



**Ricardo**  
**Energy & Environment**

## **Airport Carbon Footprint**

### **2021 Scope 1, 2 & 3 ED15779**

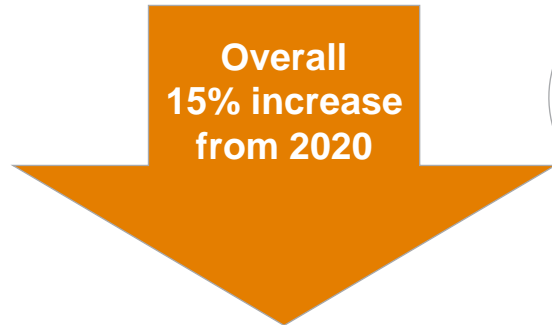
**In accordance with the UK Government's Conversion  
Factors for Company Reporting**

**Report for Edinburgh Airport Limited – Version 1**

**Edinburgh Airport**  
*Where Scotland meets the world*

**All Scope emissions = 61,514 tCO<sub>2</sub>e\***

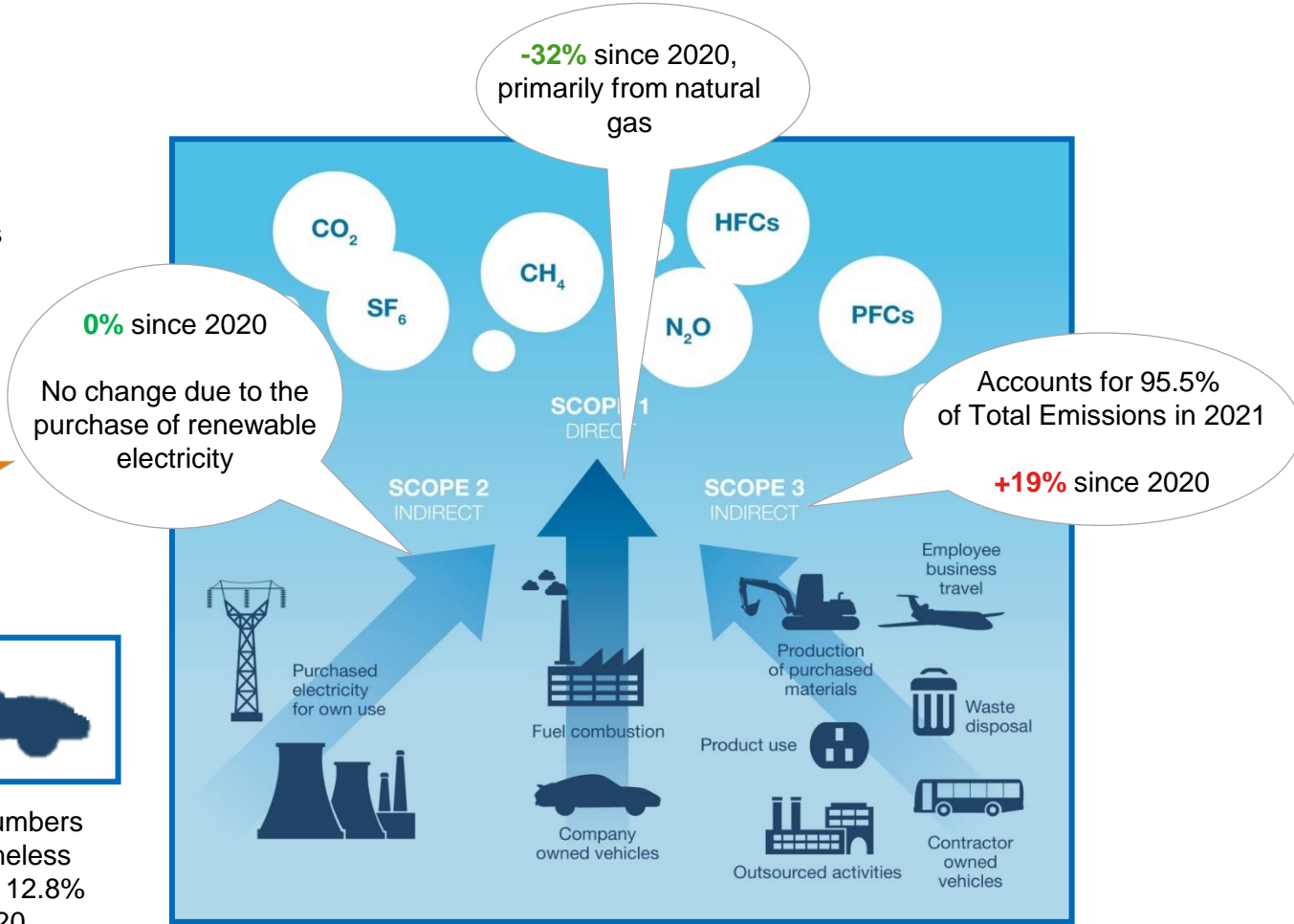
Overall increase, primarily due to the impacts of the loosening of Covid-19 travel restrictions on aircraft movements and airport travel



Number of aircraft movements have increased by 26% since 2020



Passenger numbers have nevertheless decreased by 12.8% since 2020



\* Note that emissions figures shown in this report are calculated using the market-based methodology unless clearly indicated otherwise.

# Included Emissions Sources

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

## Scope 1: Direct emissions:

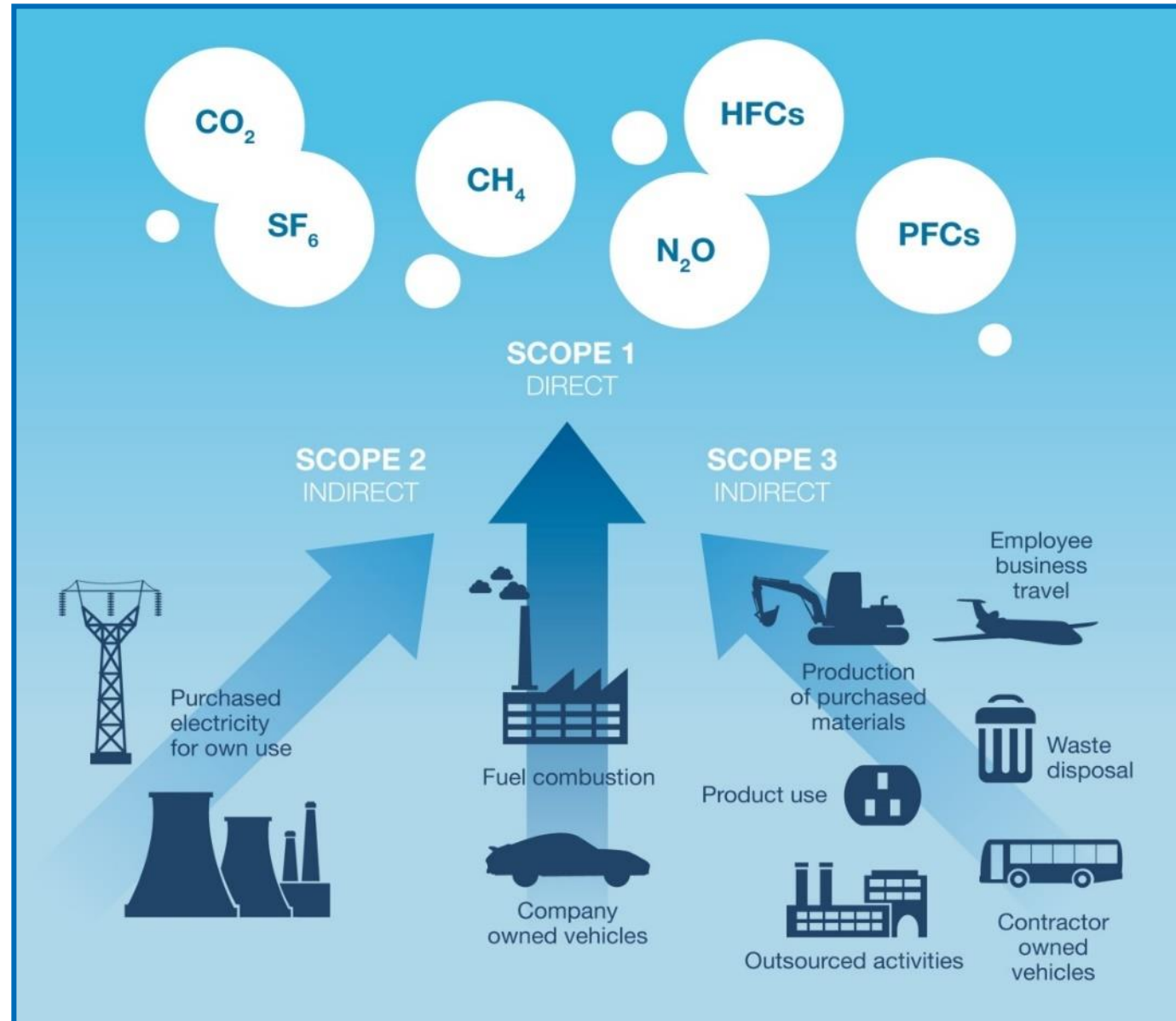
- Fuels burnt on site (boilers, generators, operational vehicles, fire training)
- Refrigerant gas losses
- Runway de-icer

