

## FY2019 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 2018 to 30 June 2019. 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 2019**

Scope	Category	CO <sub>2</sub> -e Emissions (Tonnes)					
		FY2011 (Baseline)	FY2011 v2*	FY2016	FY2017	FY2018	FY2019 (New MIE Factors)
1	Jet Fuel - Domestic	530,404	487,468	503,183	532,092	545,248	556,404
	Jet Fuel - International	2,418,347	2,222,581	2,530,162	2,657,400	2,741,366	2,903,146
	Jet Fuel - Ground		0			1,276	831
	LPG	3,610	3,610	2,394	1,630	2,063	1,579
	Natural Gas	2,520	2,520	2,292	2,458	2,621	2,732
	Diesel	977	977	3,571	3,370	3,441	3,935
	Bio-Diesel	1,194	1,194	0	0	0	0
	Petrol	84	84	151	46	56	73
	Coal	2246	2,246	0	0	0	0
	Wood Pellets(CH <sub>4</sub> and N <sub>2</sub> O)	20	20	19	15	13	13
<b>Total Scope 1</b>		<b>2,959,402</b>	<b>2,720,699</b>	<b>3,041,771</b>	<b>3,197,011</b>	<b>3,296,085</b>	<b>3,468,712</b>
2	Electricity	7,246	7,246	3,636	2,624	3,044	3,098
<b>Total Scope 2</b>		<b>7,246</b>	<b>7,246</b>	<b>3,636</b>	<b>2,624</b>	<b>3,044</b>	<b>3,098</b>
<b>Total CO<sub>2</sub>-e Emissions (Scope 1 and 2)</b>		<b>2,966,648</b>	<b>2,727,945</b>	<b>3,045,407</b>	<b>3,199,635</b>	<b>3,299,129</b>	<b>3,471,811</b>
Biomass	Wood Pellets (CO <sub>2</sub> )	1,423	1,423	1,235	998	638	725

**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

### 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
AirNewZealandTravelBusiness 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
AirNewZealand(Australia)Pty Limited <sup>1</sup>	100%	Yes	No
ANZGT Field Services LLC <sup>1</sup>	51%	No	Yes/No
11ANTS AnalyticsGroup	100%	No	Yes/No
ANNZES Engines Christchurch Limited <sup>2</sup>	100%	Yes	No

**Notes to Table 2:**

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

<sup>2</sup> Non-trading entity.

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 GHG emissions. Emissions for Scope 1 and 2 have been quantified using the calculation method based on activity data multiplied by GHG 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 <sub>2</sub> e/Unit)				Reference
		Total	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	
Jet fuel	l	2.525				2
Jet fuel	l		2.02	0.00151	0.02110	3
Liquefied Petroleum Gas (LPG)	kg	3.03	3.02	0.00594	0.00142	1
Natural gas	GJ	53.86	53.81	0.0225	0.0268	1
Electricity	kWh	0.098				4
Diesel (automotive)	l	2.72	2.67	0.00356	0.0424	1
Regular Petrol	l	2.44	2.33	0.0246	0.0793	1
Wood Pellets	kg	0.015	1	0.00578	0.00918	1

**References:**

- 1 Ministry for the Environment – Guidance for Voluntary Corporate Greenhouse Gas Reporting – 2016, Using Data and Methods from the 2014 Calendar Year.
- 2 Climate Change (Liquid Fossil Fuels) Regulations 2008 (SR 2008/356) (as at 29 December 2015)
- 3 National Greenhouse Accounts Factors (Australia) July 2018: Department of Environment. Jet fuel assumed to be gasoline
- 4 2019 MfE Factors

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

This report has been verified by Deloitte, a third-party independent assurance provider. A reasonable level of assurance has been given over the assertions and quantifications included here. Deloitte is also the financial auditor of Air New Zealand on behalf of the Office of the Auditor-General.

**Table 4: 2019 Greenhouse gas emissions by greenhouse gas**

Source	Units	Volume	Emission Factor (t <sub>2</sub> CO <sub>2</sub> -e/unit)				Emissions (t CO <sub>2</sub> -e)			
			Total	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<b>Scope 1 Emissions</b>										
Jet Fuel - Domestic (000 USG)	000 litres	239,767.11	2,321	2,240	0.016	0.064	556,404	537,078.3	3,908.2	15,417.0
Jet Fuel - International (000 USG)	000 litres	1,251,032.58	2,321	2,240	0.016	0.064	2,903,146	2,802,313.0	20,391.8	80,441.4
Jet Fuel - Ground (akl & chc test cells)	000 litres	358.15	2,321	2,240	0.016	0.064	831	802.3	5.8	23.0
<b>Jet Fuel - Total</b>	000 litres	1,491,157.84	2,321	2,240	0.016	0.064	3,460,381	3,340,193.6	24,305.9	95,881.4
LPG (RML full year @ 91.028L) + E&M (576.97t)	Tonnes	521.34	3,029	3,021	0.006	0.001	1,579	1,575.1	3.1	0.7
Natural Gas (Shown as GJ )	TJ	50.58	54,006	53,957	0.023	0.027	2,732	2,729.3	1.1	1.4
Diesel <sup>1</sup>	000 litres	1,373.00	2,694	2,648	0.004	0.042	3,699	3,635.9	4.9	57.9
Diesel <sup>2</sup>	000 litres	87.90	2,694	2,648	0.004	0.042	237	232.8	0.3	3.7
<b>Diesel - Total</b>	000 litres	1,460.90	2,694	2,648	0.004	0.042	3,935	3,868.7	5.2	61.6
Petrol <sup>1</sup>	000 litres	29.61	2,453	2,346	0.028	0.080	73	69.5	0.8	2.4
Wood pellets (CH <sub>4</sub> and N <sub>2</sub> O)	Tonnes	841.95	0.015		0.006	0.009	13	-	4.9	7.7
<b>Total Scope 1</b>							<b>3,468,712</b>	<b>3,348,436</b>	<b>24,321</b>	<b>95,955</b>
<b>Scope 2 Emissions</b>										
Electricity	kWh	31,709,770	9.77E-05	9.32E-05	4.39E-06	8.61E-08	3,098	2,956	139	3
<b>Total Scope 2</b>							<b>3,098</b>	<b>2,956</b>	<b>139</b>	<b>3</b>
<b>Total Emissions Scope 1 &amp; 2</b>							<b>3,471,811</b>			
<b>Biomass Emissions: Wood pellets (CO<sub>2</sub>)</b>	Tonnes	841.95	0.014961168	0.861564	-	-	13	725	-	-

