

The background of the entire page is an aerial photograph of a winding asphalt road cutting through a dense, lush green forest. In the distance, rolling hills and mountains are visible under a clear sky. Two blue trucks are driving on the road, one in the foreground and one further down the road.

# GREENHOUSE GAS EMISSIONS INVENTORY REPORT

<b>Inventory Scope:</b>	<b>Mainfreight Global</b>
<b>Reporting Period:</b>	<b>1 January 2022 to 31 December 2022</b>
<b>Version:</b>	<b>1.0</b>
<b>Audit Status:</b>	<b>Verified</b>

# CONTENTS

<b>CHAPTER 1: GENERAL DETAILS, PURPOSE AND POLICY</b>	<b>3</b>
1.1 Introduction	3
1.2 Purpose	3
1.3 Description of Mainfreight	3
1.3.1 GHG and Sustainability Policies, Strategies and Programmes	3
1.4 Persons Responsible	4
1.4.1 Team Training for the Preparation of this Emissions Inventory and GHG Report	5
1.5 Audience and Dissemination Policy	5
1.6 Reporting Period and Frequency of Reporting	5
1.7 Reporting Standards, Approach and Verification	5
1.7.1 Compliance with ISO 14064-1:2018	5
1.7.2 Audit of GHG Inventory	5
<b>CHAPTER 2: ORGANISATIONAL BOUNDARIES</b>	<b>6</b>
2.1 Consolidation Approach	6
2.2 Organisational Chart	6
<b>CHAPTER 3: REPORTING BOUNDARIES</b>	<b>7</b>
3.1 Emissions Categories and Classification	7
3.2 Significance and Materiality	7
3.3 Summary of Emissions Source Inclusions	8
3.4 Summary of Emissions Source Exclusions	9
<b>CHAPTER 4: QUANTIFIED GHG INVENTORY OF EMISSIONS</b>	<b>10</b>
4.1 Consolidated Statement of Greenhouse Gas Emissions	10
4.2 Methodologies for the Collection and Quantification of Data	11
4.2.1 Approach to Emission Factors	11
4.2.2 Changes in Methodologies on prior year/base year	12
4.2.3 GWP Calculation and Source	12
4.2.4 GHG Liabilities	12
4.2.5 Review, Internal Audit and Improvement	14
4.3 Information Management Procedures	14
4.3.1 Key Procedural Elements for GHG Information Management	15
4.4 Assessment of Uncertainty	16
4.5 Changes to Base Year	16
4.6 Removals and Reductions / Increases	17
4.6.1 Removals	17
4.6.2 Emissions Reductions / Increases	17
<b>CHAPTER 5: INTERNAL REPORTING &amp; PERFORMANCE</b>	<b>18</b>
5.1 Emissions by Category, Gas and Freight Mode	18
5.2 Emissions by Region (Tonnes CO <sub>2</sub> e)	19
5.3 Emissions Intensity Measures	19
5.4 Freight Emissions by Mode (Year on Year)	20
5.5 Performance Measures, Targets and Benchmarks	20
<b>APPENDICES</b>	<b>21</b>
Appendix 1 – ISO 14064-1:2018 Reporting Index	21
Appendix 2 – Mainfreight Group Structure	22
<b>NDEPENDENT ASSURANCE STATEMENT</b>	<b>24</b>

# CHAPTER 1: GENERAL DETAILS, PURPOSE AND POLICY

## 1.1 Introduction

The following document provides the Mainfreight Group of companies' full global greenhouse gas (GHG) emissions inventory for the 2022 calendar year.

Mainfreight's reporting processes and emissions classifications are consistent with international protocols and standards. This report has been prepared in accordance with the *International Standards Organisation* standard *ISO 14064-1:2018*. The information provided follows the requirements outlined in Part 9.3.1 and (where applicable) 9.3.2 of the standard.

## 1.2 Purpose

Mainfreight's intent here is to demonstrate best practice with respect to consistency, comparability and completeness in the accounting of greenhouse gas emissions.

This report:

- Relates to emissions for the Mainfreight Group of companies.
- Has been prepared in accordance with the requirements of the ISO 14064-1: 2018 standard.
- Endeavours to use primary data wherever possible but especially surrounding all major emissions sources. Where primary data is not available, a consistent and conservative approach to calculation will be applied.
- Reflects our commitment to better understanding and ultimately improving our operational performance with respect to emissions.
- Excludes specific targets.

## 1.3 Description of Mainfreight

Mainfreight is a global supply chain and logistics provider with 324 branches worldwide offering full solutions across warehousing, international freight and domestic forwarding. Mainfreight is a New Zealand Stock Exchange listed company (MFT: NZX). The company is made up of "Mainfreight NZ Limited" (the 'Parent') and its subsidiaries (together the 'Group').

For further information see [www.mainfreight.com](http://www.mainfreight.com).

### 1.3.1 GHG and Sustainability Policies, Strategies and Programmes

Our vision for a 100-year company is not about reaching an endpoint. It's a mind-set that every day and every deed is about growing a strong, iconic, enduring business. This means leaving the place better than we found it and doing all we can to safeguard the future of our people, our communities and our planet.

Climate change remains a defining issue for businesses and governments everywhere. For Mainfreight, it begins with accepting that our business is based on an activity that generates greenhouse gas emissions and therefore taking responsibility to reduce those emissions over time, while maintaining our competitiveness and ability to deliver quality services as our customers expect.

Mainfreight's commitment to sustainability, safety, health and the environment has been, and continues to be, a fundamental element of our operating practices and success to date. For more on Mainfreight sustainability please visit: <https://www.mainfreight.com/global/en/global-home/about-us/sustainability.aspx>.

## 1.4 Persons Responsible

The provided GHG Inventory and Report has been prepared by the New Zealand based team, with significant support from many parties across all major operating regions.

Overall responsibility lies with Tim Williams, Chief Financial Officer.

Responsibility for the preparation of the report and inventory:

- Jodi McLaren, Business Development & Sustainability – New Zealand

Assisting with background data and supporting information:

- Graeme Illing, Financial Controller – New Zealand
- Alvin Datt, Financial Controller – New Zealand
- Raju Vegesna, Accountant – New Zealand
- Shaun Morrow, Project Manager – New Zealand
- Richard Vlasblom, Financial Controller – Australia
- Joyce Wain, Financial Accountant – Australia
- Leigh Vlasblom, National Finance Support – Australia
- Lewis Moore, Overseas Settlements – Australia
- Bregan Good, Business Solutions – Americas
- Kody Ichinaga, Warehousing Account Executive – Americas
- Ryan Ogren, Accounts – Americas
- Joyce Guillen Cox, Financial Controller – Americas
- Erik Berger, Financial Controller – Americas
- Craig Stukey, Business Solutions – Americas
- Franky Lui, Financial Controller – Asia
- Shirly Liu, Financial Controller – Asia
- Felix Boyce, Sales Support – Europe
- Remy Rosendahl, Business Solutions – Europe
- Sjoerd van den Bos, Business Solutions – Europe

#### 1.4.1 Team Training for the Preparation of this Emissions Inventory and GHG Report

Members of the core inventory preparation team are trained on the principles and requirements within the ISO 14064-1:2018 standard.