## Scope 2: Indirect emissions:

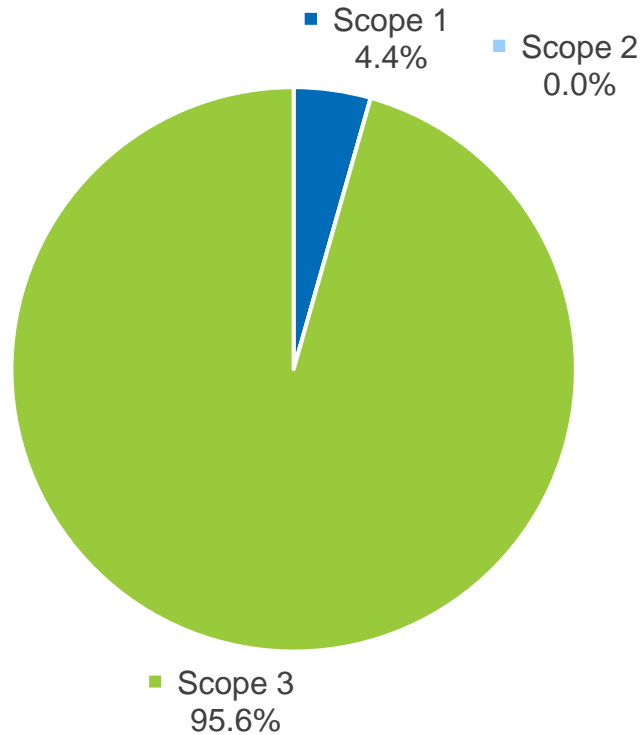
- Purchased electricity

## Scope 3: Indirect emissions:

- 3<sup>rd</sup> party operational vehicle fuels
- Tenant energy
- Aircraft LTO cycle, APU usage and engine testing
- Business travel
- Water supply and wastewater treatment
- Staff commute
- Passenger surface access
- Waste (disposal of materials)
- Runway de-icer



# Key Stats - Carbon Emissions by Scope 2021



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

	Total 2021 emissions (tCO <sub>2</sub> e)	% of total emissions
Scope 1	2,707	4.4%
Scope 2	0	0.0%
Scope 3	58,792	95.6%
Outside of Scope	15	0.0%
<b>Total</b>	<b>61,514</b>	<b>100.0%</b>

### 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.

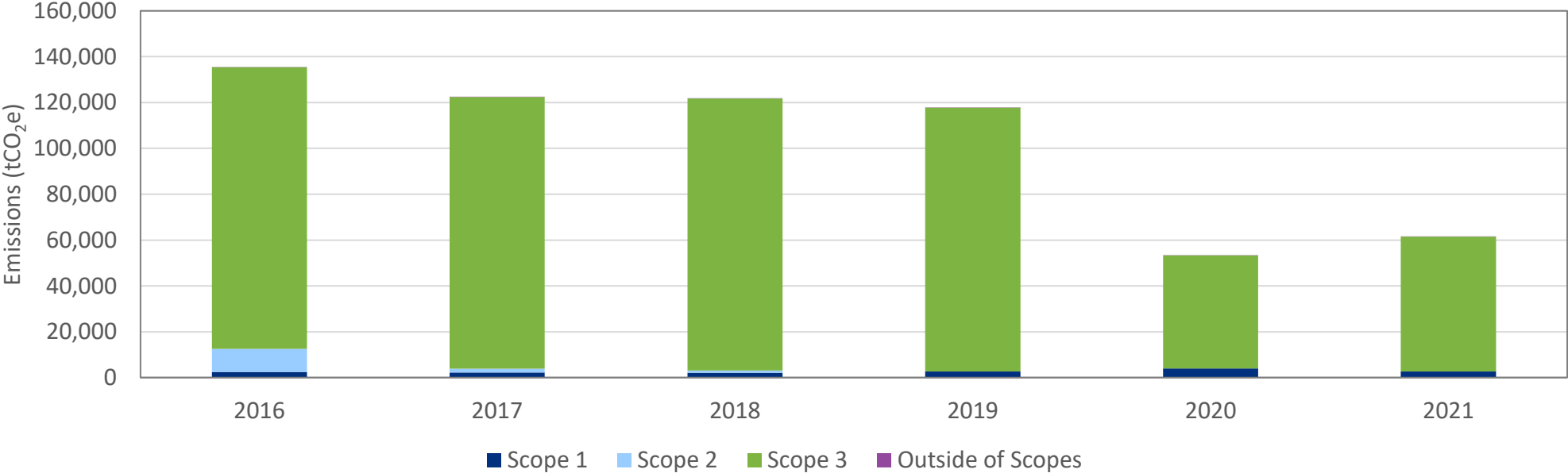
### Scope 2:

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.

### Scope 3:

Emissions arising as a direct consequence of the use of goods or services provided by the company. For Edinburgh Airport this would be the operation of the airport. Sources include aircraft movements, passenger and staff travel to the airport, airside activities, waste disposal, water and business travel.

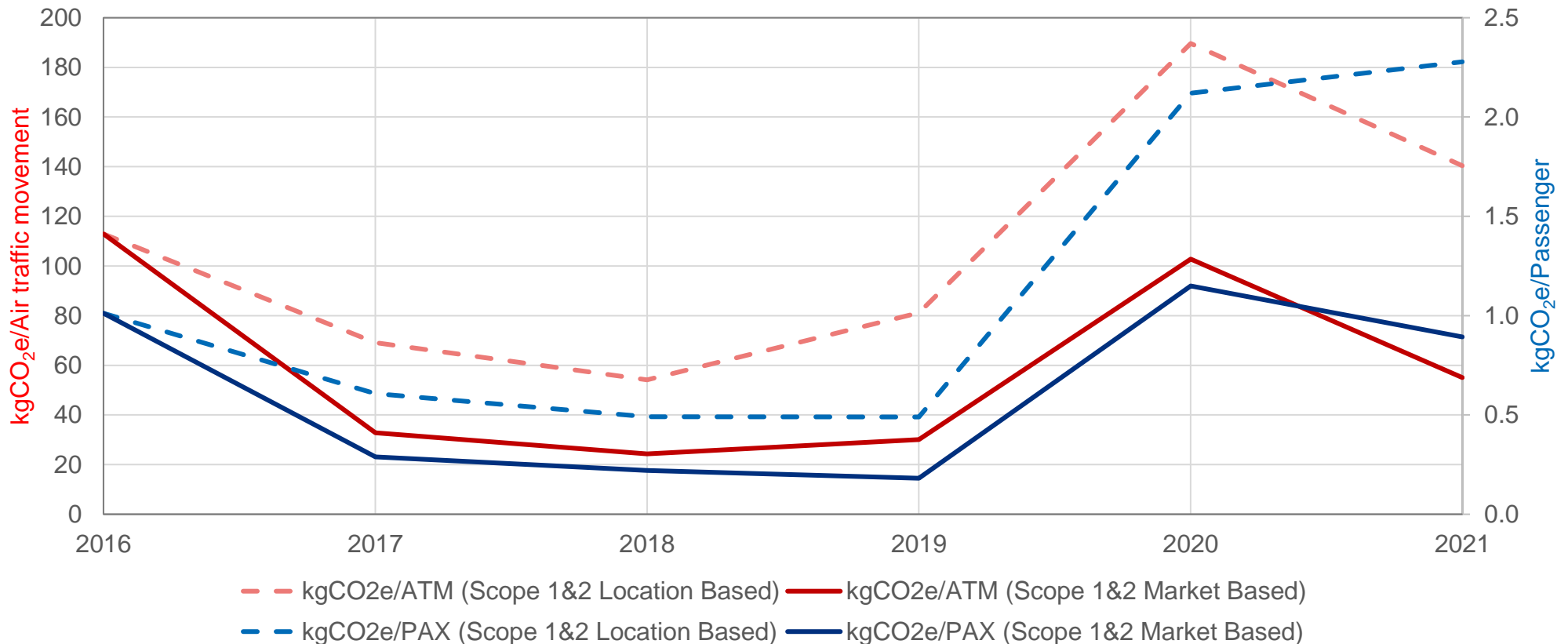
# Annual Emissions trends - 1



# 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 airport. The two chosen key performance indicators are aircraft traffic movements (ATM) and passenger numbers (PAX).





# Key Stats - Intensity Metrics comparison over time - 2



This chart shows intensity metrics for Scope 1&2 kgCO<sub>2</sub>e/passenger (PAX) and kgCO<sub>2</sub>e/air traffic movement (ATM) for both location and market based reporting methodologies.

	2016	2017	2018	2019	2020	2021
<b>ATM</b>	110,813	117,938	129,755	130,959	45,120	49,167
<b>PAX</b>	12,366,187	13,428,271	14,304,993	14,743,137	3,477,754	3,031,319
<b>% Change in ATM (year-on-year)</b>	9.7%	6.4%	10.0%	0.9%	-65.5%	8.8%
<b>% Change in PAX (year-on-year)</b>	11.1%	8.6%	6.5%	3.1%	-76.4%	-12.8%
<b>Scope 1 &amp; 2 (tCO<sub>2</sub>e) Location Based Scope 2 Tenant energy in Scope 3 in 2020</b>	12,511	8,151	7,025	7,226	7,356	6,904
<b>kgCO<sub>2</sub>e/ATM</b>	112.9	69.1	54.1	55.2	163.0	140.4
<b>kgCO<sub>2</sub>e/PAX</b>	1.0	0.6	0.5	0.5	2.1	2.3
<b>Scope 1 &amp; 2 (tCO<sub>2</sub>e) Market Based Scope 2 Tenant energy in Scope 3 in 2020</b>	12,511	3,869	3,160	2,682	3,980	2,707
<b>kgCO<sub>2</sub>e/ATM*</b>	112.9	32.8	24.4	20.5	88.2	55.1
<b>kgCO<sub>2</sub>e/PAX*</b>	1.0	0.3	0.2	0.2	1.1	0.9

\* Note that for 2015-2017 no figures for the market based methodology are available, so the location method has been applied

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Edinburgh Airport is located at Ingliston, on the outskirts of Edinburgh, Scotland. It was the busiest airport in Scotland in 2019, operating 365 days per year serving 14.7 million passengers and handling around 131,000 aircraft movements. During 2021, Edinburgh Airport has been restricted in its ability to provide air travel to passengers, primarily as a result of Covid-19 restrictions. This has meant that the airport has had significantly reduced aircraft movements and passenger numbers (approximately 3.3 million). Edinburgh Airport currently employs 500 full time employees (FTE), many of whom typically commute to the airport by car or public transport. To continue operating in an environmentally responsible manner, it is important for the airport to monitor and manage all its emissions from all operations.

