Ricardo Energy & Environment

Aberdeen Airport Carbon Footprint 2021

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

Report for Aberdeen International Airport Limited

Aberdeen International Airport

Introduction

All Scope emissions = 46,883 tCO_2e

All emissions are reported in Market-based methodology, unless stated otherwise.

Overall 17% increase from 2020

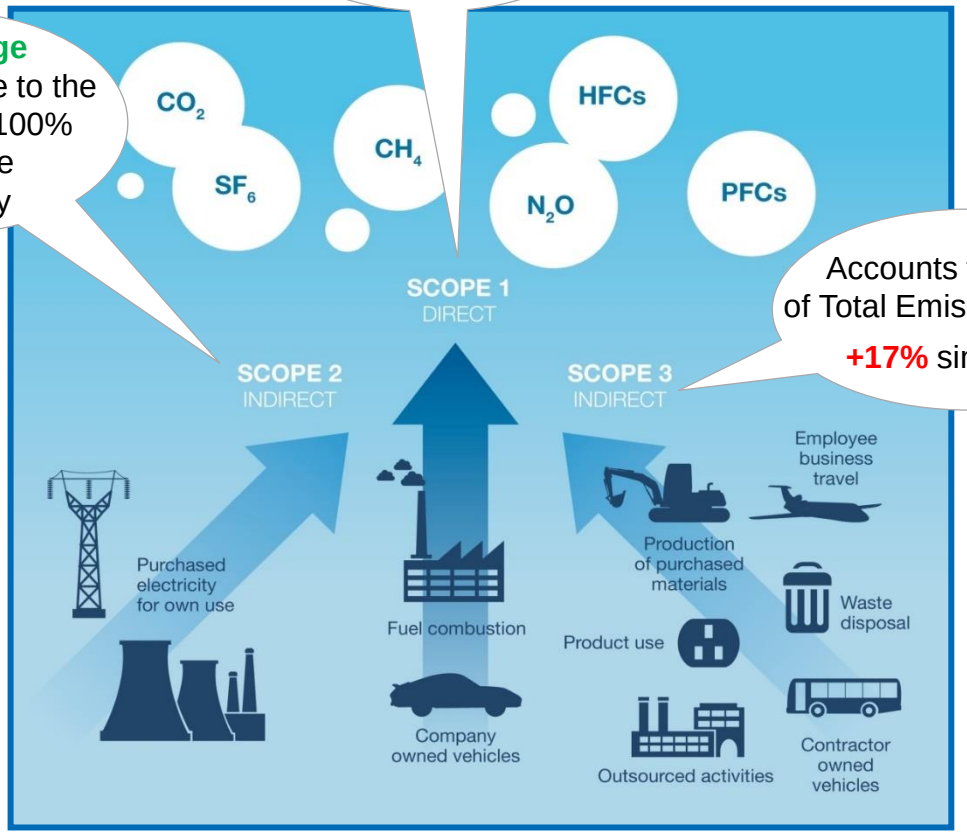
Overall increase is primarily due to national restrictions on travel in 2020 due to the Covid-19 pandemic and the removal of these restrictions in 2021.

Number of aircraft movements have increased by 6.7% since 2020

Passenger numbers have increased by 11.6% since 2020

+31% since 2020

0% change since 2020 due to the purchase of 100% renewable electricity



Accounts for 96.7% of Total Emissions in 2021

+17% since 2020

Scope 1 and Scope 2 emissions have seen an overall increase of **+31%** since 2020.

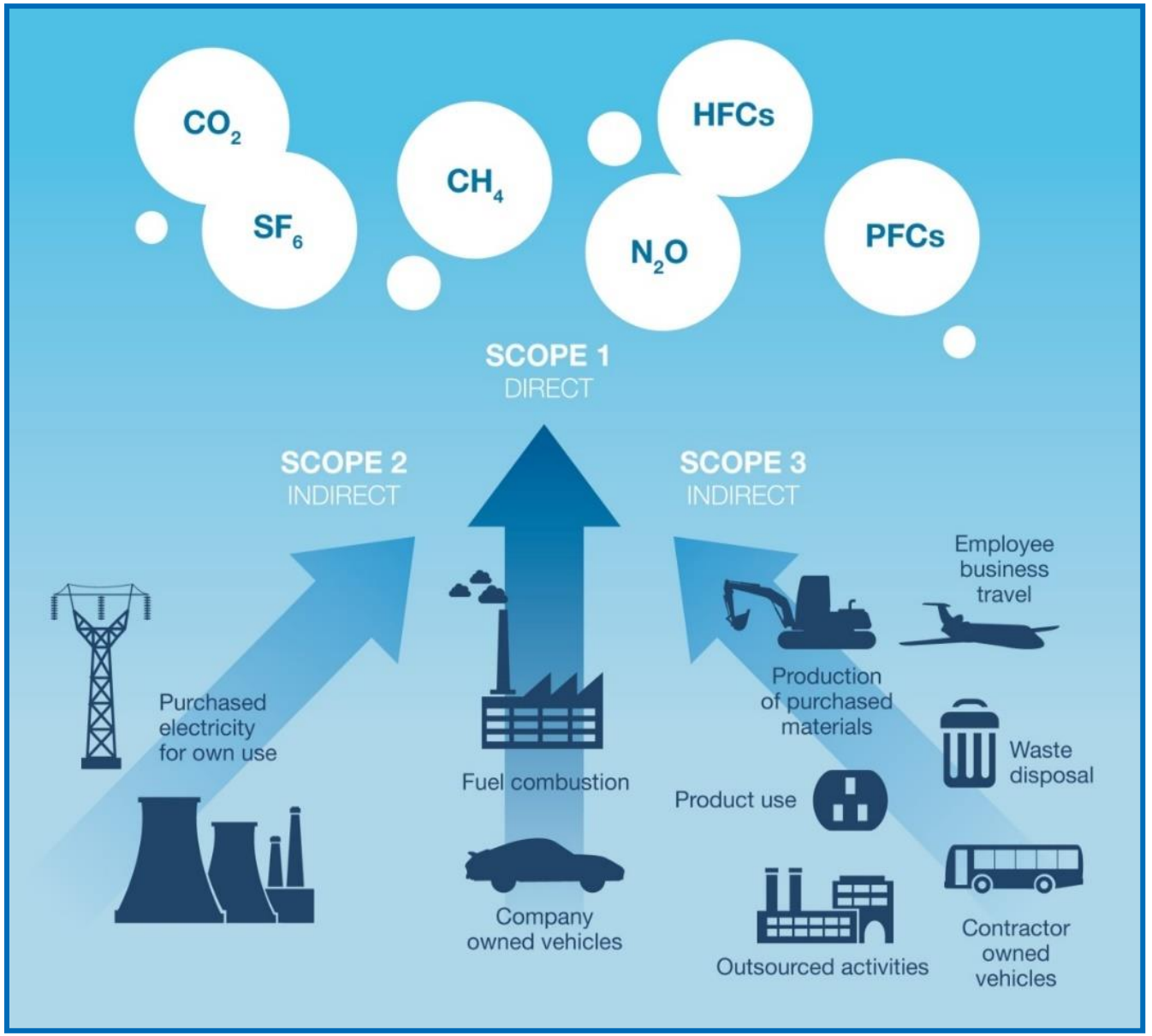
Included Emissions Sources

The following emissions sources are included in the 2021 carbon footprint for Aberdeen Airport:

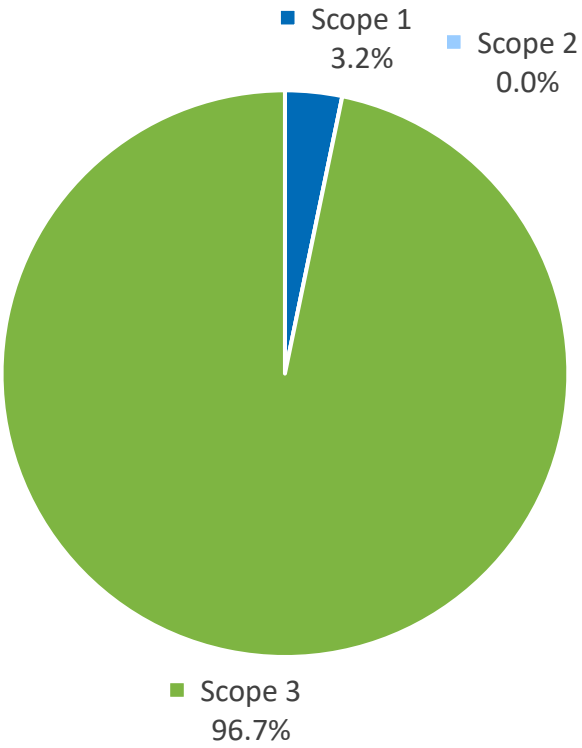
Scope 1: Direct emissions:
- Fuels burnt on site (boilers, generators, airport owned operational vehicles, fire training)
- Refrigerant gas losses
- Airport glycol based de-icer