Additional support and insight was provided through a separate service arrangement with Toitū Envirocare in 2020 to provide a detailed gap analysis on Mainfreight's existing understanding and reporting methods.

Each year the inventory preparation team provide regional contributors with a detailed data input template and instructions on collection of data in line with the standard. Workshops are then arranged with each regional team around their contributions.

In 2022, following the preparation and publishing of the 2021 Calendar Year GHG Inventory report a detailed post audit review was conducted and the results disseminated to the global team for training and continued improvement.

### 1.5 Audience and Dissemination Policy

This report is intended for all Mainfreight stakeholders interested in its greenhouse gas emissions inventory and the associated reporting structure, notation and explanations. It is provided publicly on our website following appropriate third-party verification.

### 1.6 Reporting Period and Frequency of Reporting

This GHG report covers the calendar year 1<sup>st</sup> January 2022 to 31<sup>st</sup> December 2022.

GHG reports are produced annually.

Mainfreight are a designated Climate Reporting Entity as part of the New Zealand Climate Related Disclosure standards. In order to align with these standards, we will be adapting our reporting period to Financial Year from year ending March 31st, 2024. A three-month balance will also be included in this report.

### 1.7 Reporting Standards, Approach and Verification

#### 1.7.1 Compliance with ISO 14064-1:2018

The GHG report for the year ending 31<sup>st</sup> December 2022 has been prepared in accordance with ISO 14064-1:2018. A reporting index has been provided in Appendix 1.

#### 1.7.2 Audit of GHG Inventory

Verified to reasonable assurance by Toitū Envirocare.

## CHAPTER 2: ORGANISATIONAL BOUNDARIES

### 2.1 Consolidation Approach

Mainfreight utilises the ‘operational control’ consolidation method for our emissions inventory. This approach considers all emissions that Mainfreight exercises some control over but not necessarily financial control (all financially controlled entities are also included).

The most significant application of this approach is the inclusion of emissions from our owner drivers, agents, rail providers, shipping lines and airlines that support our service offering to customers.

A small number of franchises, although related to the Mainfreight Group, are not considered under its control and have not been included in the emissions summary. Emissions for transportation services to and from franchises as part of our network are included.

### 2.2 Organisational Chart

The below organisational chart depicts the operating nature of the Mainfreight Group as is relevant to the emissions summary.

Mainfreight has 324 branches across five regional operations, 4 of which run our 3 key service platforms, with Asia largely focused on the Air & Ocean division along with a small warehousing footprint.

The formal Group Structure is provided as Appendix 2.

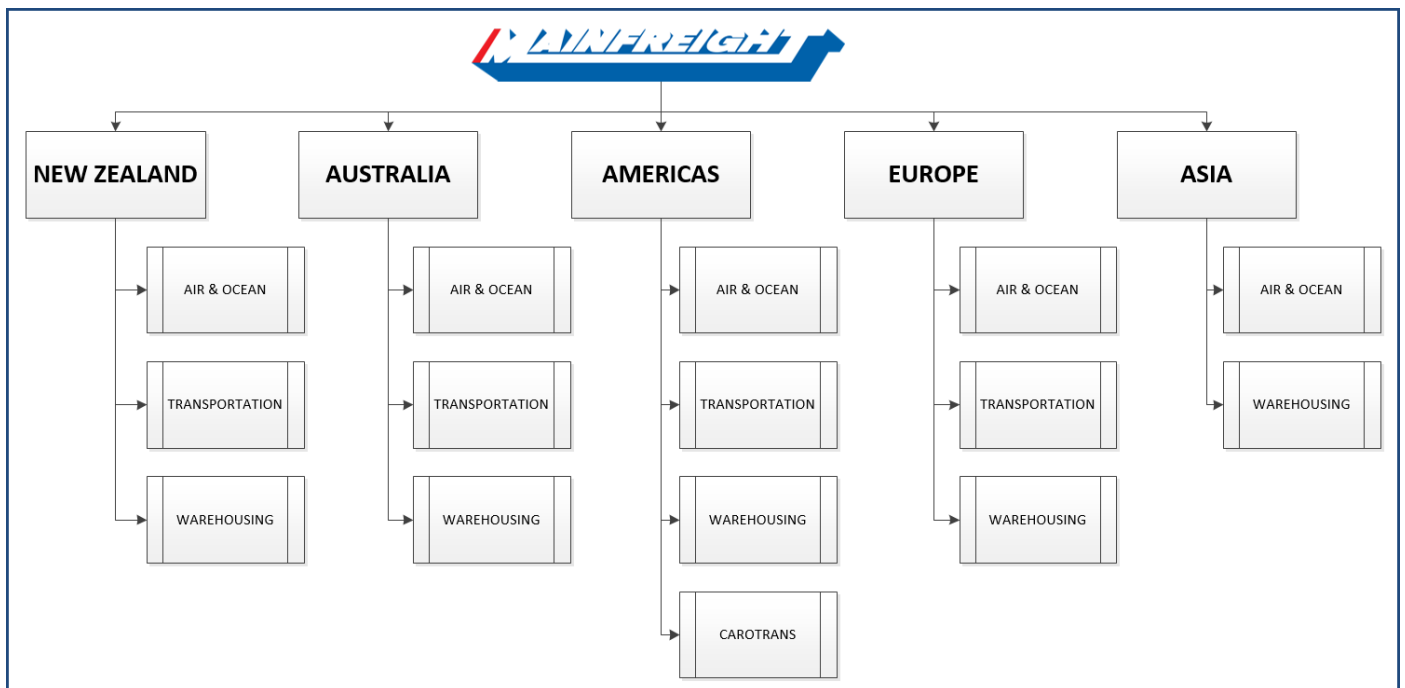


Figure 1: Mainfreight Operational Organisation Chart

## CHAPTER 3: REPORTING BOUNDARIES

### 3.1 Emissions Categories and Classification

Greenhouse gas emissions sources have been identified and grouped in accordance with the ISO 14064-1:2018 standard. This methodology lists six categories of emissions and differs somewhat from earlier categorisation in line with the Greenhouse Gas Protocol's Scopes 1 through 3.

- Category 1: Direct GHG emissions and removals
- Category 2: Indirect GHG emissions from imported energy
- Category 3: Indirect GHG emissions from transportation
- Category 4: Indirect GHG emissions from products used by the organisation
- Category 5: Indirect GHG emissions associated with the use of products from the organisation
- Category 6: Indirect GHG emissions from other sources

### 3.2 Significance and Materiality

Factors for consideration in assessing significance and materiality include:

- Size of the emissions
- Mainfreight's influence on the emission source
- Difficulty in obtaining data
- Poor validity in available estimation approaches

Whilst all of the above would be considered in materiality assessments, the criteria that would mandate disclosure of emissions sources as significant is:

- a) Where a single source has an estimated emissions likely to be at least 1% of Mainfreight's total emissions, that source must be included.
- b) Where the total of 'insignificant' sources have estimated emissions likely to be at least 5% of Mainfreight's total emissions, enough of those must be included to bring the excluded total below 5%.