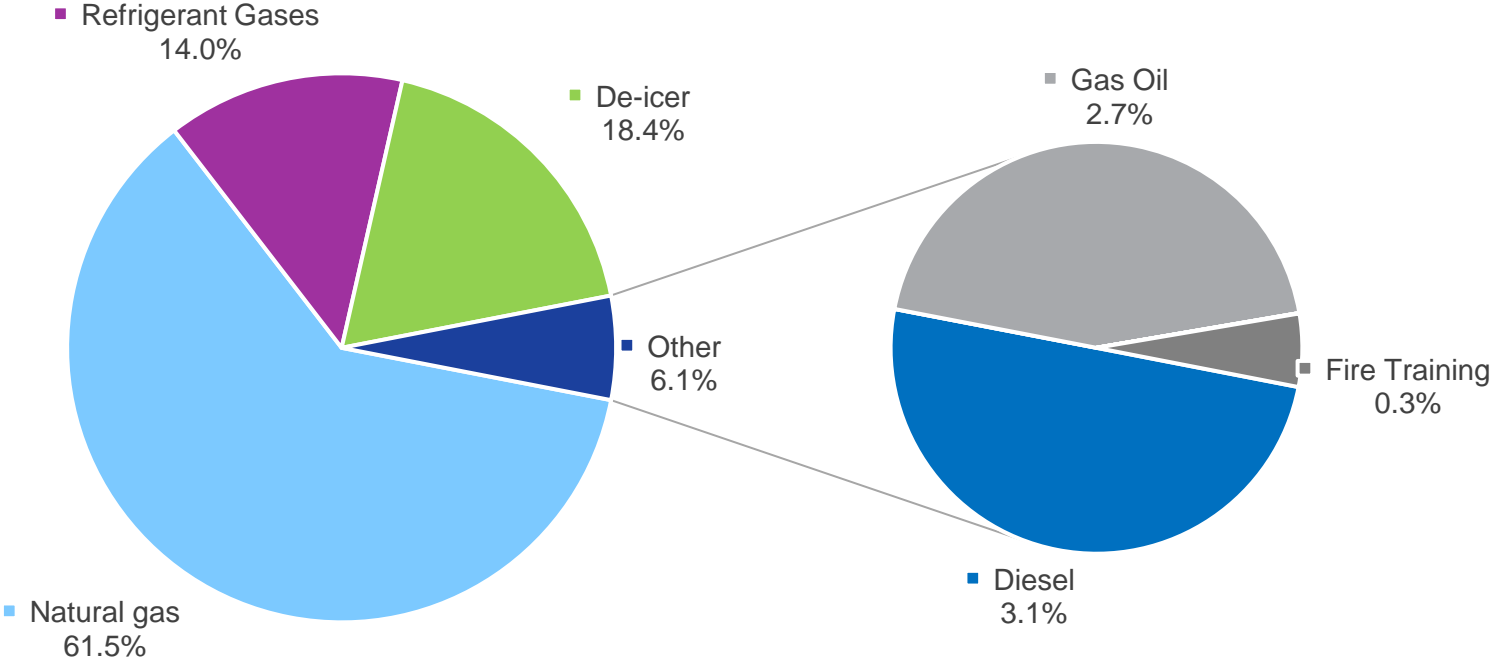
The calculation of the annual carbon footprint will help Edinburgh Airport understand the different areas which contribute to their overall carbon footprint and monitor changes on a yearly basis. This process will help identify improvement opportunities, which will ultimately reduce Edinburgh Airport's carbon footprint and associated costs. In addition, the success of any management strategies previously implemented can be evaluated. It is also a requirement of ACA accreditation to complete a carbon footprint and compare the scope 1 and 2 emissions to a three year rolling average.



# Scope 1 Emissions Sources (Market Based)



Scope 1 = 2,707 tCO<sub>2</sub>e (4.40% of Total)



# Scope 2: Location and Market Based Emissions



## Scope 2 = 0 tCO<sub>2</sub>e (0.0% of Total)

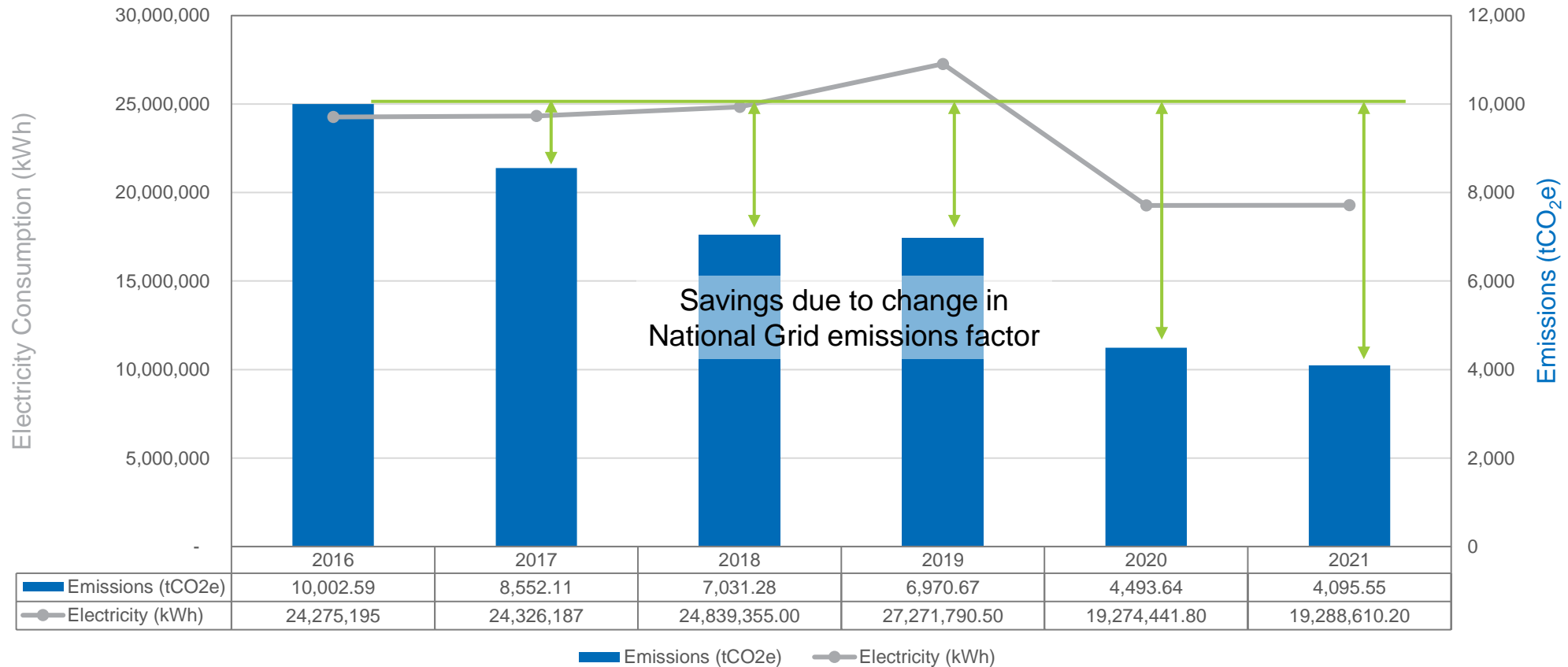
Scope 2 emissions relate to the electricity consumption at the airport. These can be calculated as:

- 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 <sub>2</sub> e)	Market-based (tCO <sub>2</sub> e)
Airport Electricity Emissions (Scope 2)	3,169	0

- Here, market-based emissions are zero because Edinburgh Airport purchased 100% green electricity from its energy suppliers. This has been corroborated against a supplier-issued statement and REGO certificates.

# Comparison of Electricity Consumption and Carbon Emissions



The emissions in the figure above are the location based electricity emissions. Electricity consumption fell by 29% between 2019 and 2021 due to COVID-19 and the associated impact this had on airport operations.

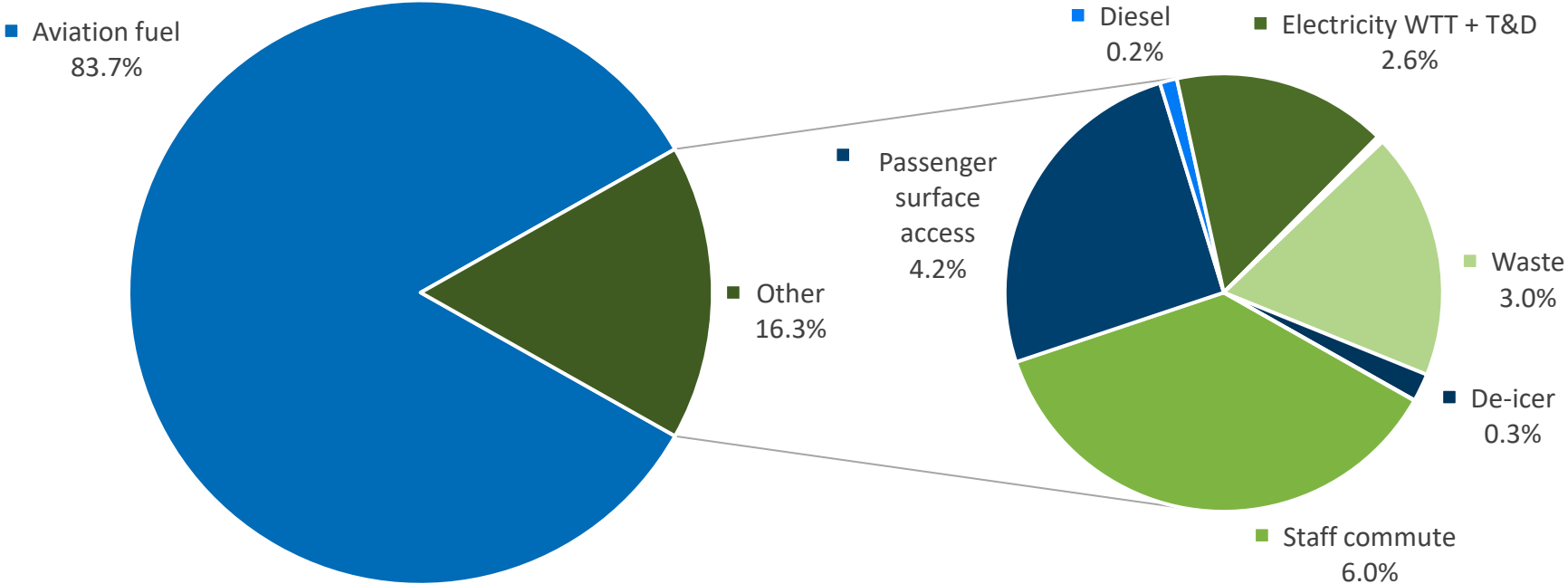
Note: to allow for better comparison to previous years, the figures for electricity emissions above include both airport (Scope 2) and tenant (Scope 3) electricity use. All figures exclude transmission and distribution (T&D) losses emissions.