Scope 2: Indirect emissions:
- Purchased electricity

Scope 3: Indirect emissions:
- 3rd party operational vehicle fuels
- 3rd party glycol based de-icer
- Tenant energy (sub metered electricity and natural gas recharged to tenants)
- Aircraft LTO cycle, APU usage and engine testing
- Business travel
- Water supply and wastewater treatment
- Staff commute
- Passenger surface access
- Waste disposal and material use



Key Stats - Carbon Emissions by Scope 2021



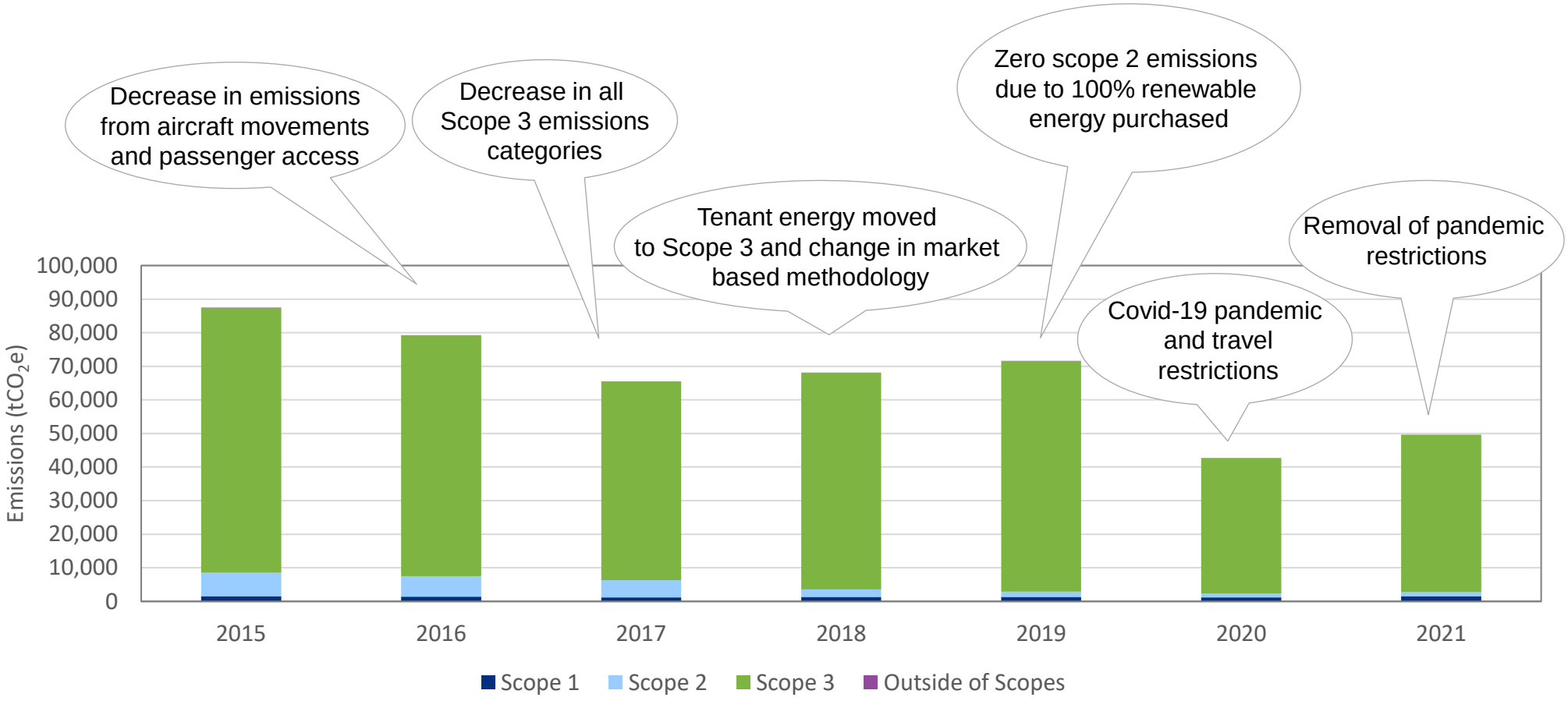
	Total 2021 emissions (tCO_2e)	% of total emissions
Scope 1	1,523	3.2%
Scope 2	0	0.0%
Scope 3	45,352	96.7%
Outside of Scopes	8	0.02%
Total	**46,883**	**100.0%**

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

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.

Scope 3:
Scope 3 is a category that includes the emissions from all other indirect sources. Scope 3 emissions are the consequence of the activities of ABZ but arise from sources not owned or controlled by ABZ. These include aircraft movements, passenger and staff travel to the airport, airside activities, waste disposal, water, and business travel.

Key Stats - All Scopes Summary

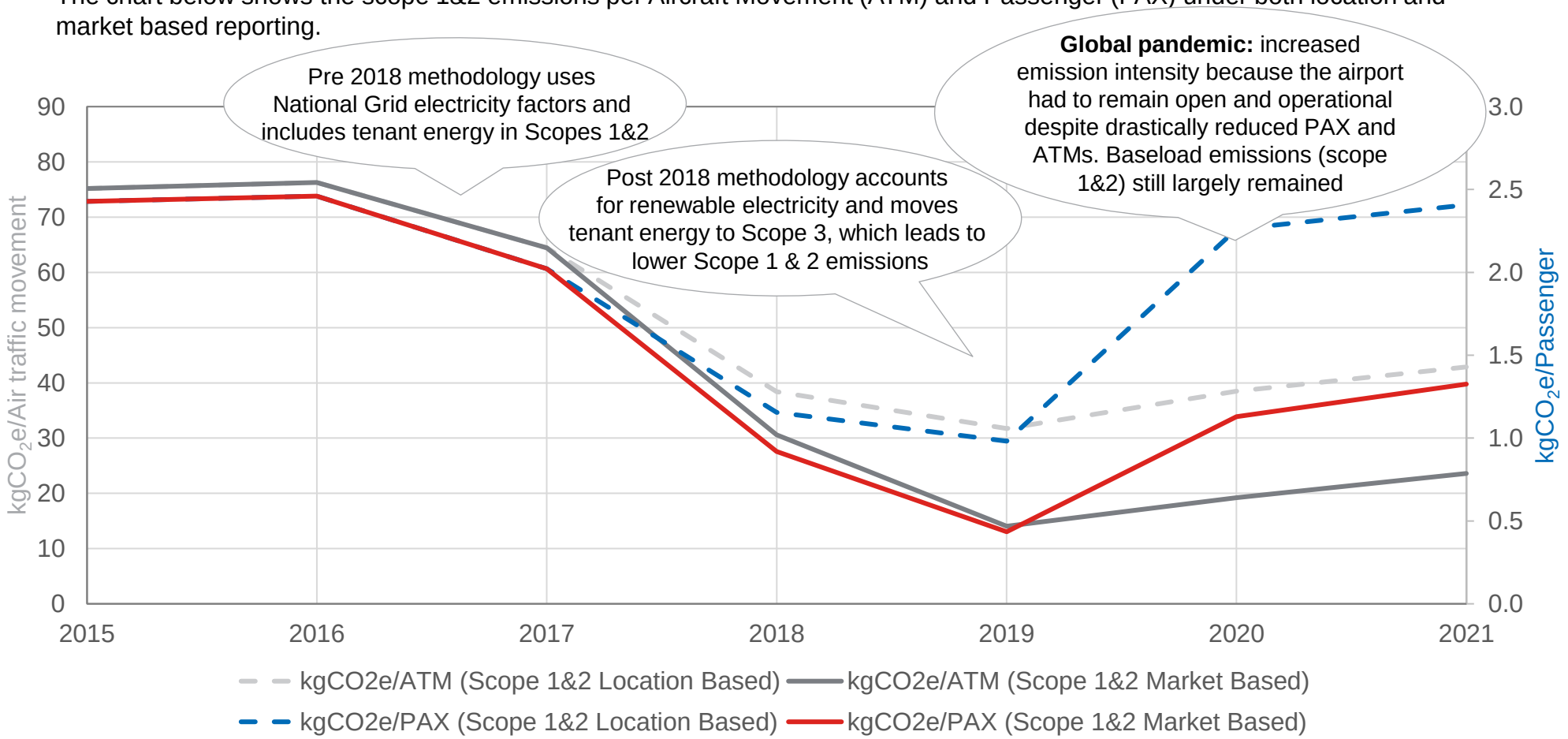


Scope 3 emissions have always been the largest contributor to Aberdeen Airport's carbon footprint. The majority of which are from aircraft activities and passenger access to the airport.

Key Stats - Intensity Metrics comparison over time - 1

Intensity metrics allow comparison over time against other factors that fluctuate and have an impact on the environmental performance of the airports. The two chosen key performance indicators are aircraft movements and passenger numbers.

The chart below shows the scope 1&2 emissions per Aircraft Movement (ATM) and Passenger (PAX) under both location and market based reporting.



There was a slight increase in market and location based intensity metrics in 2021. This is likely due to the Covid-19 pandemic continuing to cause reduced PAX and ATM numbers, yet Aberdeen Airport had to remain operational for more limited travel than usual. For this reason, emissions did not decrease in proportion with ATM and PAX numbers when compared to before the pandemic.