### 3.3 Summary of Emissions Source Inclusions

Category	Emission Source	Data Source	Methodology & Materiality
1	Biofuels used	Fuel billing	Fuel use in litres
1	Fuel used by owner drivers	Fuel billing	Fuel use in litres
1	Fuel used by company trucks	Fuel billing	Fuel use in litres
1	Fuel used by company/rental cars	Fuel billing	Fuel use in litres
1	Fuel use for mileage expensed	Expense accounts	In kms or litres
1	Tkm for transport where fuel is not available	TMS reports [1]	Where fuel is sourced externally Tkm are used
1	Fuel for material handling equipment	Fuel reports [2]	In litres or kg
1	One-off refrigerant leakage event	Top up billing	Top up volume x by GWP
2	Electricity	Electricity billing	By kWh
2	Energy from gas sources (heating)	Fuel billing	In m <sup>3</sup>
3	Tkm Road (third party carriers)	TMS reports	Summary road Tkm by third party carrier
3	Tkm Rail	TMS reports [4]	Summary Tkm by mode rail.
3	Tkm and TEU-km Sea	Shipments & Port-Port km [5]	Summary of Shipment port-port distance x weight, TEU
3	Tkm Air – Short haul (<1000km), Medium haul (1000-3700km) and Long haul (>3700km)	Shipments & Port-Port km	Summary of Shipment port-port distance x weight
3	Business Travel	Provider reports on emissions/kms	Direct emissions reports or km summaries
4	Waste – Landfill	Provider reports on tonnes	Tonnes of general waste (assumed)
4	Waste – Recycling	Provider reports on tonnes	Tonnes of general recycling
4	Electricity transmission and distribution losses	Electricity billing	kWh input at T&D emission factor
4	WTT emissions associated with fuel extraction and refining	Fuel billing [6]	Fuel x appropriate WTT fuel emission factor
6	Accommodation	Provider reports	Direct reports or per night

Table 1: Emissions Source Inclusions

#### Notes to Table 1

1. We operate our own bespoke Transport Management System (TMS) and run specific queries to produce summary details on Tkm by mode.
2. Different regions use different fuel types (i.e. LPG vs natural gas) and measures (kg vs litres), electric MHE would be accounted for in 2.1.
3. Diesel assumed for all regional rail factors. NZ and AU use supplier factors
4. A Port-Port (and Airport-Airport) table has been developed as a reference tool. For international container freight TEU-km is the preferred unit. Our sea freight factors follow the GLEC V2 standard.
5. WTT emissions are not a required inclusion per the MfE 'Measuring Emissions: Guide for Organisations (2022)'. But as a consumed product (Category 4) with a material impact we have included the upstream emissions for this area (for Categories 1 and 2).



### 3.4 Summary of Emissions Source Exclusions

The following emissions sources have been identified but excluded from the emissions inventory. These sources are not considered significant or material to stakeholders (see 3.2), the context of the inventory, and/or are not feasible or practical to calculate at the current point in time.

Category	Emission Source	Data Source	Methodology & Materiality
1	Fugitive emissions from air conditioning systems including chilled transport	[1], [2]	Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
1	Fumigants for treatment of product/equipment for export	[3]	Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
1	Emissions from workshop operations e.g. welding	[4]	Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
3	Team commuting		Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
3	International pre and post carriage where Mainfreight is not the service provider	[5]	Difficult to obtain and assign, estimated to be <i>de minimis</i> (<1%)
3	Upstream transportation	[6]	Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
4	Emissions from use of consumables	[7]	Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
4	Emissions from use of goods in branches	[8]	Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
4	Waste emissions for non-transporting services, Carotrans		Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
6	Building and construction projects		Difficult to obtain, estimated to be <i>de minimis</i> (<1%)
	Biogenic emissions excluding biofuels	[9]	Difficult to obtain, estimated to be <i>de minimis</i> (<1%)

Table 2: Emissions Source Exclusions

#### Notes to Table 2

1. We have 324 branches across different regions and climates, as well as with different ownership and maintenance models. As a result, these figures are especially difficult to obtain. Note that refrigerant leakage events from such systems will be captured.
2. There are a handful of chilled vehicles in our fleet of several thousand, maintenance handled by owners.
3. Fumigants are required for some products and equipment to prevent potential spread of pests.
4. We have a small number of workshops on our major sites, these do repair work and some metal fabrication and painting.
5. Where Mainfreight is the service provider these emissions are captured within our domestic data.
6. As a logistics service provider, upstream transportation for goods purchased is relatively insignificant.
7. Consumables include packaging items like shrink wrap and pallets. While estimated to be below levels of significance, it remains a point of interest for future examination.
8. Obvious goods used include office equipment and stationery.
9. Biogenic emissions for the likes of composting have not been included, known biofuels have.

# CHAPTER 4: QUANTIFIED GHG INVENTORY OF EMISSIONS

## 4.1 Consolidated Statement of Greenhouse Gas Emissions

EMISSIONS	Notes	CO <sub>2</sub> -e	Methane		Hydrofluoro-	
		TOTAL (Tonnes p.a.)	Carbon Dioxide (CO <sub>2</sub> )	Non/Fossil Origin (CH <sub>4</sub> )	Nitrous Oxide (N <sub>2</sub> O)	carbons (HFCs)
	1	GWP	1	27/29.8	273	2088
<b>1 Category 1: Direct GHG emissions and removals in tonnes CO<sub>2</sub>-e</b>		<b>239,235.04</b>	<b>235,044.99</b>	<b>407.25</b>	<b>3,762.75</b>	
Direct emissions from stationary combustion						
Direct emissions from mobile combustion		239,214.99	235,044.99	407.25	3,762.75	
Direct process and removals from industrial processes						
Direct fugitive emissions from the release of GHGs in anthropogenic systems		20.04				20.04
Direct emissions and removals from land use and forest change						
Direct emissions in tonnes of CO <sub>2</sub> from biomass	2	<b>6.35</b>	<b>6.35</b>			
<b>Indirect emissions in tonnes CO<sub>2</sub>-e</b>		<b>1,257,385.87</b>				
<b>2 Category 2: Indirect GHG emissions from imported energy</b>		<b>18,385.44</b>				
Indirect emissions from imported electricity		16,570.60				
Indirect emissions from imported energy		1,814.84				
<b>3 Category 3: Indirect GHG Emissions from Transportation</b>		<b>1,170,368.50</b>				
Emissions from upstream transportation and distribution of goods	NS					
Emissions from downstream transportation and distribution of goods		1,167,266.77				
Emissions from employee commuting	NS					
Emissions from client and visitor transport	NS					
Emissions from business travels		3,101.73				
<b>4 Category 4: Indirect GHG emissions associated with the use of products by the organisation</b>		<b>68,500.95</b>				
Emissions from purchased goods and services	3	62,681.30				
Emissions from capital goods	NS					
Emissions from the disposal of solid and liquid waste		5,819.65				
Emissions from the use of assets	NS					
Emissions from other services not described above						
<b>5 Category 5: Indirect GHG emissions associated with the use of products from the organisation</b>						
Emissions or removals from the usage of product	NS					
Emissions from downstream leased assets	NS					
Emissions from end of life stage of the product	NS					
Emissions from investments	NS					
<b>6 Category 6: Other indirect GHG emissions sources</b>		<b>130.98</b>				
Emissions from accommodation		130.98				
<b>TOTAL EMISSIONS CATEGORIES 1 - 6</b>		<b>1,496,627.26</b>				
<b>REMOVALS</b>	4					
Direct removals in tonnes CO <sub>2</sub> -e						
<b>Emissions Liabilities</b>	5					
<b>Total Storage as of year end in tonnes CO<sub>2</sub>-e</b>		<b>9,735.36</b>				
<b>Other Related Information</b>						
Performance tracking (emissions and removals by metric)		Greenhouse Gas Emissions Inventory Report				5
Base year GHG emissions, removals and stocks; and adjustments to base year		Greenhouse Gas Emissions Inventory Report				4.6
Disclosure of most significant sources and sinks		Greenhouse Gas Emissions Inventory Report				3.3
Emissions Liabilities		Greenhouse Gas Emissions Inventory Report				4.3
Significance criteria		Greenhouse Gas Emissions Inventory Report				3.2
Uncertainty assessment		Greenhouse Gas Emissions Inventory Report				4.5

