

2020 Greenhouse Gas Inventory Report

Introduction

This document is the annual greenhouse gas (GHG) emissions inventory report for the Air New Zealand group of companies for the period 1 July 2019 to 30 June 2020. Air New Zealand's reporting process and emissions classifications are consistent with international protocols and standards. This report has been written in accordance with *The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard, Revised Edition ('Greenhouse Gas Protocol')*.

Table 1: Greenhouse gas emissions inventory summary for Air New Zealand 2020

| Scope | Category | CO ₂ -e Emissions (Tonnes) | | | | | | |
|---|--|---------------------------------------|------------------|------------------|------------------|------------------|--------------------------|------------------|
| | | FY2011 (Baseline) | FY2011 v2* | FY2016 | FY2017 | FY2018 | FY2019 (New MfE Factors) | FY2020 |
| 1 | Jet Fuel - Domestic | 530,404 | 551,837 | 569,627 | 602,354 | 617,247 | 629,876 | 518,607 |
| | Jet Fuel - International | 2,418,347 | 2,516,069 | 2,864,266 | 3,008,305 | 3,103,359 | 3,286,502 | 2,649,922 |
| | Jet Fuel - Ground | | 0 | | | 1,445 | 941 | 1,180 |
| | LPG | 3,610 | 3,610 | 2,394 | 1,630 | 2,063 | 1,579 | 1,437 |
| | Natural Gas | 2,520 | 2,520 | 2,292 | 2,458 | 2,621 | 2,732 | 2,275 |
| | Diesel | 977 | 977 | 3,571 | 3,370 | 3,441 | 3,935 | 3,129 |
| | Bio-Diesel | 1,194 | 1,194 | 0 | 0 | 0 | 0 | 0 |
| | Petrol | 84 | 84 | 151 | 46 | 56 | 73 | 67 |
| | Coal | 2246 | 2,246 | 0 | 0 | 0 | 0 | 0 |
| | Wood Pellets(CH ₄ and N ₂ O) | 20 | 20 | 19 | 15 | 13 | 13 | 18 |
| Total Scope 1 | | 2,959,402 | 3,078,557 | 3,442,320 | 3,618,179 | 3,730,246 | 3,925,650 | 3,176,634 |
| 2 | Electricity | 7,246 | 7,246 | 3,636 | 2,624 | 3,044 | 3,098 | 2,832 |
| Total Scope 2 | | 7,246 | 7,246 | 3,636 | 2,624 | 3,044 | 3,098 | 2,832 |
| Total CO₂-e Emissions (Scope 1 and 2) | | 2,966,648 | 3,085,803 | 3,445,956 | 3,620,802 | 3,733,290 | 3,928,748 | 3,179,466 |
| Biomass | Wood Pellets (CO ₂) | 1,423 | 1,423 | 1,235 | 998 | 638 | 725 | 1,050 |

Note: In 2019, New Zealand Ministry for the Environment released a new set of greenhouse gas emissions factors for organisational reporting, including for the first time an emissions factor for aviation fuel. Air New Zealand has adopted this figure to stay consistent with national greenhouse gas inventory guidance, a process which has included updating our baseline inventory and inventories for financial years 2016 to 2019. Note a correction was made to the use of this factor for the 2020 financial year, which has been implemented for all previous years.

Organisational Boundary

Air New Zealand's organisational boundary encompasses the companies listed in the table below. Apart from where indicated, Air New Zealand has operational control of these companies.

Table 2: Air New Zealand’s Organisational Boundary

| List of all legal entities or facilities over which Air New Zealand has equity share, financial control or operational control | % equity share in legal entity | Does reporting company have operational control? (yes/no) | Does entity or facility produce GHG emissions (yes/no)? If yes, are they included in the GHG inventory figures (yes/no)? |
|--|--------------------------------|---|--|
| ADP (New Zealand) Limited | 100% | Yes | Yes/Yes |
| Air Nelson Limited | 100% | Yes | Yes/Yes |
| Air New Zealand Regional Maintenance Limited | 100% | Yes | Yes/Yes |
| Air New Zealand Travel Business Limited | 100% | Yes | No |
| Eagle Airways Limited | 100% | Yes | Yes/Yes |
| Mount Cook Airline Limited | 100% | Yes | Yes/Yes |
| Teal Insurance Limited | 100% | Yes | No |
| Air New Zealand Aircraft Holdings Limited | 100% | Yes | No |
| Air New Zealand Associated Companies Limited | 100% | Yes | No |
| Air New Zealand Associated Companies (Australia) Limited | 100% | Yes | No |
| Air New Zealand Express Limited | 100% | Yes | No |
| Ansett Australia & Air New Zealand Engineering Services Limited | 100% | Yes | No |
| Air New Zealand (Australia) Pty Limited ¹ | 100% | Yes | No |
| ANZGT Field Services LLC ¹ | 51% | No | Yes/No |
| 11ANTS Analytics Group Limited ¹ | 100% | No | No |
| ANNZES Engines Christchurch Limited | 100% | Yes | No |

Notes to Table 2:

¹ Joint Control - Air NZ does not control the operations of ANZGT based on the definition given in *The Greenhouse Gas Protocol*.