Key Stats - Intensity Metrics comparison over time - 2

The table below shows the figures from the chart on the previous slide for:

- Location based Scope 2 and tenant energy in Scope 3 from 2018
- Market based Scope 2 and tenant energy in Scope 3 from 2018

	2015	2016	2017	2018	2019	2020	2021
ATM	113,203	98,363	98,309	92,943	91,711	60,440	64,503
PAX	3,505,164	3,048,787	3,132,652	3,092,007	2,966,389	1,029,767	1,148,982
% Change in ATM (year-on-year)	N/A	-13.1%	-0.1%	-5.5%	-1.3%	-34.1%	6.7%
% Change in PAX (year-on-year)	N/A	-13.0%	2.8%	-1.3%	-4.1%	-65.3%	11.6%
Scope 1 & 2 (tCO_2e) Location Based Tenant energy in Scope 3	8,511	7,502	6,336	3,571	2,911	2,328	2,766
$kgCO_2e$/ATM	75.2	76.3	64.4	38.4	31.7	38.5	42.9
$kgCO_2e$/PAX	2.4	2.5	2.0	1.2	1.0	2.3	2.4
Scope 1 & 2 (tCO_2e) Market Based Tenant energy in Scope 3	N/A*	N/A*	N/A*	2,843	1,290	1,162	1,523
$kgCO_2e$/ATM	N/A*	N/A*	N/A*	30.6	14.1	19.2	23.6
$kgCO_2e$/PAX	N/A*	N/A*	N/A*	0.9	0.4	1.1	1.3

* Note that for 2015-2017 no figures for this methodology are available

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Background

AGS Airports Limited, a partnership between Ferrovial and Macquarie Infrastructure and Real Assets (MIRA), owns Aberdeen International Airport Limited (ABZ). The airport operates 365 days per year, with business as usual operations supporting around 3 million passengers and handling around 92 thousand aircraft movements. AGS Airports employ around 350 full-time staff (FTE), with around 70 based at Aberdeen Airport.

To continue operating in an environmentally responsible manner, it is important for the airport to monitor and manage all its emissions from all operations – both those the airport is directly responsible for, and those it can influence under it's scope 3 emissions.

During the reporting year of 2021, national travel restrictions were still in place in the UK until spring in response to the ongoing Covid-19 pandemic. Aberdeen International Airport continued to remain open and was essential in supporting the offshore energy sector and provided lifeline flights for the Highland and Islands, essential maintenance and training, and air ambulance flights. As a result, Aberdeen International Airport saw a less significant drop in aircraft movements than others in the sector. The reporting year 2021 saw an increase in aircraft movements, passenger numbers and employee commuting, however these are not yet at pre-pandemic levels.

The calculation of the annual carbon footprint will help AGS 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 AGS Airports' carbon footprint and associated costs. In addition, the success of any management strategies previously implemented can be evaluated.

Aberdeen International Airport

Changes to footprint methodology

It is important to understand any changes in emissions that are a direct result of changes in carbon footprint calculation methodology, and not a change in operations. Therefore, for the 2021 carbon footprint these are outlined below:

- WTT Emissions added to Electricity (Scope 3) in carbon footprint calculations in order to better encapsulate the emissions related to using the UK energy grid
- Staff commute emissions were calculated using a pre-covid survey and an average 2021 furlough figure to account for employees on furlough between January-September 2021.
- Business Travel methodology has been updated and improved in both 2020 and 2021 calculations. Estimates were slightly inflated in previous years but have now been corrected.
- Improved calculation methods for passenger surface access emissions was applied to 2019, 2020, 2021 calculations to more accurately show annual emission change
- CCD emissions estimated and reported separately from carbon footprint calculations in order to better encapsulate the emissions from aircraft movements beyond the immediate vicinity of the airport.
- Emissions from 3rd party operational vehicles that do not purchase fuel from Aberdeen Airport were reported for the first time in 2020. These have been excluded in 2021 due to lack of data available. This impacts scope 3 operational vehicle emissions.
- Data on fuel used for helicopters during the LTO cycle and engine testing had been provided by helicopter operators at Aberdeen Airport for 2020, replacing calculation methodology used in previous years. 2021 data from all helicopter operators was not available (Bristows, CHC and NHV) as in previous years.

Carbon Emissions by Source and Activity 2021 - 1

Aberdeen Airport's emissions can be broken down by activity as seen in this table.

The main activities that contribute to the footprint are Aircraft movements and passenger surface access

Utilities include natural gas and refrigerant usage in the terminal as well as electricity consumption and glycol based de-icer

Aircraft engine testing emissions decreased from 2020 due to the reduced testing of helicopter engines

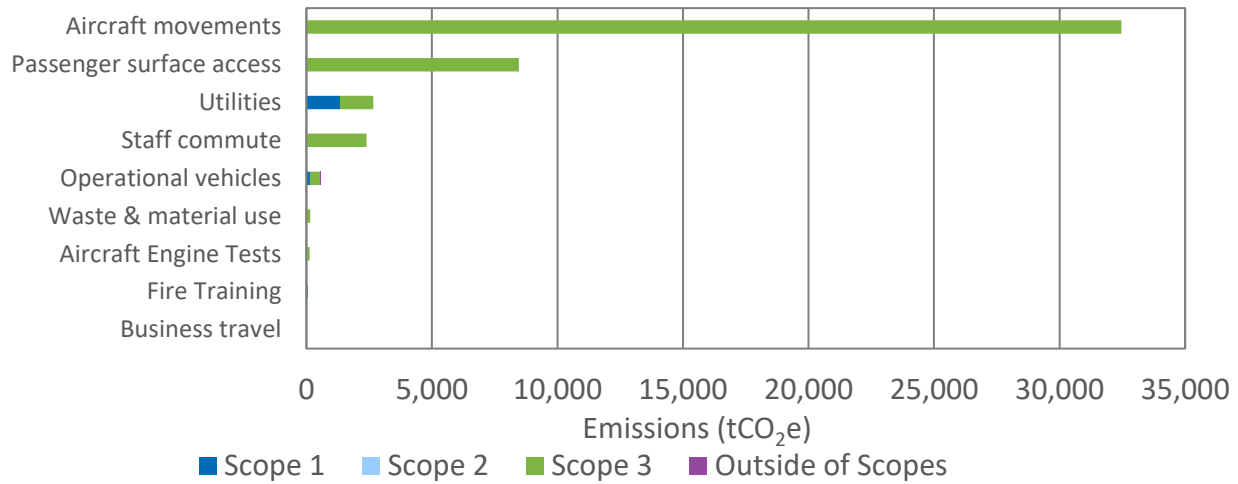
Waste, fire training and business travel contribute to <1% of the carbon footprint

Emissions Source	Scope 1 (tCO_2e)	Scope 2 (tCO_2e)	Scope 3 (tCO_2e)	Outside of Scope (tCO_2e)	Total (tCO_2e)	% of Total Emissions
Aircraft movements	0	0	32,461	0	32,461	69.2%
Passenger surface access	0	0	8,467	0	8,467	18.1%
Utilities	1,338	0	1,322	0	2,660	5.7%
Staff commute	0	0	2,387	0	2,387	5.1%
Operational vehicles	134	0	435	8	577	1.2%
Waste & material use	0	0	153	0	153	0.3%
Aircraft Engine Tests	0	0	126	0	126	0.3%
Fire Training	51	0	0	0	51	0.1%
Business travel	0	0	0	0	0	0.0%
Total	**1,523**	**0**	**45,352**	**8**	**46,883**	**100.0%**

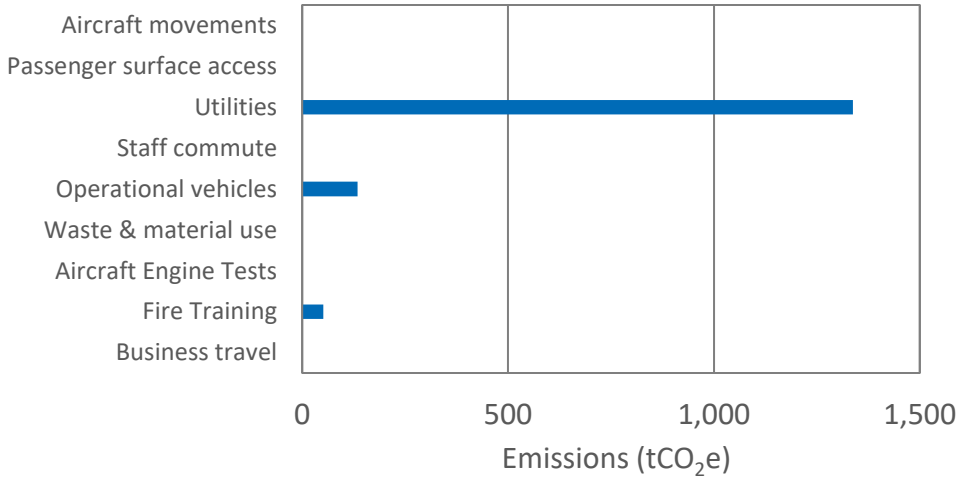
Accounts for the direct carbon dioxide (CO_2) impact of using biofuels in airport vehicles