[NS] Non significant.

## Notes to Consolidated Statement of Greenhouse Gas Emissions

1. *Direct and indirect emissions have been prepared in accordance with the recommendations of Annex B. Gas types CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and HFCs have been included as those relevant to direct emissions.*
2. *Biomass emissions relate to the use of biofuels, while not significant in scale they are an area of interest and as such are included here. As per the ISO 14064-1: 2018 Standard the CO<sub>2</sub> emissions are recorded against biomass whereas the other gases (CH<sub>4</sub>, N<sub>2</sub>O etc are grouped within Category 1).*
3. *This includes electricity transmission and distribution losses. WTT (Well To Tank) emissions have also been included as emissions from purchased goods and services.*
4. *This document does not provide any recommendations or requirements for removal.*
5. *Emissions liabilities are denoted here but not included in the emissions total. For further details see section 4.2.*

## 4.2 Methodologies for the Collection and Quantification of Data

As a large global enterprise, the collection of emissions data spans a broad range of localities and consequently, service providers and data sources. As a result, source data varies in both format and degree of detail.

The emissions summary represents a best attempt to consolidate and standardise emissions data and provide a detailed explanation of working and estimation in line with the ISO 14064-1:2018 standard.

Due to their access and understanding of global reporting and data sources, Mainfreight's finance team have led the data collection efforts to date.

Section 3.3 describes the overview of emissions sources and their respective data sources. Where an estimation approach is required, the best available data and calculation method is applied. Where two or more estimation approaches are considered equally valid, that which produces the more conservative figure is used.

### 4.2.1 Approach to Emission Factors

Where possible, emission factors are specific to each reporting region. Where specific regional emission factors are not available or applicable, we have taken the most relevant as suggested by the website <https://emissionfactors.com/>. Sources include:

- IPCC 6<sup>th</sup> Assessment Report
- NZ Ministry for the Environment Guidance for Voluntary GHG Reporting – 2022
- USA EPA - Emission Factors for Greenhouse Gas Inventories 2023
- UK Department for Business, Energy & Industrial Strategy 2022
- Australian National Greenhouse Accounts Factors: 2023
- Australian Energy Market Operator
- US Energy Information Administration
- Corporate Traveller and EcoTransIT World
- Cornell Hotel Sustainability Benchmarking Index (CHSB) Tool 2021
- Statista.com
- GLEC Version 2 – Smart Freight Centre
- AU Survey of Motor Vehicle Use 2020
- Pacific National ESG Report FY2022
- KiwiRail Steel Wheels Report

#### 4.2.2 Changes in Methodologies on prior year/base year

The 2018 calendar year was the first GHG report published by Mainfreight, it provides the base year for the original assessment and for future years. The following represent changes in methodology with respect to the base year and our commitment to improve the accuracy and breadth of reporting year on year:

- Using the IPCC AR6 Global Warming Potential values.
- Emission factor updates.
- Improvements identified from our own post audit review, across data sourcing, quality, completeness and consistency.
- Improved 'follow the freight' for shipment leg level detail across LCL consolidations.
- Split out 3rd party carrier road freight into urban and long-haul, where available.
- Reduced reliance on averages.

#### 4.2.3 GWP Calculation and Source

Quantities of GHG emissions are expressed as tonnes of CO<sub>2</sub>e (Carbon Dioxide Equivalents) using the global warming potentials (GWP) from the IPCC Sixth Assessment Report (AR6). The time horizon is 100 years.

Direct emissions sources (Category 1) are expressed as both CO<sub>2</sub>e and their detailed GHG breakdown, including the GWP (Global Warming Potential) value. The most notable GHGs include:

GHG	Chemical Formula	GWP
Carbon dioxide	CO <sub>2</sub>	1
Methane (Fossil Origin)	CH <sub>4</sub>	29.8
Methane (Non-Fossil Origin)	CH <sub>4</sub>	27
Nitrous oxide	N <sub>2</sub> O	273
Hydrofluorocarbon R410A	R410A	2088

*Table 3: Greenhouse Gases and their respective Global Warming Potentials*

#### 4.2.4 GHG Liabilities

Mainfreight operates a small number of chilled storage facilities across New Zealand, Australia and Europe.

The refrigerants used to maintain temperature at these sites have extremely high GWP. As a result, despite relatively small volumes, their potential impact could be arguably significant.

GHG liabilities have been included separately in our emissions inventory to denote the risk associated with this pool of emissions were it to be released (by accident or leakage). Emissions liabilities are not included in the totals of our emissions count per the ISO 14064-1:2018 standard.

The provided GHG liabilities for Mainfreight are:

Region	GHG Liability / Site	Refrigerant	GWP	Quantity	GHG Liability
New Zealand	Auckland – Chiller System 1	R407F	1,825	401kg	731.83T
New Zealand	Auckland – Chiller System 2	R404A	3,922	180kg	705.96T
New Zealand	Auckland – Chiller System 3	R134A	1,430	190kg	271.70T
New Zealand	Christchurch – Chiller	R407F	1,825	212kg	386.90T
Australia	Sydney – Chiller	R404A	3,922	640kg	2,510.08T
Australia	Brisbane – Chiller	R404A	3,922	300kg	1,176.60T
Australia	Melbourne – Chiller	R404A	3,922	680kg	2,666.96T
Australia	Dandenong – Chiller	R410A R404A	2,088 3,922	303.92kg 162kg	1,269.95T
Europe	Born – Warehousing Chiller	R449A	1,282	12kg	15.38T
<b>Global</b>	Total				9,735.36T

Table 4: GHG Liabilities

GWP Source: <https://www.gov.uk/guidance/calculate-the-carbon-dioxide-equivalent-quantity-of-an-f-gas>

Liabilities excluded based on expected values below levels of significance or relevance include:

- Refrigerators and cool rooms as part of our canteens
- Refrigerants within chilled trucks (less than 0.5% of our fleet are chilled)
- Refrigerants within air conditioning systems
- Diesel in backup generators (covered under category 1 purchased fuel)
- Fire extinguishers (numerous but small holding and low GWPs)