Air New Zealand applies an operational control approach allowing the company to focus on those emissions sources over which it has control and can therefore implement management actions, consistent with Air New Zealand’s corporate responsibility objectives.

Operational Boundary

Air New Zealand has chosen to report on Scope 1 and 2 emissions, given that emissions from the use of aviation jet fuel are the most significant emissions source in the organisation’s value chain and are under Air New Zealand’s ability to manage and influence.

Baseline Year

The base year is 1 July 2010 to 30 June 2011. This was chosen as the base year because it was the first year that Air New Zealand had complete data for Scope 1 and 2 emissions. If Air New Zealand's Scope 1 or 2 emissions were to change by more than 10% due to company or portfolio acquisitions or divestments, it acknowledges a base year recalculation would be appropriate.

Methodologies and uncertainties

Air New Zealand used Microsoft Excel spreadsheets to calculate greenhouse gas emissions. Emissions for Scope 1 and 2 have been quantified using the calculation method based on activity data multiplied by greenhouse gas emissions factors. Emissions factors have been sourced from the following publicly available publications:

Table 3: Emissions Factors and Sources

| Source | Unit measure | Emission Factor (kg CO ₂ e/Unit) | | | | Reference |
|-----------------------------------|--------------|---|-----------------|-----------------|------------------|-----------|
| | | Total | CO ₂ | CH ₄ | N ₂ O | |
| Aviation Fuel (Kerosene) / Jet A1 | litre | 2.627 | 2.538 | 0.018 | 0.071 | 1 |
| Liquefied Petroleum Gas (LPG) | kg | 3.03 | 3.021 | 0.006 | 0.001 | 1 |
| Natural gas | GJ | 54.01 | 53.96 | 0.02 | 0.03 | 1 |
| Electricity | kWh | 0.0977 | 0.09322 | 0.00439 | 0.00009 | 1 |
| Diesel (automotive) | litre | 2.694 | 2.648 | 0.003539 | 0.042 | 1 |
| Regular Petrol | litre | 2.453 | 2.346 | 0.028 | 0.080 | 1 |
| Wood Pellets | kg | 0.0150 | 0.862 | 0.006 | 0.009 | 1 |
| Waste to landfill | kg | 1.17 | | 1.171 | | 1 |

References:

- 1 Measuring Emissions: A Guide for Organisations – 2019 - Emission Factors Workbook using data and methods from the 2016 calendar year – New Zealand Ministry for the Environment

To minimise uncertainties in the accuracy of this inventory, data has been sourced wherever possible from a verifiable source as detailed in the inclusions table.

Verification of GHG Inventory

Greenhouse gas emission calculations and emission factors published in this report were reviewed by a 3rd party. Processes and emission classifications are consistent with international protocols and standards.