Carbon Emissions by Source and Activity 2021 - 2

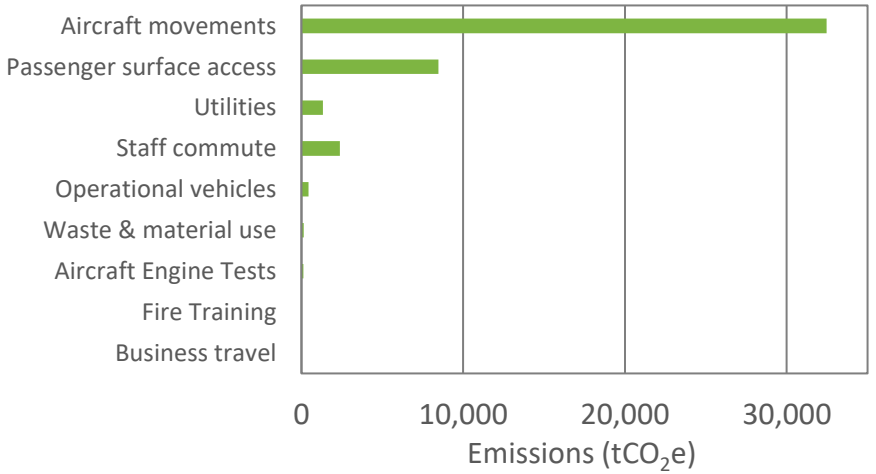
All Scopes carbon emissions split by source/activity



Scopes 1 and 2 carbon emissions split by source/activity

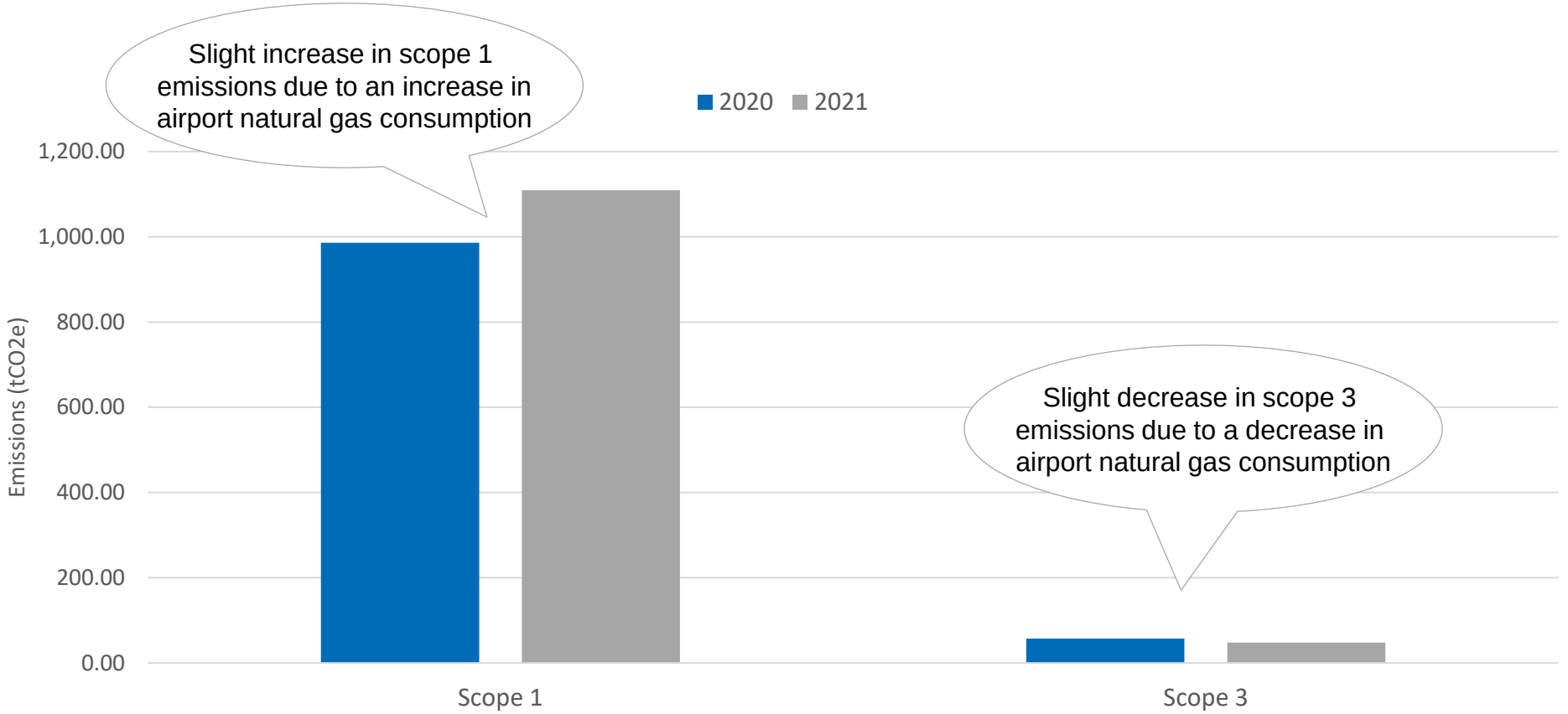


Scope 3 carbon emissions split by source/activity



Tenant Energy

- As tenant energy is outside the control of the airport, this was moved to Scope 3 emissions in 2019, in order to more clearly identify the airport's controllable emissions.
  - All tenant energy that is contained in Scope 3 is metered energy that was recharged to tenants
  - 100% of the airport and tenant electricity purchased is renewable and so there are no emissions associated here. Therefore, only emissions for natural gas, split by scope 1 and 3 (airport and tenant) can be seen below:

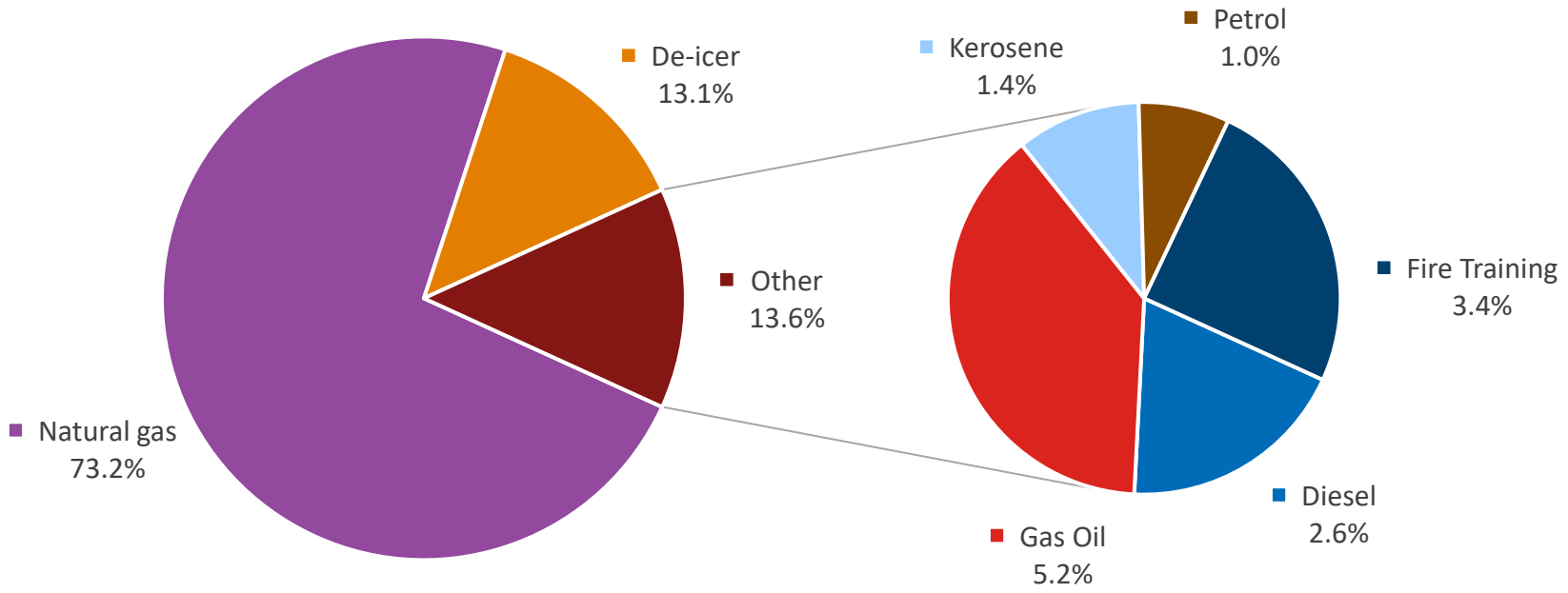


Electricity is not included in the figure above because renewable electricity is purchased and has no associated emissions.