#### 4.2.5 Review, Internal Audit and Improvement

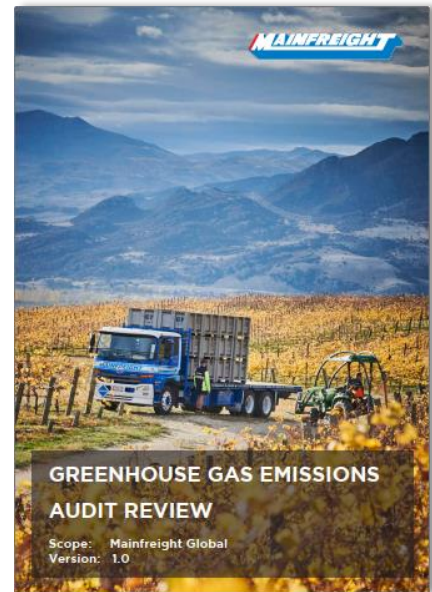
Primary data has been sought for all significant emissions sources. Where data is unavailable or not comparable, conservative estimation methods have been applied such that incentives lie in continually improving the ratio of primary data to estimation approaches.

Preparation of the inventory is done iteratively with several internal draft, check and resubmission stages in the lead up to verification as well as online regional workshops.

Following reporting for the 2021 calendar year, a post audit review document was prepared in 2022 and disseminated to the global preparation team. It rated individual data sources for quality and completeness and sought to address areas for improvement outlined from previous audit findings.

Some improvements identified and enacted include:

- Extended timeline for compiling data
- Video-call check-ins with all regional teams
- Better data quality and completeness
- Providing previous values for comparison
- Transition to better units of measure



### 4.3 Information Management Procedures

The GHG measurement and reporting process has been developed to ensure conformance to the principles of the ISO 14064-1:2018 standard and to be consistent with the intended use of the GHG inventory.

The procedural elements below are designed to set structure and consistent checks to provide accuracy and completeness of the inventory and address errors and omissions.

*Figure 2* outlines the structure and storage approach for documentation. Its intention is to enable relevant access and traceability to the source information of our emissions inventory for our verifiers.

### 4.3.1 Key Procedural Elements for GHG Information Management

- Regional inventory preparation teams collect source data from third party suppliers and Mainfreight’s finance and transport management systems.
- Data is organised by region and within each region by business unit.
- Documentation is held in an access-controlled folder on Mainfreight’s intranet.
- Data is reviewed and consolidated by the GHG inventory and report preparation team based in New Zealand.
- Emission factors are provided for each region and reviewed annually.
- The emissions inventory and GHG report are independently audited by Toitū Envirocare.
- This GHG report also outlines consideration for the following:
  - Responsibility and authority for inventory development.
  - Review and implementation of training for the inventory development team.
  - Identification of organisational and reporting boundaries.
  - Selection and review of GHG sources and sinks.
  - Details of quantification approaches and consideration to their consistent application.
- Post audit: all data, reports and inventory are copied to a Sharepoint location and archived.

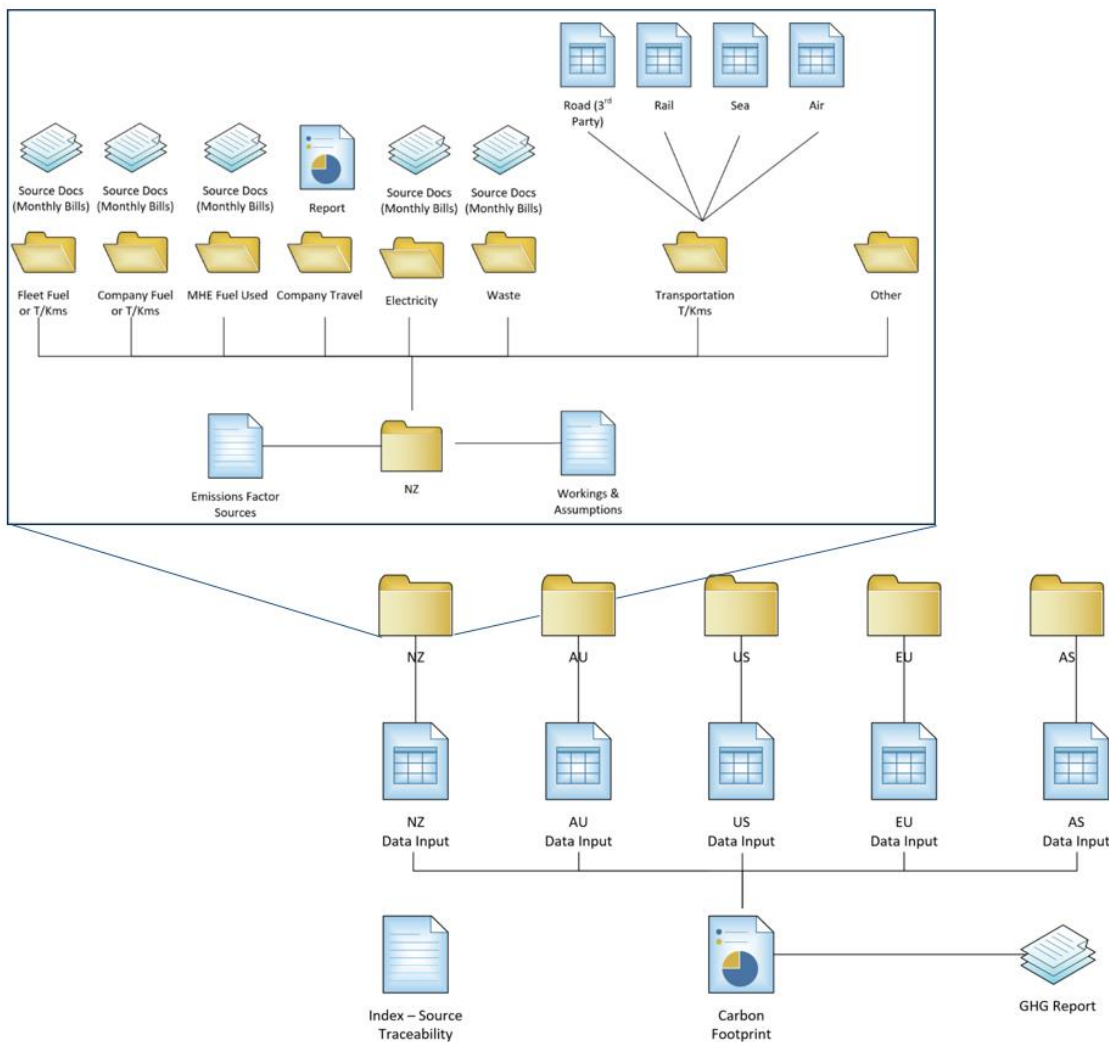


Figure 2: Documentation and Source Information Structure

## 4.4 Assessment of Uncertainty

For this 2022 report a qualitative rather than quantitative assessment of uncertainty has been applied. With the current tools and variety of emission sources, our view is that a quantitative assessment would be complex, time consuming and offer little validity in respect to statistical uncertainty. The applicability of these quantitative assessments will be reviewed in each reporting period.

