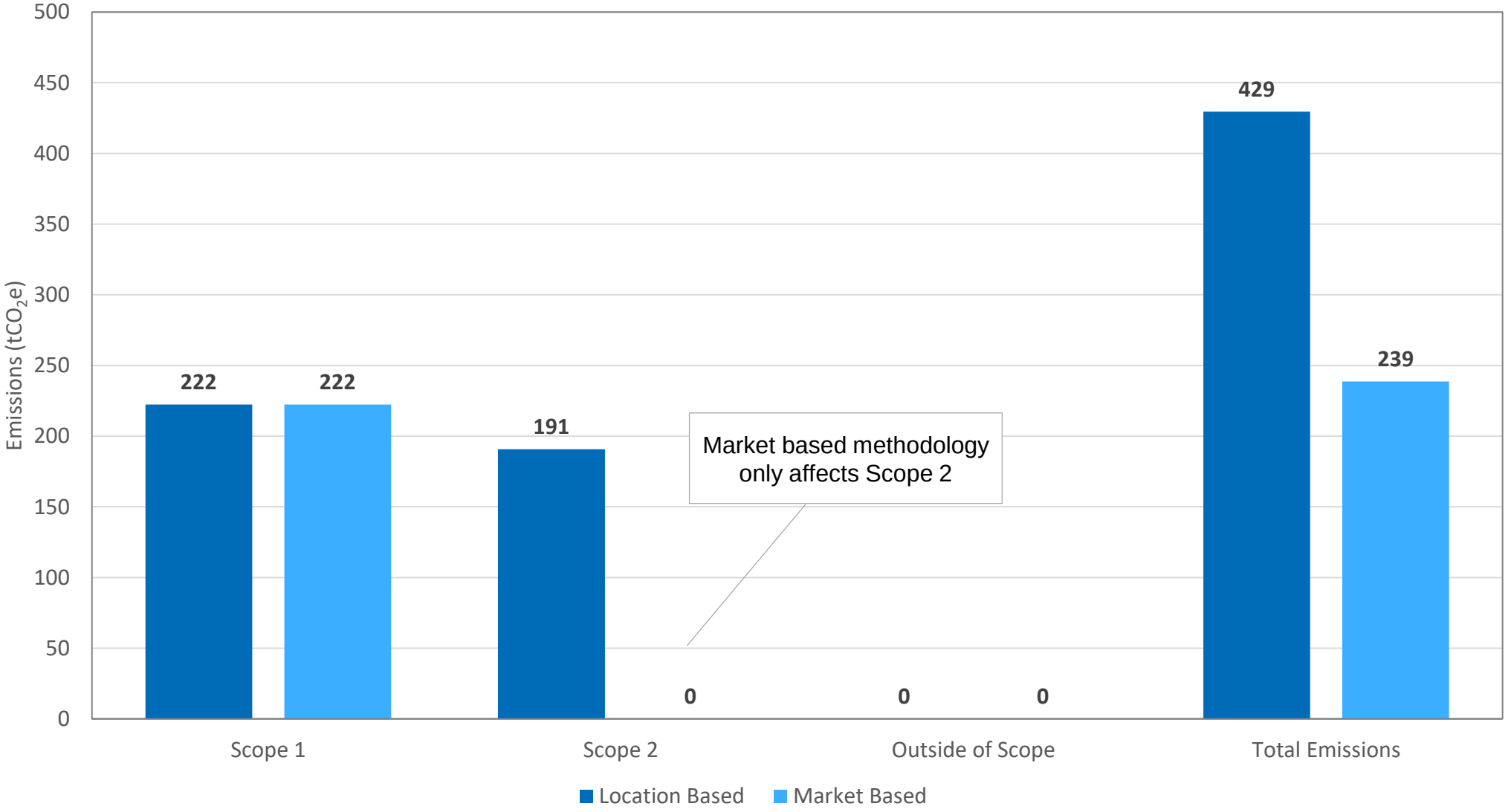
Scope 1:
Emissions on-site, or an associated process, from the combustion of fossil fuels, e.g. natural gas, oil, LPG and company-owned vehicles.

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 (CO_2) 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.



Glossary

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 (CO_2e)	The carbon dioxide equivalent (CO_2e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO_2. CO_2e 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_2e).
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	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. 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 CO_2 during the growth phase as the that CO_2 is released through combustion).
PAX	Number of passengers.