Scope 1 Emissions Sources

Scope 1 = 1,523 tCO_2e (3.2% of Total)

Scope 1 emissions are under the direct control of the airport.



Emissions from refrigerant gases have been removed from the chart as it contributes <1% of emissions.

Scope 2: Location and Market Based Emissions

Scope 2 = 0 tCO_2e (0.0% of Total)

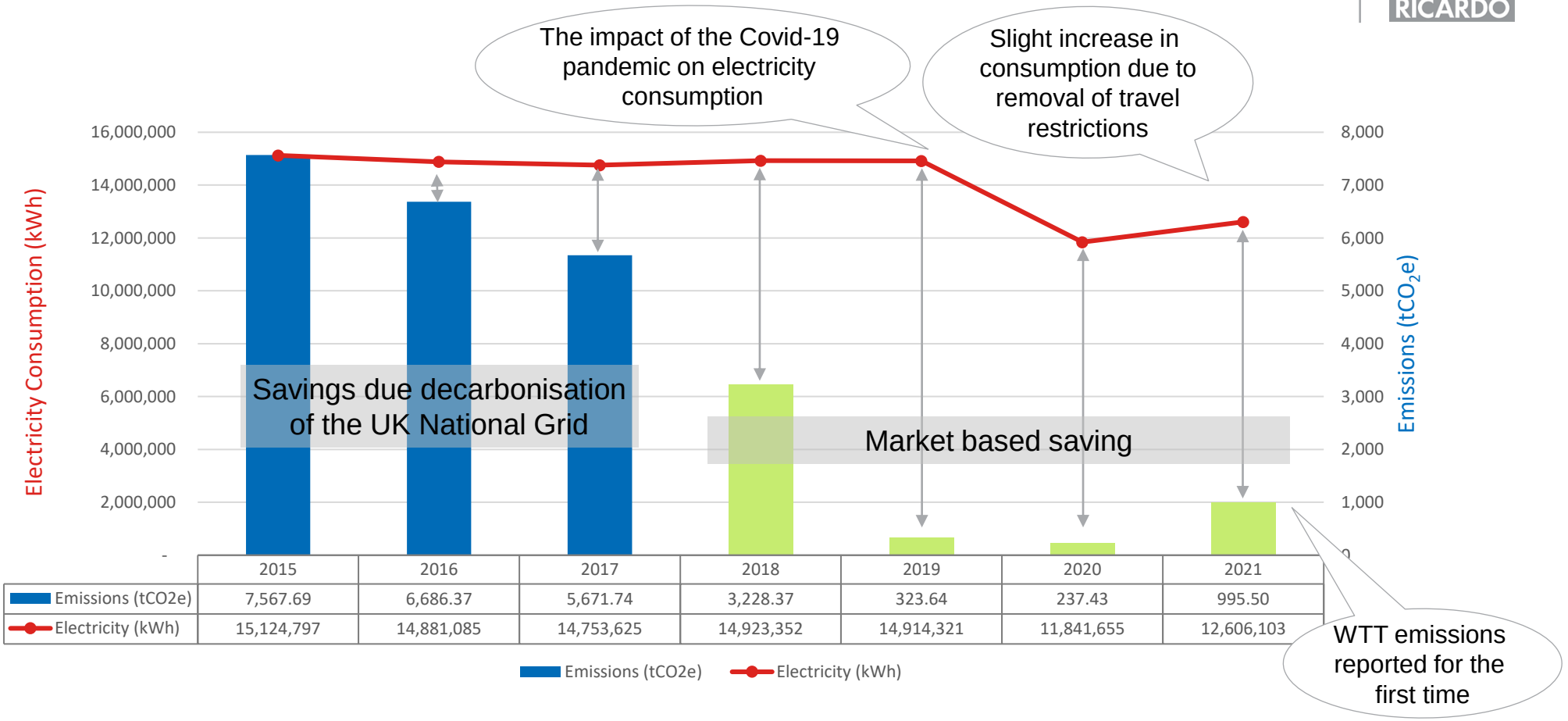
Scope 2 emissions relate to the electricity consumption at the airport. These can be calculated as:

- 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 UK 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 electricity that is greener than the National Grid average emissions factor. The advantage of procuring electricity that is higher in renewable energy content than that of the National Grid is outlined in the table below:

	Location-based (tCO_2e)	Market-based (tCO_2e)
Airport Electricity Emissions (Scope 2)	1,243	0

- Here, market-based emissions are zero because the airport purchased 100% green electricity from its energy suppliers. A supplier statement has been provided which indicates that the supply is 100% renewable and REGOs will be available in mid-2022.
- The following slide provides an annual comparison of the electricity consumption and relevant emissions at Aberdeen Airport.

Comparison of Electricity Consumption and Carbon Emissions



	2015	2016	2017	2018	2019	2020	2021
Emissions (tCO2e)	7,567.69	6,686.37	5,671.74	3,228.37	323.64	237.43	995.50
Electricity (kWh)	15,124,797	14,881,085	14,753,625	14,923,352	14,914,321	11,841,655	12,606,103

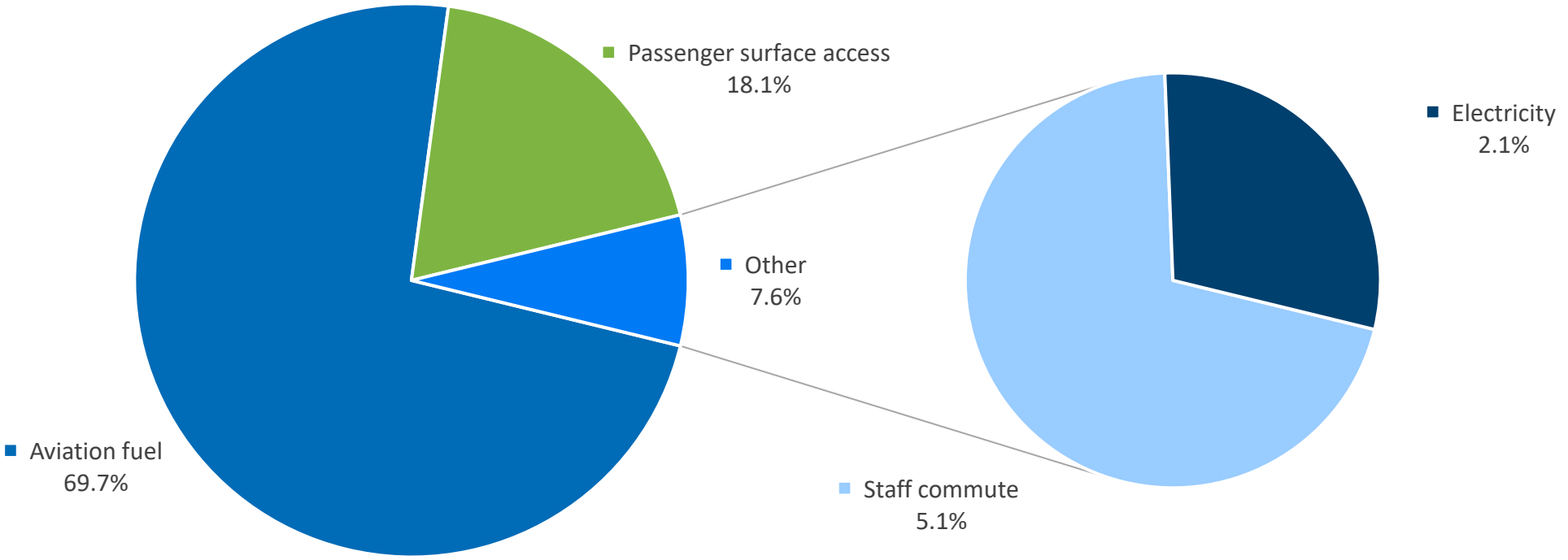
There was only a small deviation in total electricity consumption from 2015-2019. The majority of savings in emissions during this period is due to the increase of renewables on the national electrical grid and the purchasing of 100% renewable electricity from 2018. From 2019-2020, electricity consumption and the resulting emissions reduced, likely due to the Covid-19 pandemic. From 2021, electricity consumption increased 6.1% due to the removal of travel restrictions in the latter half of the year. Emissions from electricity have increased largely because of the inclusion of Well-To-Tank (WTT) emissions for the first time in 2021.

Note: to allow for better comparison to previous years, the figures for electricity emissions above include tenant electricity use, as well as Transmission and Distribution (T&D) and WTT emissions.

Scope 3 Emissions Sources

Scope 3 = 45,352 tCO_2e (96.7% of Total)

Unlike Scope 1 and Scope 2 emissions, emissions categorised as Scope 3 are not generally under the direct control of the airport.



The Scope 3 figure above for electricity is inclusive of the emissions associated with Transmission and Distribution (T&D) and Well-To-Tank (WTT) only. Aberdeen procures 100% renewable electricity, however, it still receives energy from the UK electricity grid and therefore it is best practice to report these scope 3 emissions.

Business travel, Diesel, Gas Oil, Natural gas, Petrol, Water, Waste & material use, De-icer and Mileage are not included in the figure above they individually contribute <1% of Scope 3 emissions.