# Scope 3 Emissions Sources (Market Based)



**Scope 3 = 58,792 tCO<sub>2</sub>e (95.5% of Total)**

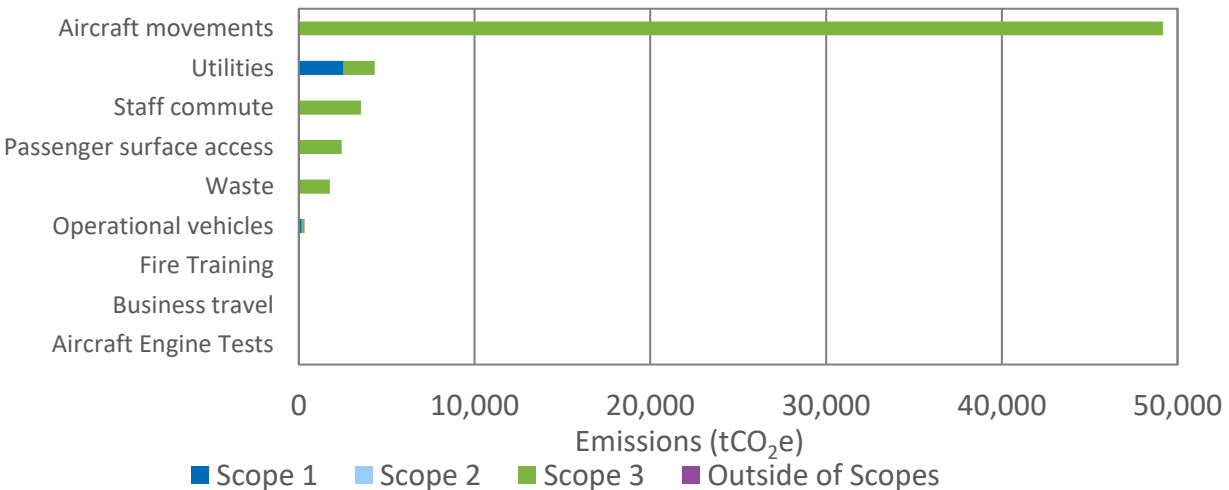
Unlike Scope 1 and Scope 2 emissions, emissions categorised as Scope 3 are not generally under the direct control of the airport.



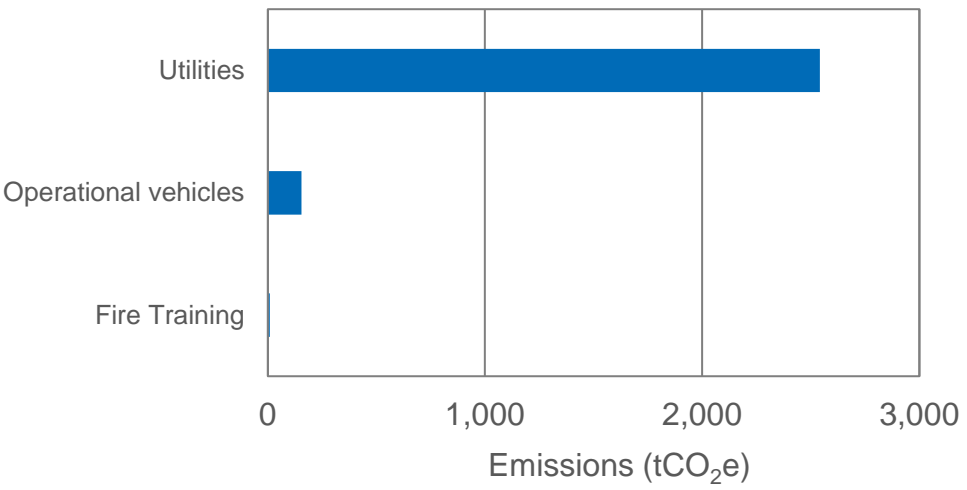
# Carbon Emissions by Source and Activity 2021 - 1



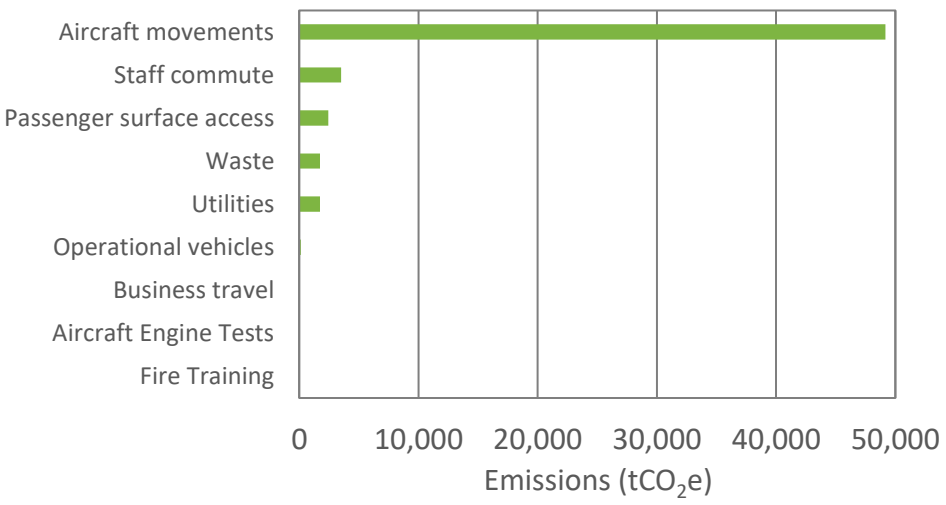
All Scopes carbon emissions split by source/activity



Scopes 1 and 2 carbon emissions split by source/activity



Scope 3 carbon emissions split by source/activity



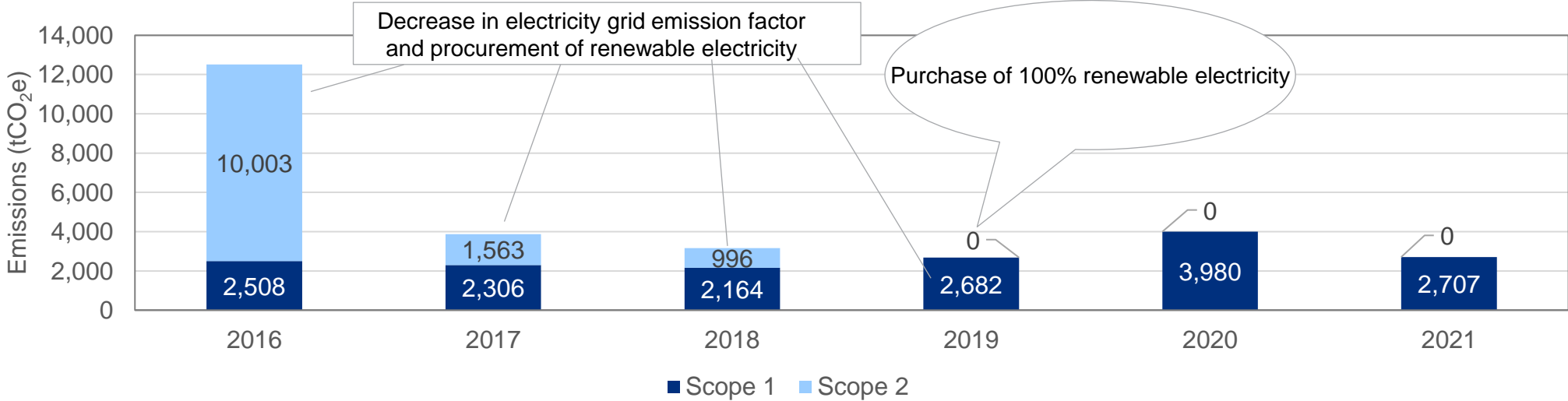
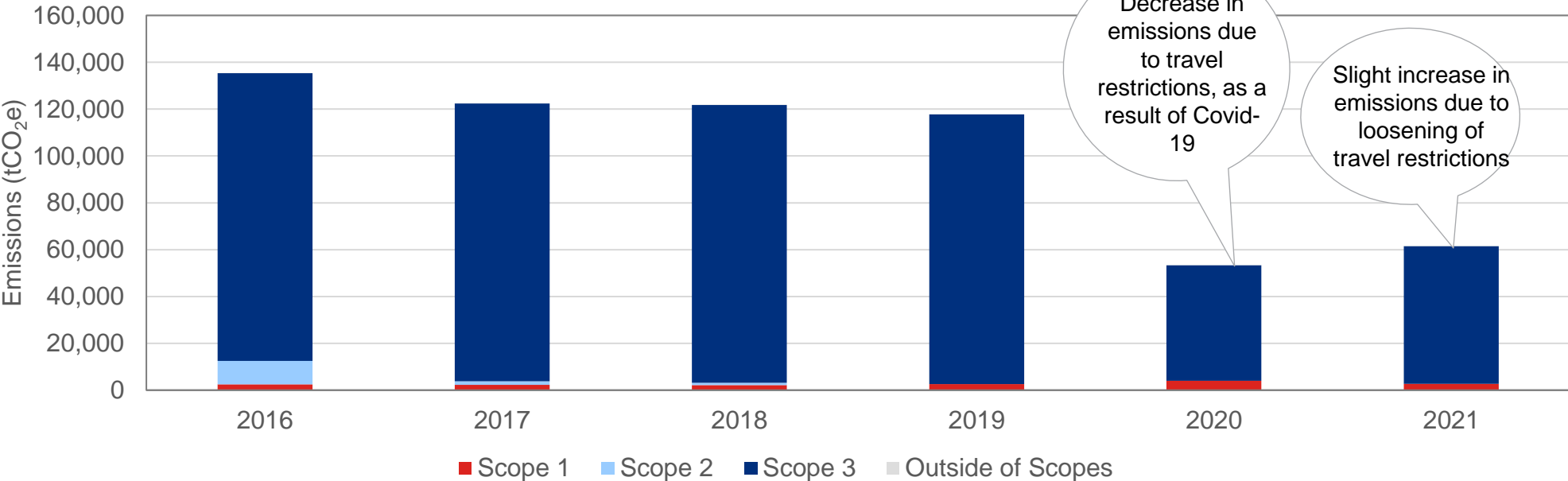
# Carbon Emissions by Source and Activity 2021 - 2