Table 4: 2020 Greenhouse gas emissions by greenhouse gas

| Source | Units | Volume | Emission Factor (t CO ₂ -e/unit) [*] | | | | Emissions (t CO ₂ -e) | | | |
|---|-------------------|---------------------|--|-----------------|-----------------|------------------|----------------------------------|--------------------|-----------------|------------------|
| | | | Total | CO ₂ | CH ₄ | N ₂ O | Total | CO ₂ | CH ₄ | N ₂ O |
| Scope 1 Emissions | | | | | | | | | | |
| Jet Fuel - Domestic | 000 litres | 197,411.71 | 2.627 | 2.538 | 0.018 | 0.071 | 518,607 | 501,124.0 | 3,525.9 | 13,956.8 |
| Jet Fuel - International | 000 litres | 1,008,713.34 | 2.627 | 2.538 | 0.018 | 0.071 | 2,649,922 | 2,560,590.2 | 18,016.5 | 71,315.2 |
| Jet Fuel - Ground | 000 litres | 449.00 | 2.627 | 2.538 | 0.018 | 0.071 | 1,180 | 1,139.8 | 8.0 | 31.7 |
| Jet Fuel - Total | 000 litres | 1,206,574.05 | 2.627 | 2.538 | 0.018 | 0.071 | 3,169,708 | 3,062,854.0 | 21,550.4 | 85,303.8 |
| LPG | Tonnes | 474.49 | 3.029 | 3.021 | 0.006 | 0.001 | 1,437 | 1,433.6 | 2.8 | 0.7 |
| Natural Gas | TJ | 42.12 | 54.006 | 53.957 | 0.023 | 0.027 | 2,275 | 2,272.6 | 0.9 | 1.1 |
| Diesel ¹ | 000 litres | 1,080.57 | 2.694 | 2.648 | 0.004 | 0.042 | 2,911 | 2,861.5 | 3.8 | 45.6 |
| Diesel ² | 000 litres | 81.00 | 2.694 | 2.648 | 0.004 | 0.042 | 218 | 214.5 | 0.3 | 3.4 |
| Diesel - Total | 000 litres | 1,161.57 | 2.694 | 2.648 | 0.004 | 0.042 | 3,129 | 3,076.0 | 4.1 | 49.0 |
| Petrol ¹ | 000 litres | 27.18 | 2.453 | 2.346 | 0.028 | 0.080 | 67 | 63.8 | 0.7 | 2.2 |
| Wood pellets (CH ₄ and N ₂ O) | Tonnes | 1,218.83 | 0.015 | | 0.006 | 0.009 | 18 | - | 7.0 | 11.2 |
| Total Scope 1 | | | | | | | 3,176,634 | 3,069,700 | 21,566 | 85,368 |
| Scope 2 Emissions | | | | | | | | | | |
| Electricity | kWh | 28,988,153 | 9.77E-05 | 9.32E-05 | 4.39E-06 | 8.61E-08 | 2,832 | 2,702 | 127 | 2 |
| Total Scope 2 | | | | | | | 2,832 | 2,702 | 127 | 2 |
| Total Emissions Scope 1 & 2 | | | | | | | 3,179,466 | | | |
| Biomass Emissions: Wood pellets (CO₂) | Tonnes | 1,218.83 | | 0.862 | - | - | 1,050 | 1,050 | - | - |

Notes to Table 4:

*Air New Zealand does not have emissions of SF₆, PFCs, or NF₃. Emissions from HFCs have been excluded as de minimus (see exclusions table).

1. Actual figures from five main NZ ports (diesel only) and light vehicle fleet (diesel and petrol).

2. Estimated figures for GSE diesel at regional ports and Rarotonga and testing of hangar deluge systems at Auckland.

Table 5: Inclusions

| Scope | Category | GHG Emissions Source | Data Source | Methodology, data quality, uncertainty (qualitative) |
|-------|-------------------------------|--|---|---|
| 1 | Aviation Fuel | Fuel used to operate aircraft domestic and international | Records from supplier invoices. | Accurate records of fuel purchased. |
| | Aviation fuel (ground) | Fuel used to ground test engines. | Fuel reconciliation process | Meters; tank dips and fuel receipts |
| | LPG | Fuel used for heating and GSEs | Records from supplier invoices. | Accurate records of fuel purchased. |
| | Natural Gas | Fuel used for heating | Records from supplier invoices. | Accurate records of fuel purchased. |
| | Ground Bio Diesel | Fuel for ground vehicle fleet | Records from supplier invoices. | (N/A in current reporting period, however included in base year.) |
| | Diesel¹ | Fuel for light vehicle fleet in New Zealand | Records from supplier (Cardlink and Z card) invoices. | Accurate records of fuel purchased. |

| | | | | |
|------------------|---------------------|--|---|---|
| | | Fuel for Ground Support Equipment at New Zealand's five main ports. | Records from supplier (Mini Tankers) | Accurate records of fuel purchased. |
| | Diesel ² | Fuel for Ground Support Equipment at regional New Zealand ports and Rarotonga. | Estimated for Regional ports and Rarotonga. | Estimated based on diesel used at the 5 main NZ ports. |
| | | Fuel testing hangar deluge systems at Auckland. | Fuel reconciliation process | Accurate records fuel reconciliation. |
| | Petrol ¹ | Fuel for light vehicle fleet in New Zealand. | Records from supplier (Cardlink and Z card) invoices. | Accurate records of fuel purchased. |
| | Coal | Not used during relevant reporting period. | No invoices held for relevant reporting period. | N/A in current reporting period, however included in base year. |
| 2 | Electricity | Electricity used in offices and facilities in New Zealand | Records from supplier invoices validated by energy meters | Accurate records of electricity purchased. |
| Biomass Emission | Wood Pellets | Fuel used for heating | Records from supplier invoices. | Records of wood pellets purchased from different suppliers. |

Notes to Table 5:

¹ Diesel (Ground Support Equipment) and Light vehicle fleet assumptions & exclusions

Includes diesel consumed at the five main New Zealand domestic airports - Auckland, Wellington, Christchurch, Nelson and Dunedin. (1,014,795litres)

Air New Zealand has 126 fleet vehicles consisting 20% fully battery electric; 21% battery electric hybrid; 13% plug in electric hybrid; 1.5% hybrid heavy vehicle. 36% diesel/petrol.