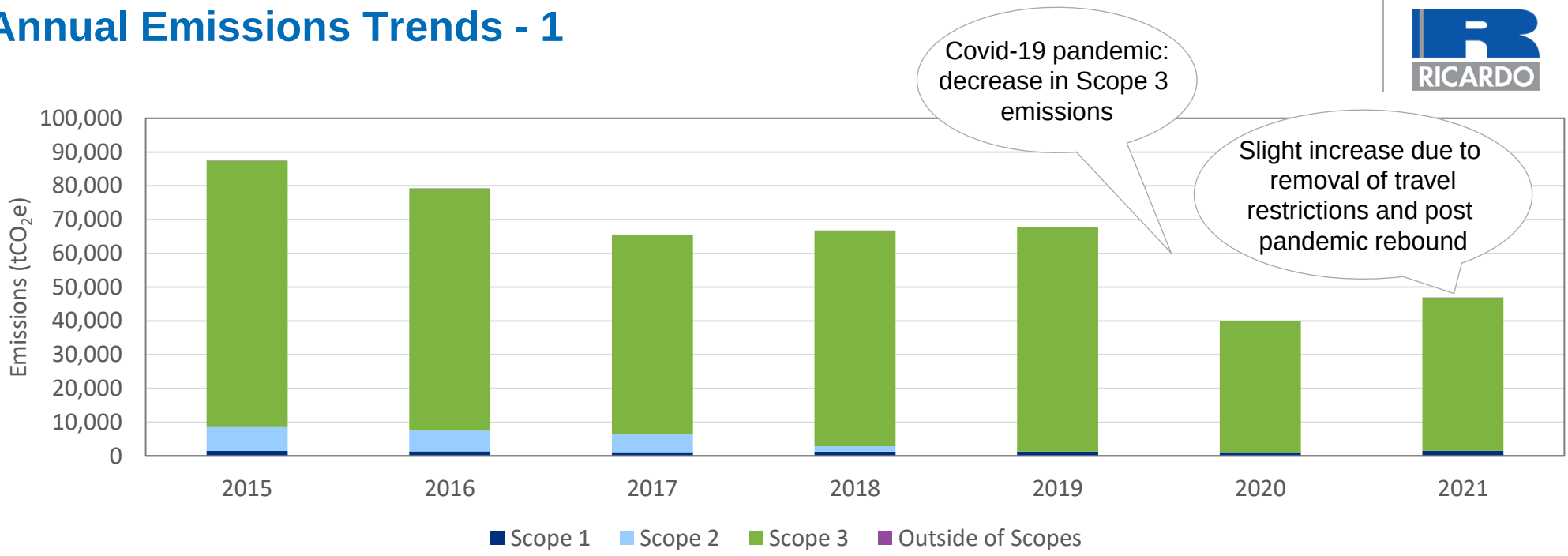
Landing Take-Off Cycle

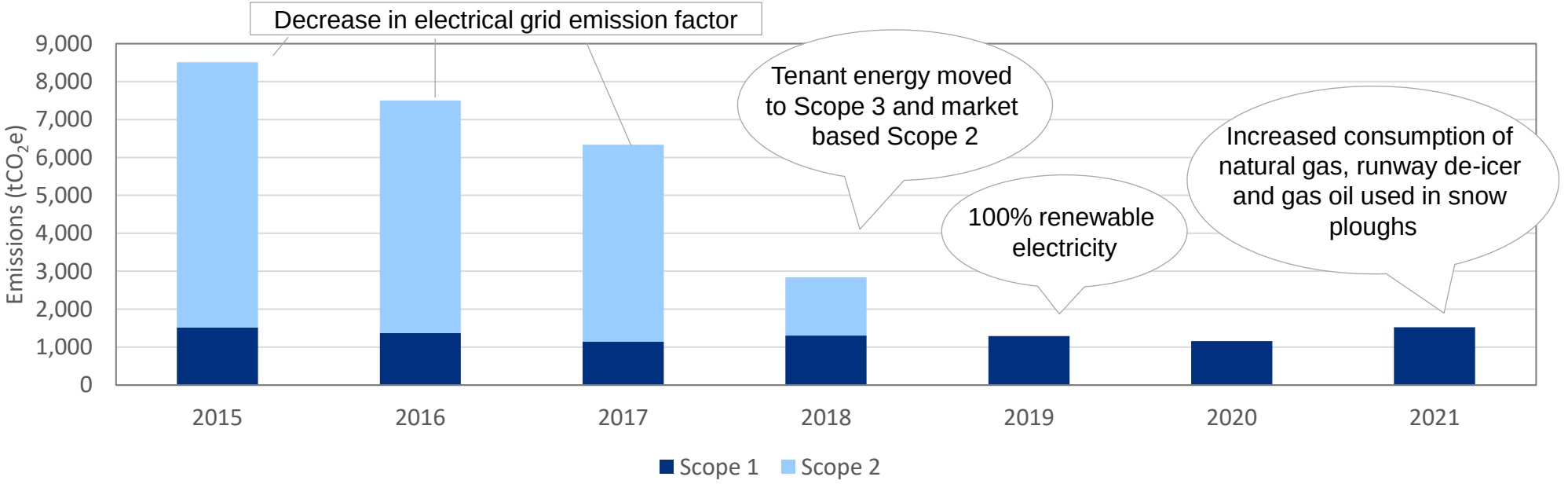
Landing Take-Off Cycle emissions account for aircraft movements which occur below 3000 feet during flight. Total LTO emissions for 2021 are **32,461 tCO_2e.**

EasyJet offset 100% of their aviation fuel emissions as per ACA guidelines and can therefore be claimed as carbon neutral. AGS airports have decided to continue reporting these emissions in their carbon footprint for clarity.

Total emissions from EasyJet that are offset are 2,767 tCO_2e which is 9% of total LTO emissions.

Annual Emissions Trends - 1





Annual Emissions Trends - 2

The table below shows the figures from the charts on the previous slide, as well as the % year-on-year (y-o-y) change of the different emissions scopes.

Emissions by Scope	2015 emissions (tCO_2e)	2016 emissions (tCO_2e)	2017 emissions (tCO_2e)	2018 emissions (tCO_2e)*	2019 emissions (tCO_2e)*	2020 emissions (tCO_2e)*	2021 emissions (tCO_2e)*
Scope 1	1,521	1,370	1,149	1,305	1,290	1,162	1,523
Scope 2	6,991	6,132	5,187	1,539	0	0	0
Scopes 1 and 2	**8,511**	**7,502**	**6,336**	**2,843**	**1,290**	**1,162**	**1,523**
Scope 3	78,959	71,716	59,143	63,867	66,436	38,732	45,352
Outside of Scopes	6	6	4	4	6	6	8
Total emissions	**87,476**	**79,224**	**65,483**	**66,714**	**67,732**	**39,901**	**46,883**
Scope 1 % y-o-y change	N/A	-10%	-16%	14%	-1%	-10%	31%
Scope 2 % y-o-y change	N/A	-12%	-15%	-70%	-100%	N/A	N/A
Scope 1 & 2 % y-o-y change	**N/A**	**-12%**	**-16%**	**-55%**	**-55%**	**-10%**	**31%**
Scope 3 % y-o-y change	N/A	-9%	-18%	8%	4%	-42%	17%
Outside of Scopes % y-o-y change	N/A	2%	39%	0%	62%	3%	26%
Total % y-o-y change	**N/A**	**-9%**	**-17%**	**2%**	**2%**	**-41%**	**17%**

- Note that due to changes in methodology, 2015-2017 emission are reported using location based methodology and tenant energy is in Scopes 1 and 2. For 2018-21 emissions are reported using the market based methodology and tenant energy is moved to Scope 3.

Annual Emissions Trends - 3

Almost all emission sources experienced an increase in 2021.

The following sources experienced the largest decrease:

- Business travel emissions reduced by 91% likely due to the increase in remote working and online meetings
- Aircraft engine testing emissions reduced by 87% due to the lack of data available for helicopter engine testing as outlined here. Last year, this data made up 86% of total engine testing. There has been a 50% decrease in emissions per helicopter test, reducing from 0.6 CO2e per test to 0.3 CO_2e per test

The following sources experienced an increase in emissions from 2020, likely due to the removal of national travel restrictions:

- Waste disposal & material use emissions increased by 195% from 2020, however they have decreased by 73% from pre-covid levels
- Staff commute emissions increased by 97% due to the removal of travel restrictions and less staff on furlough
- Utilities emissions increased by 68%, largely due to the inclusion of electricity Well-To-Tank (WTT) emissions for the first time in 2021. Excluding WTT emissions, there has been an increase of 20%. All other utility emission sources decreased, apart from those from natural gas and aircraft glycol based de-icer which increased by 11% and 43% respectively
- Operational vehicles increased by 15% due to the increased use of gas oil for snow clearing in February 2021
- Passenger surface access emissions increased by 14%, likely due to an 11% increase in passenger numbers
- Aircraft movement emissions increased by 15%, due to the increase in ATMs of 6.7% and a lower rate of engine type matches within the advanced calculation methodology

Fern Spencer

fern.spencer@ricardo.com

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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.