Market Based Emissions (tCO <sub>2</sub> e)	Emissions (tCO <sub>2</sub> e)	% of Scope	% of Total Emissions
<b>Scope 1 – Total</b>	<b>2,707</b>	<b>100.00%</b>	<b>4.4%</b>
Airport natural gas	1,665	61.50%	2.71%
Airport de-icer	498	18.4%	0.81%
Airport operational vehicles	156	5.8%	0.25%
Refrigerants	379	14.0%	0.62%
Fire training	9	0.3%	0.02%
Business travel (fuel purchase)	0	0.00%	0.00%
<b>Scope 2 – Total</b>	<b>0.0</b>	<b>0.00%</b>	<b>0.00%</b>
Airport electricity	0.0	0.00%	0.00%
<b>Scope 3 - Total</b>	<b>58,792</b>	<b>100.00%</b>	<b>95.60%</b>
Aircraft movements	49,167	83.65%	79.95%
Passenger surface access	2,443	4.16%	3.97%
Staff commute	3,521	5.99%	5.73%
Waste	1,759	2.98%	2.85%
Electricity T&D	0	0.00%	0.00%
Third party de-icer	198	0.34%	0.32%
Third party operational vehicles	141	0.24%	0.23%
Water	37	0.04%	0.04%
Aircraft engine tests	2	0.00%	0.00%
Tenant natural gas	4	0.01%	0.01%
Business travel	4	0.01%	0.01%
Tenant electricity	1,523	2.59%	2.48%
<b>Outside of Scope - Total</b>	<b>15</b>	<b>100.00%</b>	<b>0.02%</b>
Operational vehicles (diesel)	12	80.47%	0.02%
Fire training (diesel and wood)	3	19.53%	0.00%
<b>Total</b>	<b>61,514</b>		<b>100.00%</b>



# Annual Emissions Trends - 2



# Annual Emissions Trends - 3



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	2016 emissions (tCO <sub>2</sub> e)	2017 emissions (tCO <sub>2</sub> e)	2018 emissions (tCO <sub>2</sub> e)	2019 emissions (tCO <sub>2</sub> e)	2020 emissions (tCO <sub>2</sub> e)	2021 emissions (tCO <sub>2</sub> e)
Scope 1	2,508	2,306	2,164	2,682	3,980	2,707
Scope 2	10,003	1,563	996	0	0	0
Scopes 1 and 2	12,511	3,869	3,160	2,682	3,980	2,707
Scope 3	122,850	118,580	118,594	115,110	49,354	58,792
Outside of Scope	3	3	14	21	15	15
<b>Total emissions</b>	<b>135,364</b>	<b>122,453</b>	<b>121,768</b>	<b>117,813</b>	<b>53,366</b>	<b>61,514</b>

Scope 1 % y-o-y change	-8%	-8%	-6%	24%	48%	-32%
Scope 2 % y-o-y change	-6%	-84%	-36%	-100%	N/A	N/A
Scope 1 & 2 % y-o-y change	-6%	-69%	-18%	-15%	48%	-32%
Scope 3 % y-o-y change	1%	-3%	0%	-3%	-57%	19%
Outside of Scope	-20%	21%	305%	56%	-31%	3%
<b>Total % y-o-y change</b>	<b>0%</b>	<b>-9%</b>	<b>-1%</b>	<b>-4%</b>	<b>-55%</b>	<b>15%</b>

\* In 2017 tenant energy is moved to Scope 3.

\*\* In 2019 electricity is purchased from 100% renewable energy.

# Annual Emissions Trends - 4



Market Based Emissions (tCO2e)	2016	2017	2018	2019	2020	2021
<b>Scope 1 – Total</b>	<b>2,508</b>	<b>2,306</b>	<b>2,164</b>	<b>2,682</b>	<b>3,980</b>	<b>2,707</b>
Airport natural gas	1,849	1,817	1,607	2,104	3,350	1,665
Airport de-icer					415	498
Airport operational vehicles	376	427	439	534	208	156
Refrigerants	282	60	100	30	6	379
Fire training	2	2	17	2	1	9
Gas oil				12	0	0
Business travel (fuel purchase)			1.43	0.08	0.02	0
<b>Scope 2 – Total</b>	<b>10,003</b>	<b>1,563</b>	<b>996</b>	<b>0</b>	<b>0</b>	<b>0</b>
Airport electricity	10,003	1,563	996	0	0	0
<b>Scope 3 - Total</b>	<b>122,850</b>	<b>119,304</b>	<b>119,039</b>	<b>115,110</b>	<b>49,354</b>	<b>58,778</b>
Aircraft movements	102,094	96,428	98,822	89,034	38,882	49,167
Passenger surface access	13,634	14,599	13,197	13,042	2,309	2443
Staff commute	619	631	544	6,679	4,231	3521
Waste	3,703	4,188	3,008	3,328	1,753	1750
Electricity T&D & WTT (Gen, T&D)	2,543	2,291	1,731	1,647	1,060	1,523
Third party de-icer					531	198
Third party operational vehicles			914	755	282	141
Water	63	178	184	233	112	37
Aircraft engine tests	194	124	84	83	101	2
Tenant natural gas		142	82	181	71	4.01
Business travel			28	129	24	4.45
Tenant electricity		724	445	0	0	0
<b>Outside of Scope - Total</b>	<b>3</b>	<b>14</b>	<b>14</b>	<b>21</b>	<b>15</b>	<b>15</b>
Operational vehicles (diesel)	3	3	14	21	12	12
Fire training (diesel and wood)	0.02	0.00	0.00	0.02	3	3
<b>Total</b>	<b>135,364</b>	<b>123,187</b>	<b>122,213</b>	<b>117,813</b>	<b>53,349</b>	<b>61,514</b>

# Annual Emissions Trends - 5

Emissions sources with largest changes from 2020:

- Refrigerant Gas use (Scope 1) emissions **increased** by 5954%.
- Tenant electricity use (Scope 3) emissions **increased** by 44%.
- Aircraft movements (Scope 3) emissions **increased** by 26%.
- Passenger surface access (Scope 3) emissions **increased** by 6%.
- Natural gas (Scope 1) emissions **reduced** by 50%.
- Fire training emissions **reduced** by 40%, primarily as a result of the reduced use of LPG.
- Airport de-icer (Scope 1 and 3) emissions **reduced** by 26%.

Emissions sources with largest changes from 2020, as a result of restrictions from Covid-19:

- Business travel (Scope 3) emissions **reduced** by 81%.
- Water supply (Scope 3) emissions **reduced** by 79%.
- Operational vehicles (Scope 1 and 3) emissions **reduced** by 38%.
- Aircraft movements (Scope 3) emissions **reduced** by 56%.
- Staff commute (Scope 3) emissions **reduced** by 17%.

# Data Sources Review

Data source	Edinburgh	% of emissions	Comments
Aircraft movements	●	79.9%	Automated data based on real time aircraft data.
Passenger surface access	●	3.9%	Assumptions made around mode of transport and distance travelled, and scaled up from sample population.
Electricity (Scope 2)	●	0.0%	Data based on supplier invoices.
Waste	●	2.8%	Data split into relevant waste streams and measured in tonnes.
Tenant Electricity (Scope 3)	●	0.01%	Data provided in summary spreadsheet containing tenants and kWh consumed.
Natural gas (Scope 1)	●	2.7%	Data based on supplier invoices.
Operational vehicle fuel	●	0.2%	Data based on fuel card data provided in litres and fuel type.
Staff commute	●	5.7%	Assumptions made around mode of transport and distance travelled, and scaled up from sample population.
Aircraft engine testing	●	0.00%	Automated data based on aircraft type and duration of test. Assumptions required for time at high thrust.
Tenant Natural Gas (Scope 3)	●	0.01%	Data provided in summary spreadsheet containing tenants and kWh consumed.
Refrigerants	●	0.6%	Refrigerant usage log.
Water supply/treatment	●	0.04%	Figures from excel report rather than evidential records.
Fire training	●	0.02%	Fuel consumption provided by email correspondence.
Business travel	●	0.01%	Travel expense data provided in excel spreadsheet for 2021
Other utilities (gas oil and diesel)	●	0.2%	Data provided in litres and fuel type.
De-icer	●	1.1%	Data provided in litres

Key		
●	●	●
Verifiable, regular, automated and/or non-editable data source (e.g. data provided is based on half hourly meter readings, supplier invoices, contractors' worksheet, etc.)	Verifiable, manual readings/data of non-consumption data (e.g. data provided is based on recorded usage, expenses, etc.)	Non-verifiable data (e.g. data is based on estimates/calculations, scaled from previous years or assumptions, etc.)