The emissions inventory provided in 4.1 carries some degree of uncertainty, which can be heavily associated with two core considerations:

### **1. Complexity in operations, supply chain party interdependency and data availability**

International supply chain networks can be notoriously complex, involve numerous different parties and a huge quantity of data (for even a single shipment). Data availability, systems integration and commercial sensitivity can all inhibit how emissions information might be conveyed and interpreted across the chain.

Nonetheless, we are confident our own technology infrastructure and reporting approach has done the best to minimise uncertainty here and/or describe where the limitations in any approach lie.

### **2. Variety in maturity and sophistication in data from third party suppliers in global operations**

With 324 branches operating across some 26 countries, it is necessary to engage with a large number of third-party suppliers for our local needs - in particular, electricity, waste and different fuel sources. Adding further complexity here is different site operating models - for instance lease or rent arrangements that might include electricity or waste.

Our regional teams have done their best to gather and report back in a consistent fashion. However, it should be noted that these emissions sources are relatively small when compared to our direct emissions across supply chains.

## 4.5 Changes to Base Year

The base year for emissions inventory assessments is the 2018 calendar year. There are several underlying reasons for the selection of the 2018 calendar year as the base year:

1. Calendar year has been used rather than financial year.
2. As the earliest reported period, 2018 was selected as the base year.

Recalculation of the base year will only be applied where it is necessary to maintain an effective base year comparison. Reasons for this might include:

- If the emission factors used change significantly and are relevant to prior years.
- If a significant estimation method has been changed/improved.
- If a significant data sourcing strategy has been changed/improved.
- If the scope of the inventory is changed (for instance the purchase of a new business).



Recalculation of the base year will also consider whether the historical data has the required detail to perform recalculation or whether it is in the right form (i.e. unit of measure) to apply a different emission factor.

There is no change to the base year calculation in this reporting period. Our previous GHG Reports and Inventories can be found on our website:

<https://www.mainfreight.com/global/en-global/investor/reports-library>.

## 4.6 Removals and Reductions / Increases

### 4.6.1 Removals

There are no emissions removals to declare in this reporting period.

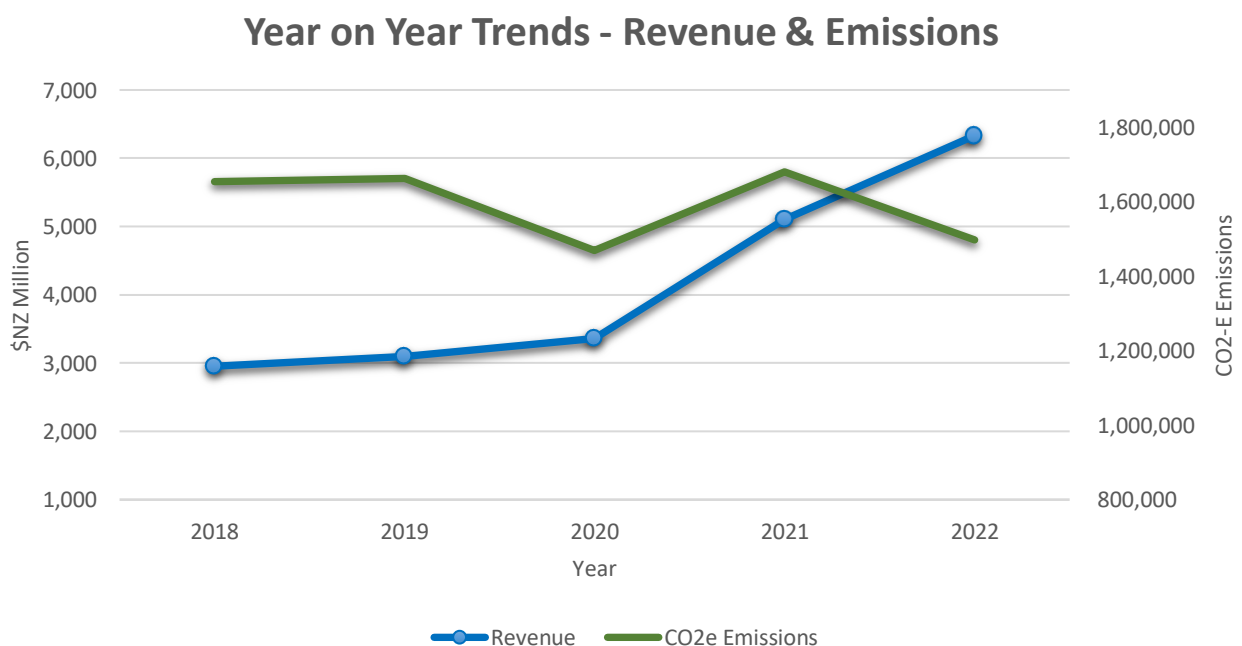
### 4.6.2 Emissions Reductions / Increases

Year on year we have recorded a **183,472 T decrease** in carbon dioxide equivalents across our global business representing a **10.92% decrease** in gross greenhouse gas emissions.

This decrease is reflective of a decrease in freight volumes, particularly air freight which was inflated throughout the first stage of the COVID-19 Pandemic due to congestion, price increases and poor reliability in ocean-based alternatives and the return of belly freight capacity in passenger aviation.

The 2022 Calendar Year also saw a return to international travel for our team. This is likely to be a larger value than normal years with extra trips taken to make up for travel missed due to border closures.

We continue to target reductions in emissions intensity year on year (see 5.3) while aiming to reduce gross emissions wherever possible.



## CHAPTER 5: INTERNAL REPORTING & PERFORMANCE

### 5.1 Emissions by Category, Gas and Freight Mode

Emissions Category



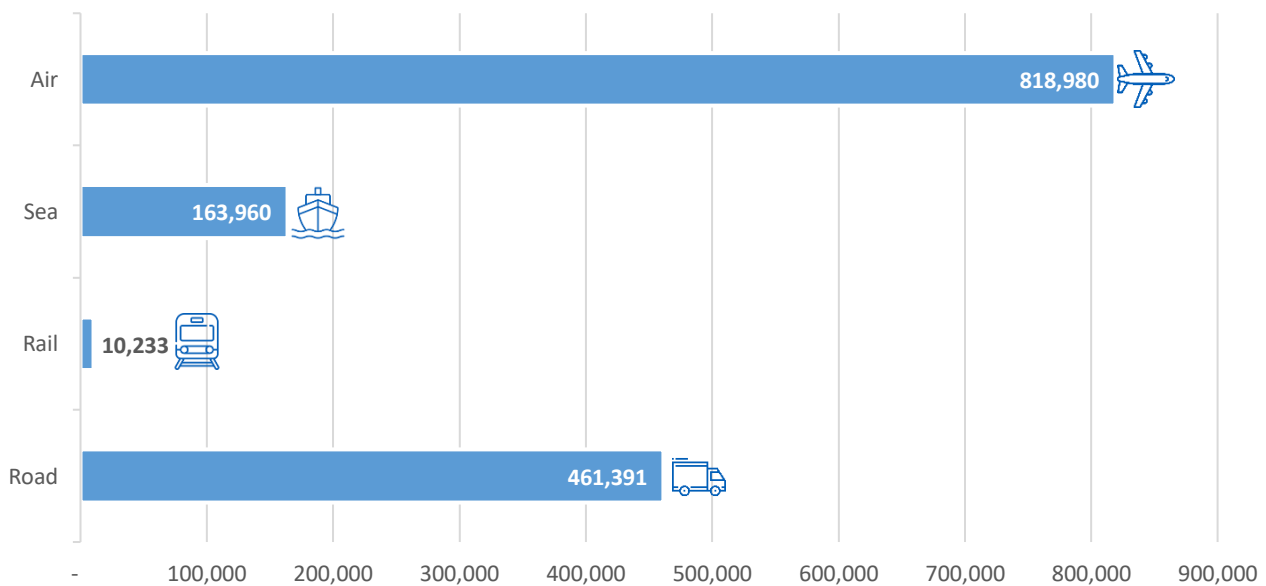
Category 1 15.99%	Category 2 1.23%
Category 3 78.20%	Category 4 4.58%
Category 5 0.00%	Category 6 0.01%