2021 = **8 tCO_2e** (0.014% of total emissions)

Methodology

The following sections provide a summary of the methodology adopted by Ricardo Energy & Environment to calculate the 2021 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. Scope 3 emissions are the consequence of the activities of the airport but arise from sources not owned or controlled by the airport. These include aircraft movements (up to a height of 1,000m above aerodrome level), passenger and staff travel to the airport, airside activities, waste disposal and material use, water, business travel, and tenant energy.

Methodology

The uncertainties associated with carbon footprint calculations can be broadly categorised into scientific uncertainty and estimation uncertainty. Scientific uncertainty arises when the science of the actual emission and/or removal process is not completely understood. For example GWP values involve significant scientific uncertainty. Estimation uncertainty arises any time GHG emissions are quantified. Estimations have been made within this footprint where areas of uncertainty have arisen.

Business Travel

Accounts data was provided for business travel (Scope 1 & 3). All transport mode data was provided in £ value and converted to distance travelled using the cost/km from Carbon Footprint and Project Register Tool (CFPRT) which can be found at https://sustainablescotlandnetwork.org/resources/carbon-footprint-and-project-register-tool . The CFPRT collates cost data for all forms of public transport across the UK, and is managed and updated by Sustainable Network Scotland and Resource Efficient Scotland.

Passenger Surface Access

Emissions are based on a survey undertaken in 2018, scaled to 2021 AIAL passenger numbers. Information was collated on the mode of travel and location of those who answered the survey. Methodology has been improved in the 2020 and 2021 calculations.

Staff Commute

For staff commute, a 2020 survey completed by the airport and 3rd party staff was utilised to reflect staff commute before and during the Covid-19 pandemic. Only pre-pandemic data has been used for 2021. There were 42 complete responses from airport staff, and final data has been scaled to total FTE averages of 88 pre pandemic. There were 232 responses for third party employees, which was scaled up to the full 1770 active third party passes. The survey respondents provided information on their modes of transport, distance travelled to work and number of days worked per week. An assumption was made that the first 39 weeks of the year were still affected by pandemic restrictions and an average figure of 19% was used to account for employees still on furlough. It was assumed that no commute was made for those on furlough. The remaining 13 weeks of the year were unaffected by furlough and pre-pandemic data was used.

De-icer

We have calculated de-icer emissions using the emissions factors provided in the latest version of the ACERT tool from the Airport Carbon Accreditation scheme. This includes the emissions from glycol based de-icer only, under ACA methodology. Where diluted glycol was used (e.g. 50:50 glycol to water), the dilution rate has been taken into account in calculations to ensure only the amount of undiluted glycol was considered.

Methodology

Engine Tests

To calculate the emissions from engine testing at Aberdeen airport, a similar process was carried out for fixed wing aircrafts to identify the engine type as per the LTO cycle detailed below. For Helicopters, a sample of engine types were provided, along with estimated fuel burn as per the LTO cycle. Other assumptions used for the calculations are:

Fixed wing

1. Two engine's are tested
2. High power testing occurred for 10% of the full test time

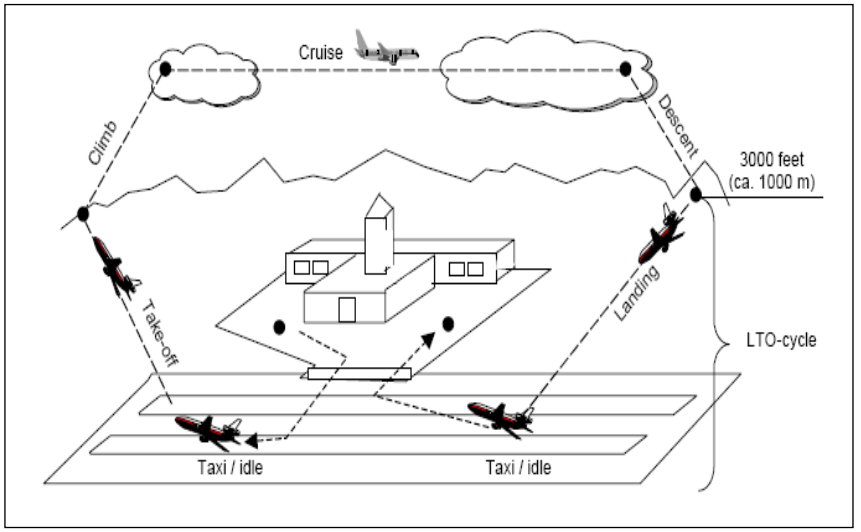
Helicopters

1. All engines were tested
2. Where time at full thrust was not provided, an assumption of 50% was used
3. Where a fuel burn rate (kg/s) was not provided for a particular helicopter model, the largest fuel burn rate available for helicopter models tested on site was used as a conservative estimate

Aircraft Movements

Data provided by Aberdeen airport included the following information for each aircraft movement in 2021: Carrier, Aircraft registration, aircraft IATA code, aircraft ICAO code, engine type, Arriving/departing, and date of movement.

This data is used to identify the number and type of engines that each aircraft has, and the fuel burn per second at each stage of the landing take-off cycle for fixed wing aircrafts (shown below) can be referenced from the latest version of the ICAO databank. The engine type and fuel burn per second at each stage of the landing take-off cycle for helicopters was provided by helicopter operators at Aberdeen airport and used under a conservative approach to estimate helicopter emissions.



Location v Market Based

Market-based method: All of the 12,606,103 kWh of electricity consumption was supplied to Aberdeen Airport by a single supplier. Aberdeen Airport contacted the supplier in 2021 and asked for the details of the fuel mix. The following breakdown was provided for the year-ending 31st March 2021 (Source of Electricity, Percentage):

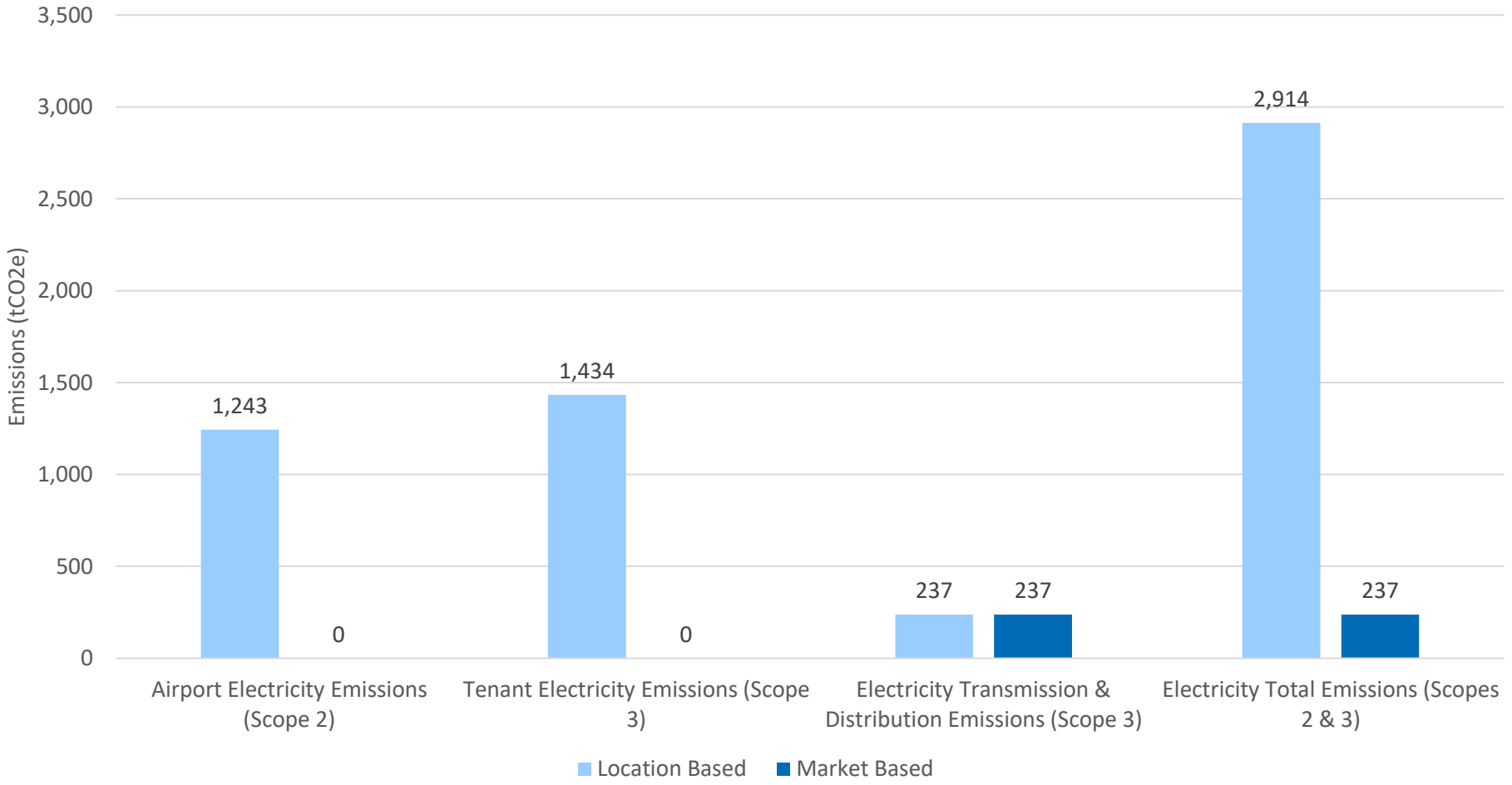
- **Renewables - 100%**

A supplier statement has been provided, which indicates that the supply is 100% renewable and REGOs will be available in mid-2022.