# Recommendations for improving your GHG footprint



Recommendation	Benefit
<p><b>Provide evidence that does not require assumptions</b></p>	<p>Evidence such as employee commuting surveys that have gaps e.g. have not been populated with responses, should be addressed through data cleaning exercises. For example, surveys could notify the respondent when they have not answered a question correctly. This will result in a more robust data collection process that doesn't require assumptions to be made.</p>
<p><b>Consider broadening staff commuting and passenger surface access survey questions</b></p>	<p>Incorporating questions such as fuel type, engine size, number of passengers during journey, will ensure a more comprehensive dataset that improves the accuracy and granularity of emissions captured.</p>
<p><b>Provide an auditable trail for consumption figures</b></p>	<p>Waste, tenant energy and fuels used during fire training have been provided through excel report figures and email correspondence. To improve the data accuracy and improve the audit trail, this should be provided through invoices, supplier statements, etc. instead.</p>
<p><b>Provide distance and/or fuel data for business travel rather than just financial costs</b></p>	<p>Within 2021 data used for this year's footprint, cost data is provided for business travel which is converted to distance travelled using several assumptions. To improve on emissions calculation accuracy the following data should include: Mode of transport, distance travelled, travel provider, class travelled (flights/trains only)</p>
<p><b>Collect more accurate data for aircraft engine testing</b></p>	<p>At present, only the start and end time of the engine tests have been provided. No information is collected on the number of engines tested, or accurate timings for engine run duration at different thrust settings. Ideally, the provided data should include: Engine type, aircraft registration number, engine UID number, number of engines tested, time at low thrust, time at high thrust</p>
<p><b>Synchronise F-Gas reporting with the calendar year.</b></p>	<p>Currently F-Gas data is provided within a July-June reporting timeframe. Engage with T-Squared and the in-house Engineering team to shift reporting to a calendar year basis, and where possible gather data on a monthly basis.</p>

# Methodologies



The following sections provide a summary of the methodology adopted by Ricardo Energy & Environment to calculate the 2020 carbon footprint for Edinburgh Airport.

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. The airport 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. The airport does have some influence over Scope 3 emissions but the activities are not under its control. Sources included by the airport 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, water (supply and treatment), airport business travel and engine testing.

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 have uncertainty have arisen.

## **Business Travel**

Accounts data was provided for business travel (Scope 1 & 3). This included expense data for flights, public transport, and petrol purchase. The distance travelled has been calculated using assumptions for GBP per mile, depending on the travel mode. Distance travelled has been converted into tCO<sub>2</sub>e by applying an emission factor depending on the travel mode that has been used. Note that flight data was split into short, medium, and long haul, depending on the distance travelled.

## **Passenger Surface Access**

Emissions are based on a survey completed by Edinburgh Airport passengers between the 2021 reporting year. The airport has collated information on the number of transactions/movements per mode of transport. A passenger load factor has then been applied to each mode of transport. The final data has been scaled to the total number of passengers.

- Transport mode: Based on the list of modes surveyed by Edinburgh Airport.
- Passenger origin: An assumption has been made using the number of passengers travelling by mode, multiplied by the average distance travelled by passengers at Edinburgh Airport (as taken from previous years).

## Staff Commute

For staff commute, the 2021 staff travel survey data was utilised. There were 239 respondents, and so final data was scaled up to the full 4,377 staff at Edinburgh Airport. The survey respondents provided information on their modes of transport, distance travelled to work and number of days worked per week. This was scaled up to reflect a full working year by assuming that there are 254 working days per year and each staff member has 25 days of leave per year.

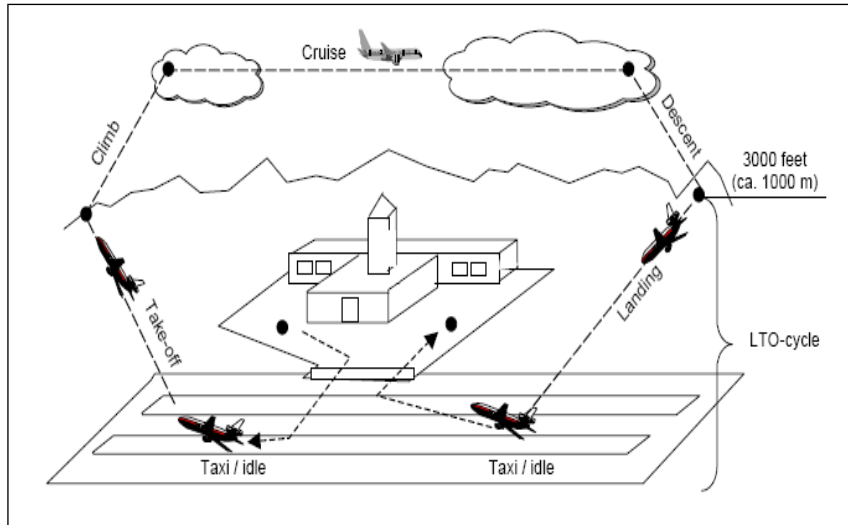
## Engine Tests

To calculate the emissions from engine testing at Edinburgh Airport, a similar process was carried out to identify the engine type as per the LTO cycle detailed on the next slide. Other assumptions used for the calculations are:

1. Only one engine was tested
2. High power testing occurred for 10% of the full test time

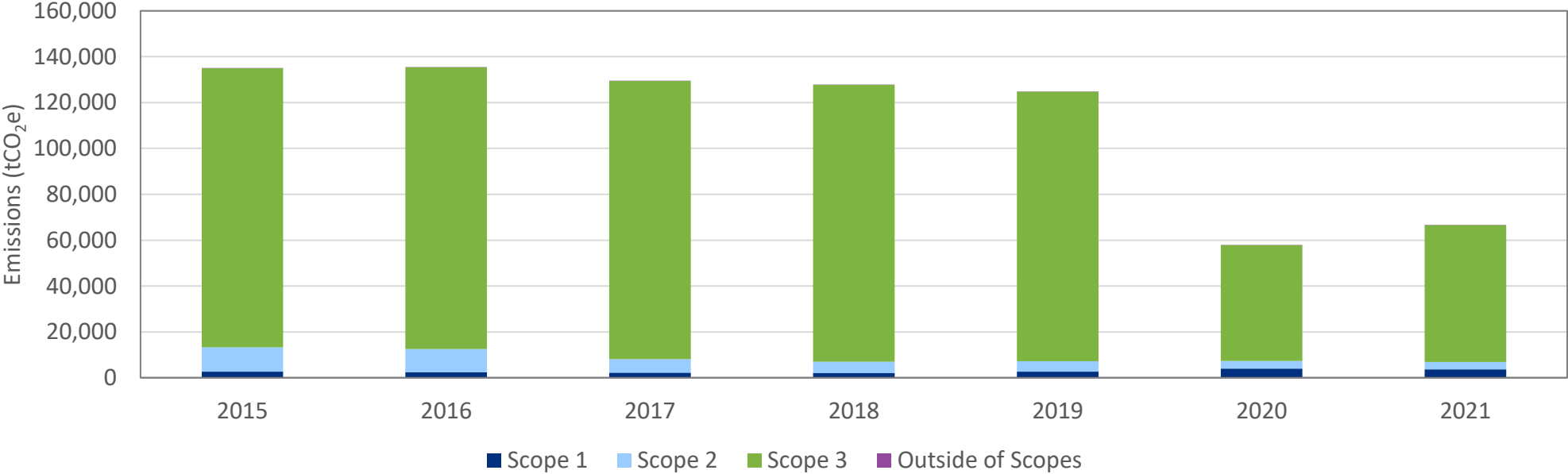
## Aircraft Movements

Data provided by Edinburgh Airport included the following information for each aircraft movement in 2020: Carrier, aircraft registration, aircraft IATA code, 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 (shown below) can be referenced from the latest version of the [ICAO databank](#).

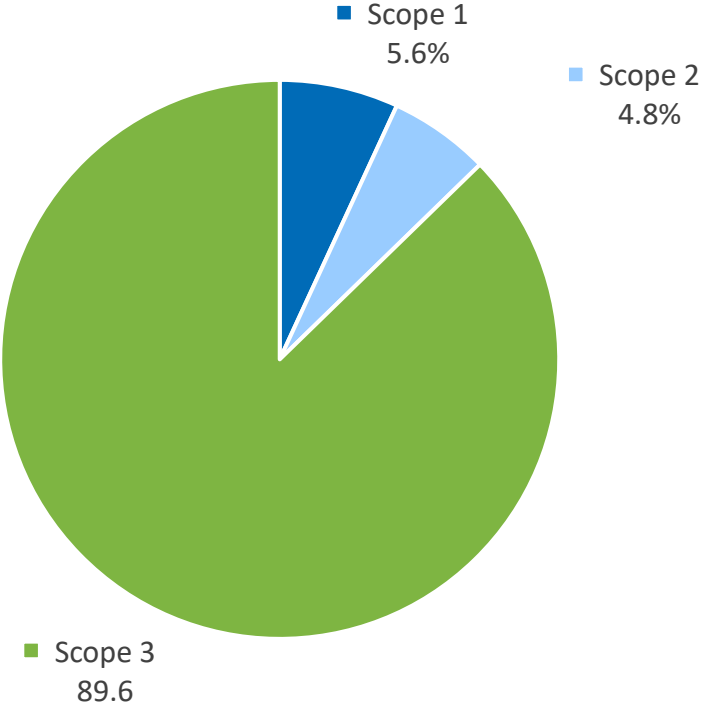


# Location Based Emissions

# Annual emission trends - 1



# Key Stats - All Scopes Summary



	Total 2021 emissions (tCO <sub>2</sub> e)	% of total emissions
Scope 1	3,736	5.6%
Scope 2	3,169	4.8%
Scope 3	59,721	89.6%
Outside of Scope	15	0.0%
<b>Total</b>	<b>66,641</b>	<b>100.0%</b>