### Notes to Table 4:

\*Air New Zealand does not have emissions of SF<sub>6</sub>, PFCs, or NF<sub>3</sub>. Emissions from HFCs have been excluded as de minimus (see exclusions table).

1. Actual figures from four 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	<b>Aviation Fuel</b>	Fuel used to operate aircraft domestic and international	Records from supplier invoices.	Accurate records of fuel purchased.
	<b>Aviation fuel (ground)</b>	Fuel used to ground test engines.	Fuel reconciliation process	Meters; tank dips and fuel receipts
	<b>LPG</b>	Fuel used for heating and GSEs	Records from supplier invoices.	Accurate records of fuel purchased.
	<b>Natural Gas</b>	Fuel used for heating	Records from supplier invoices.	Accurate records of fuel purchased.
	<b>Ground Bio Diesel</b>	Fuel for ground vehicle fleet	Records from supplier invoices.	(N/A in current reporting period, however included in base year.)

	<b>Diesel<sup>1</sup></b>	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 (GSE) at New Zealand's four main ports.	Records from supplier (Mini Tankers)	Accurate records of fuel purchased.
	<b>Diesel<sup>2</sup></b>	Fuel for Ground Support Equipment at regional New Zealand ports and Rarotonga.	Estimated for Regional ports and Rarotonga.	Estimated based on GSE diesel used at the 4 main NZ ports.
		Fuel testing hangar deluge systems at Auckland.	Fuel reconciliation process	Accurate records fuel reconciliation.
	<b>Petrol<sup>1</sup></b>	Fuel for light vehicle fleet in NZ	Records from supplier (Cardlink and Z card) invoices.	Accurate records of fuel purchased.
	<b>Coal</b>	Not used during relevant reporting period.	No invoices held for relevant reporting period.	N/A in current reporting period, however included in base year.
<b>2</b>	<b>Electricity</b>	Electricity used in offices and facilities in New Zealand	Records from supplier invoices validated by energy meters	Accurate records of electricity purchased.
<b>Biomass Emissions</b>	<b>Wood Pellets</b>	Fuel used for heating	Records from supplier invoices.	Records of wood pellets purchased from different suppliers.

**Notes to Table 5:**

**<sup>1</sup> Diesel (Ground Support Equipment) and Light vehicle fleet assumptions & exclusions**

Includes diesel consumed at the four main New Zealand domestic airports - Auckland, Wellington, Christchurch and Dunedin. (1,373,489 litres)

Air New Zealand has 140 fleet vehicles consisting 18% fully battery electric; 26% battery electric hybrid; 11% plug in electric hybrid; .7% hybrid heavy vehicle. 44.3% diesel petrol. Petrol is purchased through Cardlink & Z Card (29,608 litres)

- 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.

**<sup>2</sup> Diesel (Ground Support Equipment) at New Zealand regional ports and Rarotonga, and testing of hangar deluge systems at Auckland.**

At the time of writing, Air NZ did not have data on diesel used at regional ports and Rarotonga. The following assumptions

were made;

There are 15 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 60,000 litres per year.

There are 8 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 4800 Litres

There are 3 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 2700 Litres

There are 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

There are 12 forkhoists 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 3600 Litres

There are 5 transporter 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 9000 Litres

There are 4 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 4000 Litres

Estimations for diesel consumption at regional ports and Rarotonga (85600 litres.) Diesel is used to power Auckland hangar deluge systems which are tested monthly. Estimations for diesel consumption for deluge systems (2300 Litres).

**Exclusion:**

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

**<sup>1</sup> Petrol light vehicle fleet**

Air New Zealand has 140 fleet vehicles consisting 18% fully battery electric; 26% battery electric hybrid; 11% plug in electric hybrid; .7% hybrid heavy vehicle. 44.3% diesel petrol. Petrol is purchased through Cardlink & Z Card (29,608 litres)

Petrol purchased through Cardlink & Z card (unleaded 91 25,522 litres; unleaded 95 Octane 4,085 litres)

**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 GHG 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)	Difficult to obtain the data, estimated to be <i>de minimus</i> .

		Diesel used to test hangar deluge systems in Christchurch.	
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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