The weighted emission factor was provided as 0 gCO_2/kWh (or 0 $kgCO_2$/kWh). Multiplying the electricity consumption of 12,606,103 kWh by the emission factor of 0 $kgCO_2$/kWh calculates the emissions as 0 tCO_2e.

Location vs Market Based Emissions 2021

Scope 2 and 3 emissions due to electricity consumption (airport and tenant), calculated using either the location or market based emissions factors.



Location Based Electricity Emissions Historical Comparison

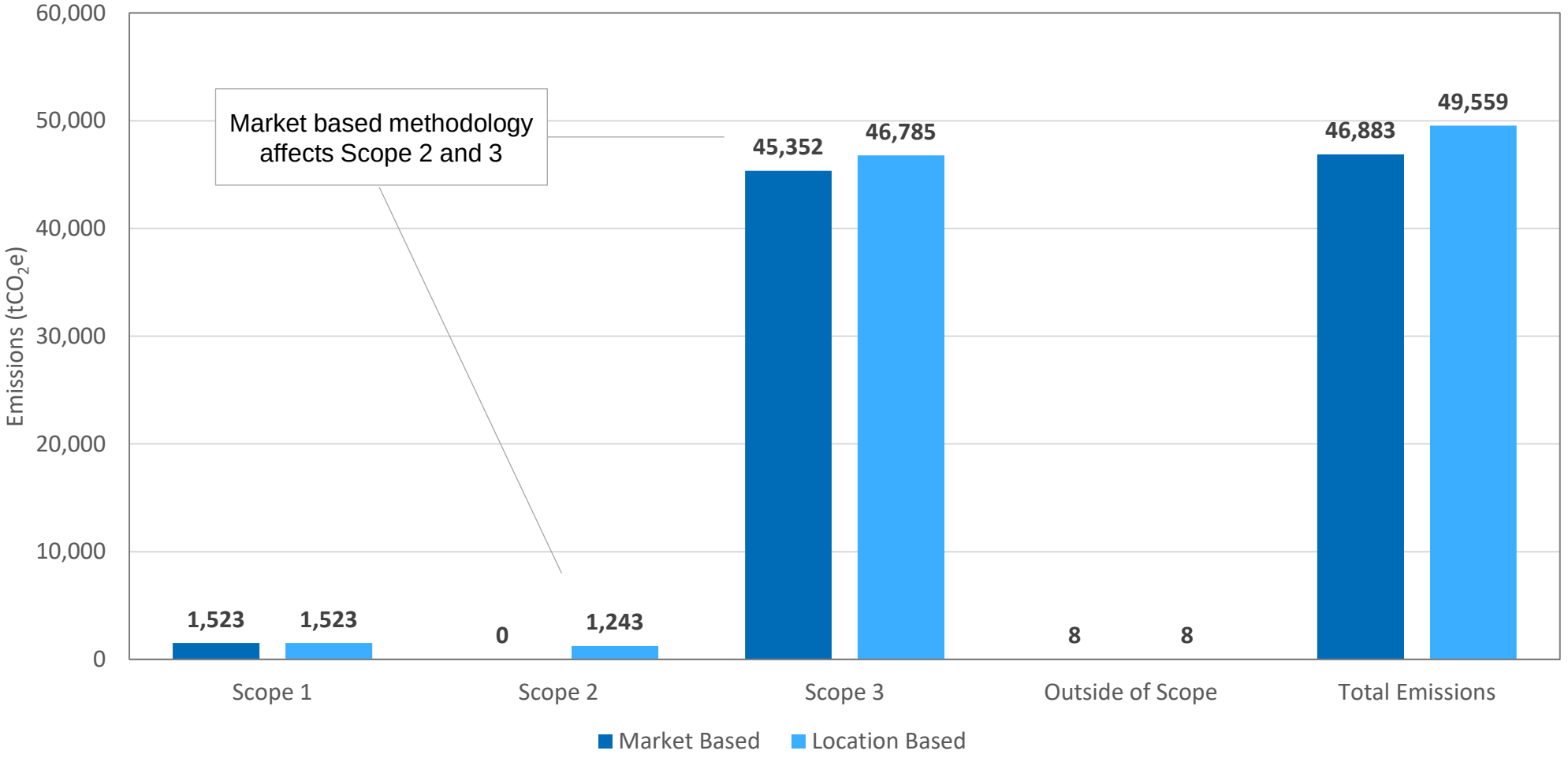
To allow for a fair comparison to previous years, the figures for electricity emissions below include tenant electricity use (classified as Scope 3 in 2021 methodology).

	2017 (Location Based)	2018 (Location Based)	2018 (Market Based)	2019 (Location Based)	2019 (Market Based)	2020 (Location Based)	2020 (Market Based)	2021 (Location Based)	2021 (Market Based)
Electricity (Scope 2 and 3) $kgCO_2e/kWh$ Airport (Scope 2) + Tenants (Scope 3)	0.35156	0.28307	0.19220	0.25560	0	0.23314	0	0.21233	0
Electricity T&D* losses (Scope 3) $kgCO_2e/kWh$	0.03287	0.02413	0.02413	0.02170	0.02170	0.02005	0.02005	0.01879	0.01879
Electricity usage (kWh) total Airport + Tenants	14,753,625	14,923,352	14,923,352	14,914,321	14,914,321	11,841,654	11,841,655	12,606,103	12,606,103
Electricity (Scope 2 and 3) emissions tCO_2e Airport + Tenants	5,187	4,224	2,868	3,812	0	2,761	0	2,676.6	0
Electricity T&D* losses (Scope 3) emissions tCO_2e	485	360	360	324	324	237	237	236.8	236.8
Electricity WTT* losses (Scope 3) emissions tCO_2e	N/A	N/A	N/A	N/A	N/A	N/A	N/A	758.6	758.6
Total electricity (Scope 2 and 3) emissions tCO_2e Airport + Tenants	**5,672**	**4,584**	**3,228**	**4,136**	**324**	**2,998**	**237**	**3,672**	**996**

*T&D = Transmission and Distribution. WTT= Well-To-Tank

Location vs Market Based Emissions 2021: All Scopes

Emissions totals by scope calculated using either the location or market based emissions factors. Tenant energy is included in Scope 3.



Historical Emissions Trends

The table below shows emissions figures where for all years Scope 2 emissions are reported using the location based methodology and tenant energy is included in Scope 2 for 2015-17 and in Scope 3 from 2018-21.

Emissions by Scope	2015 emissions (tCO_2e)	2016 emissions (tCO_2e)	2017 emissions (tCO_2e)	2018 emissions (tCO_2e)	2019 emissions (tCO_2e)	2020 emissions (tCO_2e)	2021 emissions (tCO_2e)
Scope 1	1,521	1,370	1,149	1,305	1,290	1,162	1,523
Scope 2	6,991	6,132	5,187	2,266	1,621	1,165	1,243
Scopes 1 and 2	**8,511**	**7,502**	**6,336**	**3,571**	**2,911**	**2,328**	**2,766**
Scope 3	78,959	71,716	59,143	64,496	68,627	40,328	46,785
Outside of Scopes	6	6	4	4	6	6	8
Total emissions	**87,476**	**79,224**	**65,483**	**68,070**	**71,544**	**42,149**	**49,559**
Scope 1 % y-o-y change	N/A	-10%	-16%	14%	-1%	-10%	31%
Scope 2 % y-o-y change	N/A	-12%	-15%	-56%	-28%	-28%	7%
Scope 1 & 2 % y-o-y change	**N/A**	**-12%**	**-16%**	**-44%**	**-18%**	**-20%**	**19%**
Scope 3 % y-o-y change	N/A	-9%	-18%	9%	6%	-42%	16%
Outside of Scopes % y-o-y change	N/A	2%	-39%	0%	62%	3%	26%
Total % y-o-y change	**N/A**	**-9%**	**-17%**	**4%**	**5%**	**-41%**	**16%**

Glossary

Term	Definition
Well-To-Tank (WTT)	Well-To-Tank Emissions. The emissions relating to the extraction, refinement, and transport of fossil fuels, including those used for electricity generation.
Air Traffic Movements (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).
Transmission & Distribution Losses (T&D)	Transmission & Distribution Losses. Emissions relating to electrical losses within the UK National Grid.
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.
Greenhouse Gas (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 (OoS)	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).
Passenger Surface Access (PAX)	Number of passengers.