- Air New Zealand owns 19 vehicles. These vehicles are normally old and located at Regional Maintenance Ltd, Engineering and Maintenance or Subsidiaries. There is no visibility on fuel consumption for these vehicles.
- There are 13 light vehicles offshore. There is no visibility on fuel consumption for these vehicles.

² Diesel (Ground Support Equipment) at New Zealand regional ports including Rarotonga and testing of hangar deluge systems at Auckland.

At the time of writing, Air New Zealand had no data on diesel consumption at regional ports and Rarotonga. The following assumptions were made;

- 10 diesel GPUs (Ground Power Units) at regional ports and Rarotonga. Based on 4000 litres per year (the average diesel GPU use at the four NZ domestic ports) the estimate for diesel use is 40,000 litres per year.
- 6 Tugs at regional and ports and Rarotonga. Based on 600 Litres per year (the average diesel Tug use at Dunedin) - the estimate for diesel use is 3600 Litres
- 4 pushback tractors at regional ports and Rarotonga. Based on 900 Litres per year (the average diesel Tug use at Dunedin) - the estimate for diesel use is 3600 Litres
- 5 belt loaders at regional ports and Rarotonga. Based on 300 Litres per year (the average diesel Tug use at Dunedin) - the estimate for diesel use is 1500 Litres
- 9 fork hoists at regional ports and Rarotonga. Based on 300 Litres per year (the average diesel fork hoist use at Dunedin) - the estimate for diesel use is 2700 Litres
- 12 aircraft container loaders at regional ports and Rarotonga. Based on 1800 Litres per year (the average diesel Transporter use at Dunedin) - the estimate for diesel use is 21,600 Litres
- 3 de-icing trucks at regional ports. Based on 1000 Litres per year (the average diesel Truck use at Dunedin) - the estimate for diesel use is 3000 Litres.
- 3 ambulift at regional ports and Rarotonga. Based on 400 litres per year the estimate for diesel use is 1200 litres.
- A toilet truck in the regional ports. Estimated diesel consumption is 1000 litres.
- A truck mounted stair at regional ports. Estimated diesel consumption is 250 litres.
- 7 motorised stairs at regional ports and Rarotonga. Estimated diesel consumption is 250 litres.

Estimations for diesel consumption at regional ports and Rarotonga is 78,700 litres and diesel used to power Auckland hangar deluge systems is estimated at 2,300 litres.

Total estimated diesel consumption is 81,000 litres.

Exclusion:

- Estimates of diesel consumption when testing Christchurch deluge systems was not available at the time of this report. Consumption is considered minimal.

¹ Petrol light vehicle fleet

Air New Zealand has 126 fleet vehicles consisting 20% fully battery electric; 21% battery electric hybrid; 13% plug in electric hybrid; 1.5% hybrid heavy vehicle. 36% diesel/petrol.

27,180 litres of petrol was purchased for the fleet through Cardlink & Z Card.

Exclusion:

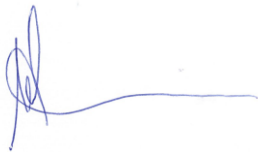
- Air New Zealand owns 19 vehicles. These vehicles are normally old and located at Regional Maintenance Ltd, Engineering and Maintenance or Subsidiaries. There is no visibility on fuel consumption for these vehicles.
- There are 13 light vehicles offshore. There is no visibility on fuel consumption for these vehicles.

Exclusions

The following exclusions are **estimated to be** less than 5% of Air New Zealand’s total Greenhouse Gas emissions.

Table 6: Exclusions

| Scope | Category | GHG Emissions Source | Reason for Exclusion |
|-------|--------------------|---|---|
| 1 | Fugitive Emissions | Fugitive emissions from air-conditioning systems. | Difficult to obtain the data, estimated to be <i>de minimus</i> . |
| 1 | Petrol and Diesel | Owned light vehicle fleet (19) and offshore vehicles (13) Diesel used to test hangar deluge systems in Christchurch. | Difficult to obtain the data, estimated to be <i>de minimus</i> . |
| 1 | LPG | Swap a bottle for Ground Support Equipment in Wellington. | Difficult to obtain the data, estimated to be <i>de minimus</i> . |
| 2 | Electricity | Used in buildings/facilities in overseas locations | Difficult to obtain the data, estimated to be <i>de minimus</i> . |



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August 2020