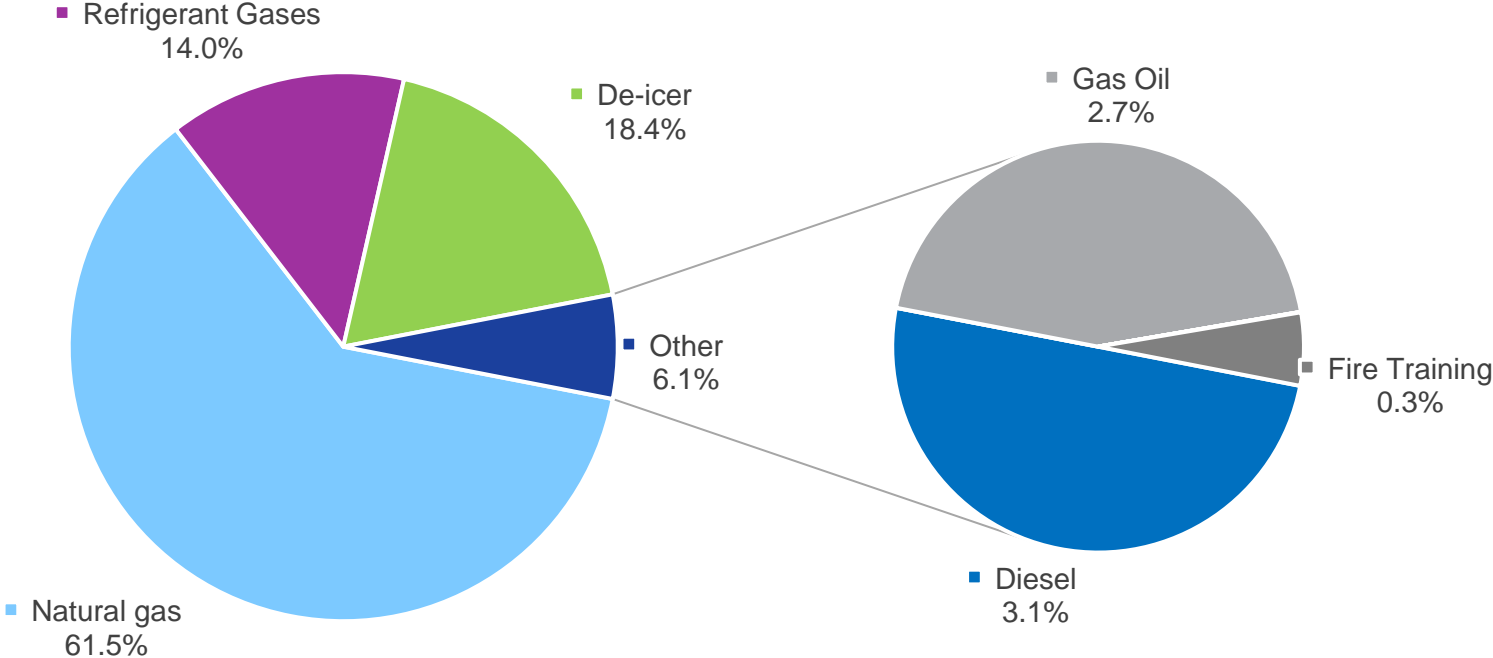


# Scope 1 Emissions Sources



**Scope 1 = 3,736 tCO<sub>2</sub>e (5.60% of Total)**

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

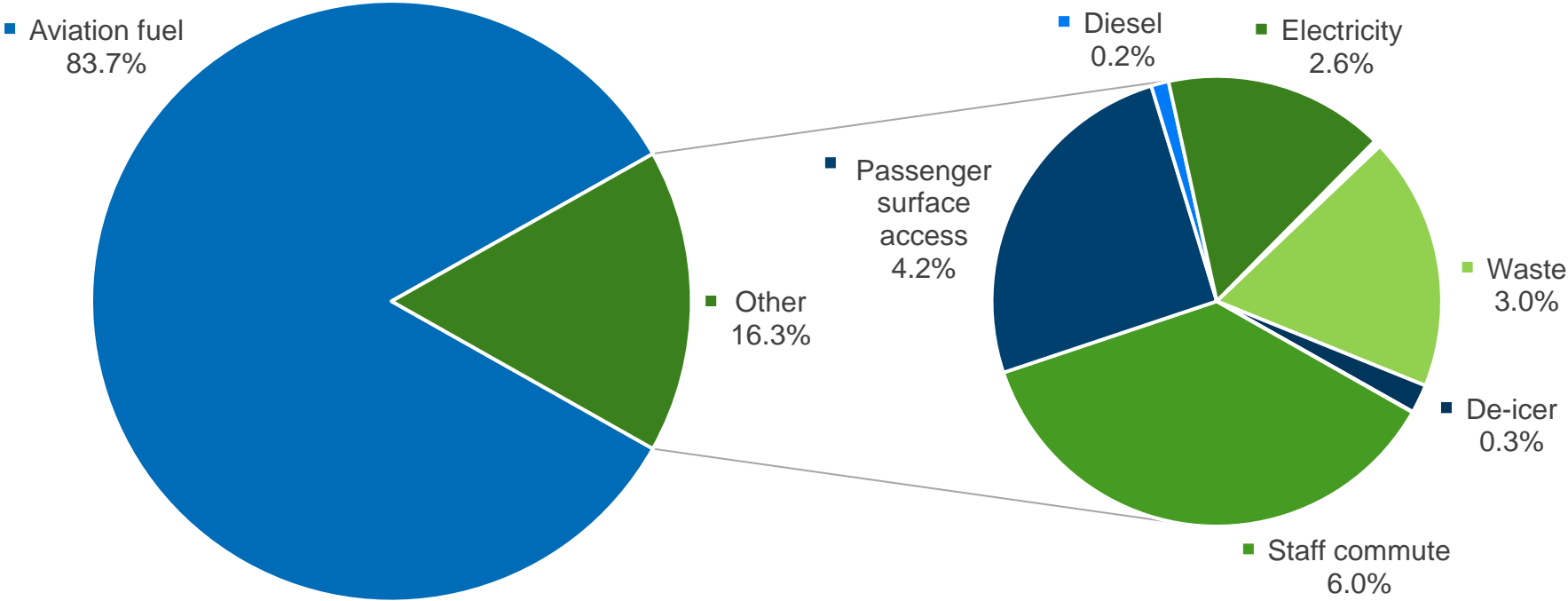


# Scope 3 Emissions Sources



**Scope 3 = 59,708 tCO<sub>2</sub>e (89.6% of Total)**

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



# Carbon Emissions by Source and Activity 2021 - 1



Location Based	Emissions (tCO <sub>2</sub> e)	% of Scope	% of Total Emissions
<b>Scope 1 – Total</b>	<b>3,736</b>	<b>100.00%</b>	<b>5.6%</b>
Airport natural gas	2,693	72.10%	4.04%
Airport de-icer	498	13.30%	0.75%
Airport operational vehicles	156	4.20%	0.23%
Refrigerants	379	10.20%	0.57%
Fire training	9	0.30%	0.01%
Business travel (fuel purchase)	0.05	0.00%	0.00%
<b>Scope 2 – Total</b>	<b>3,169</b>	<b>0.00%</b>	<b>4.8%</b>
Airport electricity	3,169		4.76%
<b>Scope 3 - Total</b>	<b>59,708</b>	<b>100.00%</b>	<b>89.6%</b>
Aircraft movements	49,167	82.62%	73.79%
Passenger surface access	2,443	4.11%	3.67%
Staff commute	3,521	5.92%	5.28%
Waste	1,750	2.94%	2.63%
Electricity T&D & WTT (Gen, T&D)	1,523	2.56%	2.29%
Third party de-icer	198	0.33%	0.30%
Third party operational vehicles	141	0.24%	0.21%
Water	37	0.04%	0.04%
Aircraft engine tests	2	0.00%	0.00%
Tenant natural gas	7	0.01%	0.01%
Business travel	4	0.01%	0.01%
Tenant electricity	927	1.55%	1.39%
<b>Outside of Scope - Total</b>	<b>15</b>	<b>100.00%</b>	<b>0.02%</b>
Operational vehicles (diesel)	12	80.59%	0.02%
Fire training (diesel and wood)	3	19.41%	0.00%
<b>Total</b>	<b>66,641</b>		<b>100.00%</b>

# 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).

	2016 (Location Based)	2017 (Location Based)	2018 (Location Based)	2019 (Location Based)	2020 (Location Based)	2021 (Location Based)
Electricity (Scope 2 and 3) kgCO <sub>2</sub> e/kWh <u>Airport (Scope 2) + Tenants (Scope 3)</u>	0.41205	0.35156	0.28307	0.25560	0.23314	0.21233
Electricity T&D* losses (Scope 3) kgCO <sub>2</sub> e/kWh	0.03727	0.03287	0.02413	0.02170	0.02005	0.01879
Electricity usage (kWh) total <u>Airport + Tenants</u>	24,275,195	24,326,187	24,839,355	27,271,791	19,274,442	19,288,610
Electricity (Scope 2 and 3) emissions tCO <sub>2</sub> e <u>Airport + Tenants</u>	10,002	8,552	7,031	6,971	4,494	4,095
Electricity T&D* losses + WTT (Gen, T&D) (Scope 3) emissions tCO <sub>2</sub> e	2,542	2,291	1,731	1,647	1,060	1,523
Total electricity (Scope 2 and 3) emissions tCO <sub>2</sub> e <u>Airport + Tenants</u>	12,545	10,843	8,762	8,617	5,554	5,618

\*T&D = transmission and distribution.