Category 1 Gas Breakdown

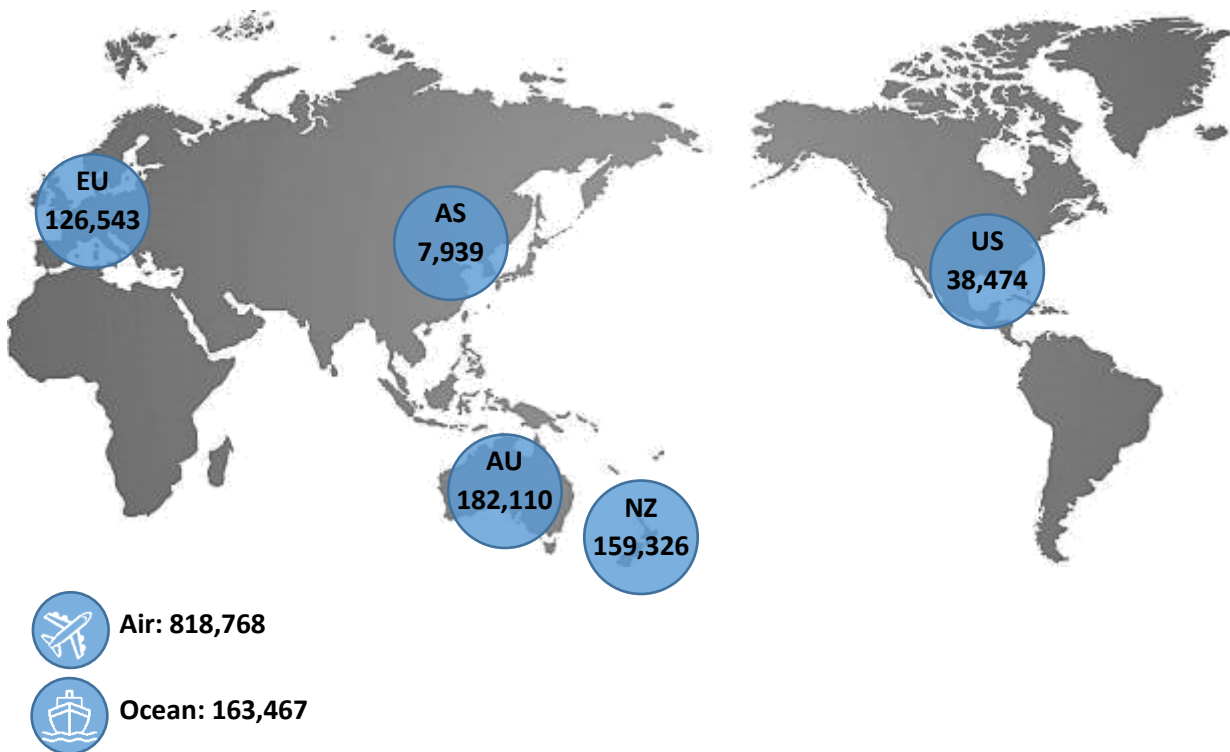


Carbon Dioxide CO2 98.25%	Methane CH4 0.17%
Nitrous Oxide N2O 1.57%	Hydrofluorocarbon HFC 0.01%

Freight Mode



## 5.2 Emissions by Region (Tonnes CO2e)



## 5.3 Emissions Intensity Measures



## 5.4 Freight Emissions by Mode (Year on Year)

Emissions Source	2022 Tonnes CO <sub>2</sub> e	2021 Tonnes CO <sub>2</sub> e
Road	461,391	464,327
Rail	10,233	9,603
Sea	163,960	226,768
Air	818,980	943,337
<b>Total Freight Emissions</b>	<b>1,454,564</b>	<b>1,644,036</b>
<i>Direct Operational Emissions</i>	<i>42,063</i>	<i>36,063</i>
<b>Total Emissions</b>	<b>1,496,627</b>	<b>1,680,099</b>
<i>Direct Operational Emissions % of Total</i>	<i>2.81%</i>	<i>2.15%</i>

## 5.5 Performance Measures, Targets and Benchmarks

Performance against fixed emissions targets is not currently practical to determine especially given Mainfreight's rate of growth. We do however aim to continuously reduce the emissions intensity of our activities year on year and will assess the relevance of new measures and targets in each reporting period.

