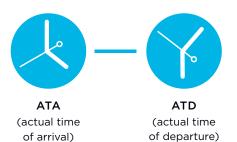# How we calculate aircraft emissions in New Zealand controlled airspace

1

Calculate flight time

Airways calculates GHG emissions using the Collaborative Arrivals Manager (CAM) system, based on data from New Zealand's radar coverage area.

ATA
(actual time of arrival)

ATD
(actual time of departure)

For flights without an ATA, use an **average** duration of 40 minutes. For international flights, **add** on an average duration of 40 minutes of international flight time.

2

Calculate fuel used in litres

Aircraft are separated into five categories each with its own average fuel burn rate using historic data from airline operators.

HEAVY JETS (IFR)
120 kg/min – Jet A1

SINGLE AISLE JETS (IFR)
38 kg/min – Jet A1

TURBO-PROPS (IFR)
13 kg/min – Jet A1

NON JET AIRCRAFT AND AIRCRAFT OPERATING UNDER VISUAL FLIGHT RULES
5 kg/min (Avgas)

Multiply flight time by the average burn rate for each category to get the monthly fuel burn.

3

Convert fuel burn to litres

Convert fuel burn to litres using MBIE (Ministry of Business Innovation & Employment) Oil Data Tables **> LINK**

JET A1 =
0.79

AVGAS =
0.72

4

GHG Inventory tCO_2e calculation

Convert litres of fuel to tCO_2e using the latest MfE Measuring Emissions Factors Workbook.
> LINK

Multiply litres by emission factors for:

Carbon Dioxide (CO_2)
Methane (CH_4)
Nitrous Oxide (N_2O)

Total results

5

Calculate Radiative Forcing

Flights above 25,000 feet have a greater warming impact, due to radiative forcing.

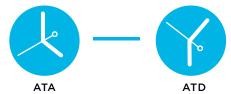**Multiply** CO_2 emissions by 1.7 for flight time above 25,000 feet and add to the tCO_2e result

Notes: For calculating flight times:

- Most flights have an ATD set, but flights arriving below radar coverage or switching from IFR to VFR mid-flight won't have an ATA set. An average flight duration of 40 minutes is used for non ATA flights.

- Airways has no way of identifying actual entry and exit times of international flights crossing the 200 nautical miles limit, so an additional average flight duration of 40 minutes per flight has been added for international flights.

How we calculate aircraft emissions in New Zealand controlled airspace

1
Calculate flight duration

ATA — ATD

2
Calculate fuel used in litres
EXAMPLE

HEAVY JETS (IFR)
120 kg/min (Jet A1)

3
Convert fuel burn to litres
EXAMPLE

JET A1 =
0.79

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GHG Inventory tCO2e calculation

Multiply litres by emission factors for:

Carbon Dioxide (CO_2)
Methane (CH_4)
Nitrous Oxide (N_2O)

5
Calculate Radiative Forcing

Multiply CO_2 emissions for the flight time above 25,000 feet by 1.7 and add to the tCO_2e result.

Total results