# 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	2016 emissions (tCO <sub>2</sub> e)	2017 emissions (tCO <sub>2</sub> e)	2018 emissions (tCO <sub>2</sub> e)	2019 emissions (tCO <sub>2</sub> e)	2020 emissions (tCO <sub>2</sub> e)	2021 emissions (tCO <sub>2</sub> e)
Scope 1	2,508	2,306	2,164	2,682	3,980	3,736
Scope 2	10,003	5,845	4,861	4,544	3,376	3,169
Scopes 1 and 2	12,511	8,151	7,025	7,226	7,356	6,904
Scope 3	122,850	121,287	120,765	117,536	50,472	59,708
Outside of Scope	3	3	14	21	15	15
<b>Total emissions</b>	<b>135,364</b>	<b>129,442</b>	<b>127,803</b>	<b>124,784</b>	<b>57,842</b>	<b>66,627</b>

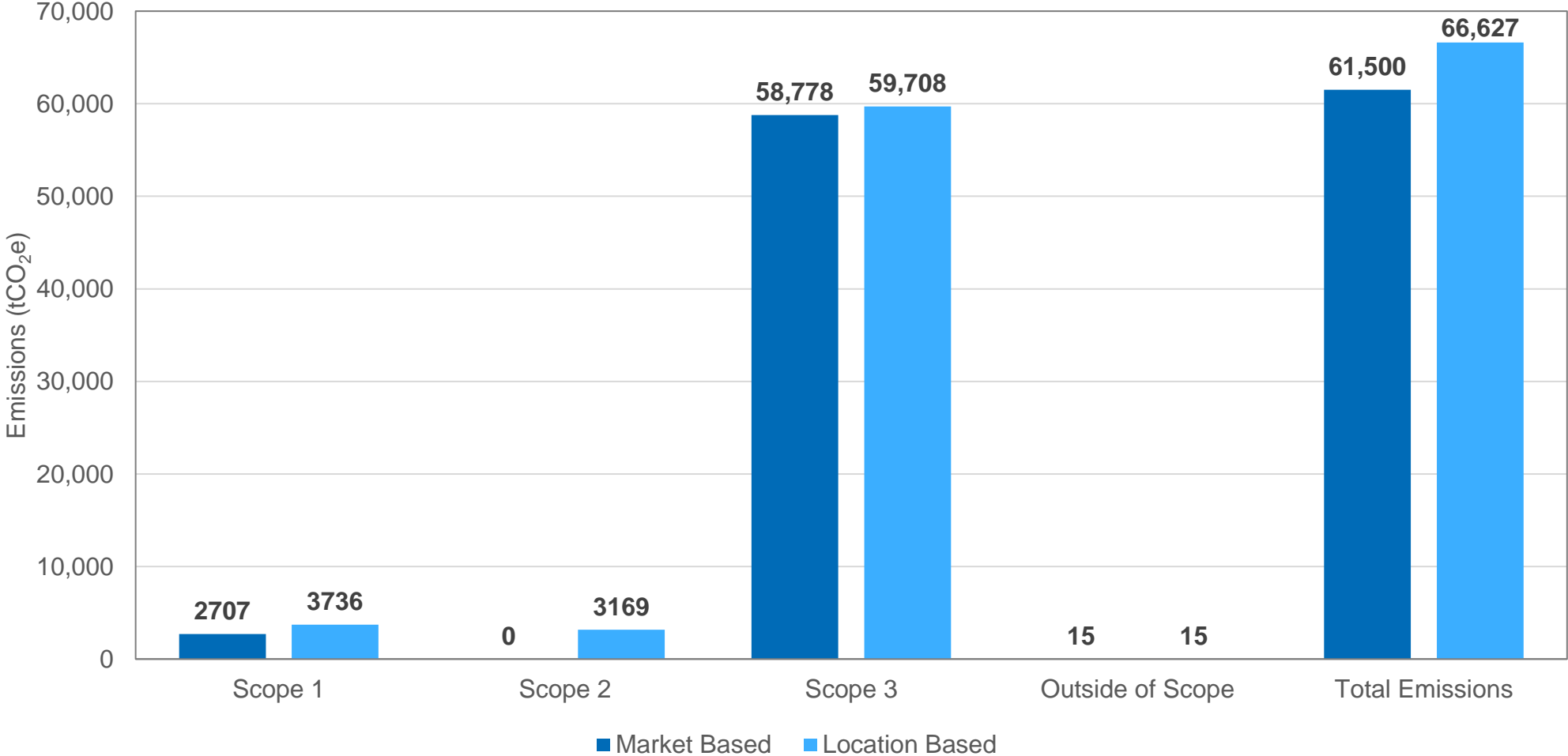
Scope 1 % y-o-y change	-8%	-8%	-6%	24%	48%	-32%
Scope 2 % y-o-y change	-6%	-42%	-17%	-7%	-26%	-6%
Scope 1 & 2 % y-o-y change	-6%	-35%	-14%	3%	2%	-6%
Scope 3 % y-o-y change	1%	-1%	0%	-3%	-57%	18%
Outside of Scope	-20%	21%	305%	56%	-31%	0%
<b>Total % y-o-y change</b>	<b>0%</b>	<b>-4%</b>	<b>-1%</b>	<b>-2%</b>	<b>-54%</b>	

\* In 2017 tenant energy is moved to Scope 3.

# 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.



# Annual Emissions Trends - 3



Location Based Emissions (tCO2e)	2016	2017	2018	2019	2020	2021
<b>Scope 1 – Total</b>	<b>2,508</b>	<b>2,306</b>	<b>2,164</b>	<b>2,682</b>	<b>3,980</b>	<b>3,736</b>
Airport natural gas	1,849	1,817	1,607	2,104	3,350	2,693
Airport de-icer					415	498
Airport operational vehicles	376	427	439	534	208	156
Refrigerants	282	60	100	30	6	379
Fire training	2	2	17	2	1	9
Gas oil				12	0	0
Business travel (fuel purchase)			1.43	0.08	0.02	0.05
<b>Scope 2 – Total</b>	<b>10,003</b>	<b>5,845</b>	<b>4,861</b>	<b>4,544</b>	<b>3,376</b>	<b>3,169</b>
Airport electricity	10,003	5,845	4,861	4,544	3,376	3,169
<b>Scope 3 - Total</b>	<b>122,850</b>	<b>121,287</b>	<b>120,765</b>	<b>117,536</b>	<b>50,472</b>	<b>59,708</b>
Aircraft movements	102,094	96,428	98,822	89,034	38,882	49,167
Passenger surface access	13,634	14,599	13,197	13,042	2,309	2,443
Staff commute	619	631	544	6,679	4,231	3,521
Waste	3,703	4,188	3,008	3,328	1,753	1,750
Electricity T&D & WTT (Gen, T&D)	2,543	2,291	1,731	1,647	1,060	1,523
Third party de-icer					531	198
Third party operational vehicles			914	755	282	141
Water	63	178	184	233	112	37
Aircraft engine tests	194	124	84	83	101	2
Tenant natural gas		142	82	181	71	7
Business travel			28	129	24	4
Tenant electricity		2,707	2,170	2,426	1,118	927
<b>Outside of Scope - Total</b>	<b>3</b>	<b>3</b>	<b>14</b>	<b>21</b>	<b>15</b>	<b>15</b>
Operational vehicles (diesel)	3	3	14	21	12	12
Fire training (diesel and wood)	0.02	0.00	0.00	0.02	3.03	3
<b>Total</b>	<b>135,364</b>	<b>129,442</b>	<b>127,803</b>	<b>124,784</b>	<b>57,842</b>	<b>66,641</b>



# Annual Emissions Trends - 4

Emissions sources with largest changes from 2020:

- Refrigerant Gas use (Scope 1) emissions **increased** by 6220%.
- Aircraft movements (Scope 3) emissions **increased** by 26%.
- Passenger surface access (Scope 3) emissions **increased** by 6%.
- Tenant natural gas (Scope 1) emissions **reduced** by 90%.
- Fire training emissions **reduced** by 40%, primarily as a result of the reduced use of LPG.
- Airport natural gas (Scope 1) emissions **reduced** by 20%.

Emissions sources with largest changes from 2020, as a result of restrictions from Covid-19:

- Business travel (Scope 3) emissions **reduced** by 81%.
- Water supply (Scope 3) emissions **reduced** by 79%.
- Operational vehicles (Scope 1 and 3) emissions **reduced** by 38%.
- Staff commute (Scope 3) emissions **reduced** by 17%.

# Annex - Climb, Cruise and Descent Emissions



Emissions from the Climb, Cruise and Descent (CCD) stage of aircrafts going to/from Edinburgh Airport have been estimated in addition to the carbon footprint and can be seen below:

	2021 (tCO <sub>2</sub> e)
<b>CCD</b>	187,935

Outlined in the ACA scheme, CCD emissions have been allocated using the half way approach: Where emissions from half of the distance of all flights going to/from the airports is allocated to the reporting airport.

Flight distance was calculated with the great circle equation, utilising the origin and destination airport latitude and longitude. This flight distance was uplifted by 5.5% to reflect the fact that aircraft do not fly in a perfect straight line from one airport to another. This figure has come from studies carried out by Ricardo Energy and Environment for the UK Department for Transport, and is an update to the commonly used figure of 9%.

Fuel kg/km in-flight for each aircraft type is calculated using data from the EMEP-EEA Fuel Database.

Emissions are calculated from the fuel consumption per flight, using the BEIS emissions factor for aviation turbine fuel.

No non-carbon warming impacts have been taken into account as part of the CCD emissions.

Term	Definition
<b>Arisings</b>	Materials forming the secondary or waste products of industrial operations.
<b>ATM</b>	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.
<b>Carbon dioxide equivalent (CO<sub>2</sub>e)</b>	The carbon dioxide equivalent (CO <sub>2</sub> e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO <sub>2</sub> . CO <sub>2</sub> e is calculated by multiplying the emissions of each of the six greenhouse gases by its 100-year global warming potential (GWP).
<b>Carbon footprint</b>	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 <sub>2</sub> e).
<b>Emission factor</b>	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.
<b>GHG</b>	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.
<b>PAX</b>	Number of passengers.
<b>APU</b>	Auxiliary power unit.
<b>CAA</b>	Civil Aviation Authority



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