## APPENDICES

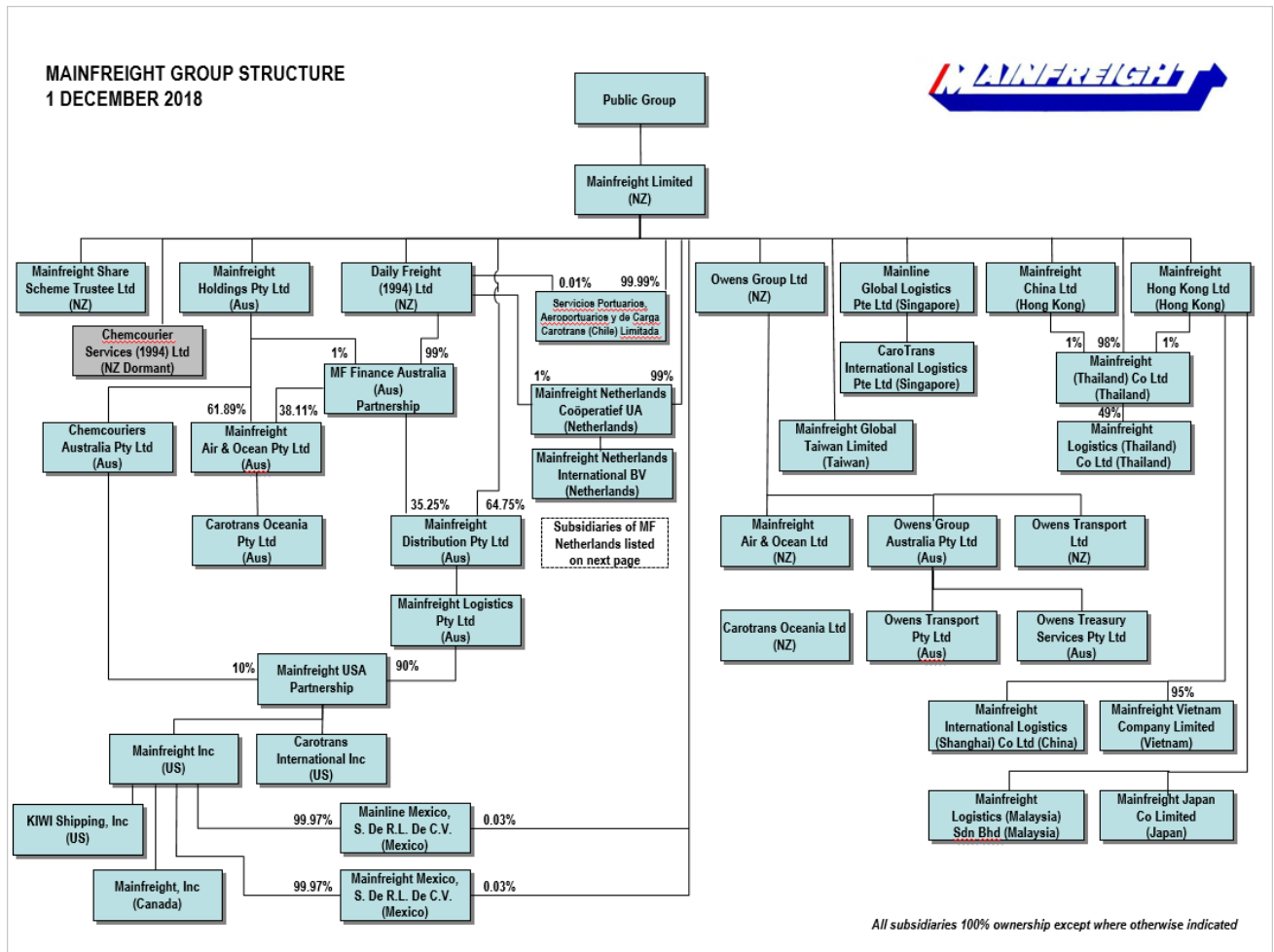
### Appendix 1 – ISO 14064-1:2018 Reporting Index

ISO Reporting	Section in this Report
9.3.1 (a)	1.3
9.3.1 (b)	1.4
9.3.1 (c)	1.6
9.3.1 (d)	2
9.3.1 (e)	3
9.3.1 (f)	4.1
9.3.1 (g)	4.1
9.3.1 (h)	4.6
9.3.1 (i)	3.3
9.3.1 (j)	4.1
9.3.1 (k)	4.5
9.3.1 (l)	4.5
9.3.1 (m)	4.2
9.3.1 (n)	4.2
9.3.1 (o)	4.2
9.3.1 (p)	4.4
9.3.1 (q)	4.4
9.3.1 (r)	1.7
9.3.1 (s)	1.7
9.3.1 (t)	4.2

ISO Reporting	Section in this Report
9.3.2 (a)	1.3
9.3.2 (b)	4.6
9.3.2 (c)	4.6
9.3.2 (d)	NA
9.3.2 (e)	4.6
9.3.2 (f)	4.1
9.3.2 (g)	5.3
9.3.2 (h)	5.5
9.3.2 (i)	4.3
9.3.2 (j)	4.6
9.3.2 (k)	4.6

ISO Reporting	Section in this Report
9.3.3	NA

# Appendix 2 – Mainfreight Group Structure

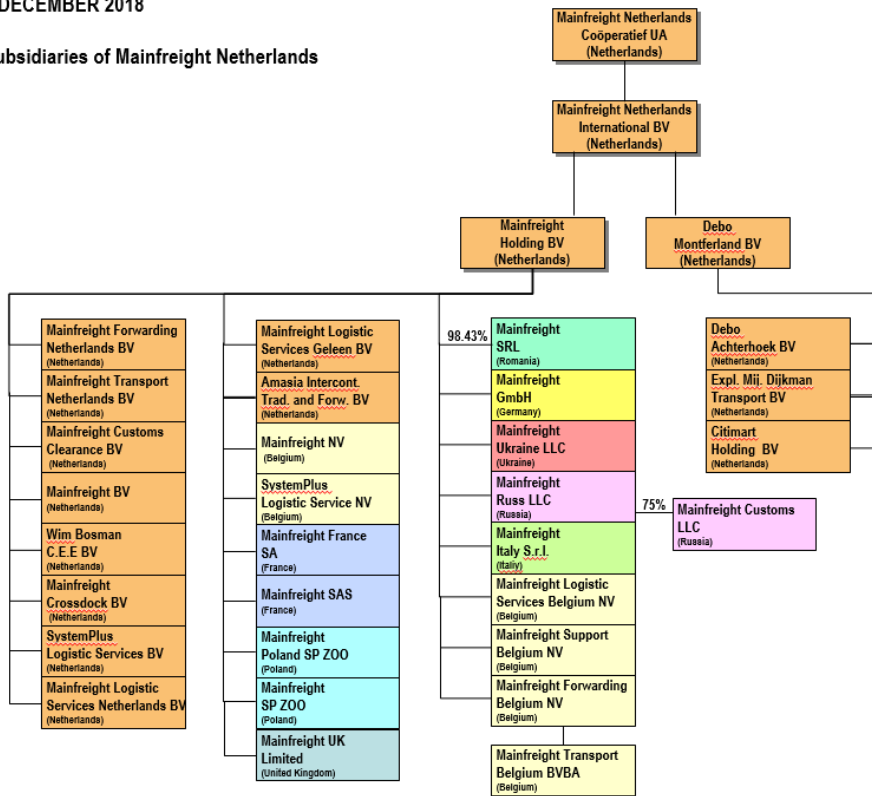


All subsidiaries 100% ownership except where otherwise indicated

**MAINFREIGHT GROUP STRUCTURE**  
**1 DECEMBER 2018**



**Subsidiaries of Mainfreight Netherlands**



# INDEPENDENT AUDIT OPINION

## Toitū Verification

### TO THE INTENDED USERS

<b>Organisation subject to audit:</b>	Mainfreight Limited
<b>Audit Criteria:</b>	ISO 14064-1:2018 ISO 14064-3:2019 Audit & Certification Technical Requirements 3.0
<b>Responsible Party:</b>	Mainfreight Limited
<b>Intended users:</b>	Mainfreight managers, team, customers, investors and all other stakeholders
<b>Registered address:</b>	2 Railway Lane, Otahuhu, Auckland, 1741, New Zealand
<b>Inventory period:</b>	01/01/2022 to 31/12/2022
<b>Inventory report:</b>	GHG Report - 2022 V0.2.pdf

We have reviewed the greenhouse gas emissions inventory report (“the inventory report”) for the above named Responsible Party for the stated inventory period.

### RESPONSIBLE PARTY'S RESPONSIBILITIES

The Management of the Responsible Party is responsible for the preparation of the GHG statement in accordance with ISO 14064-1:2018 . This responsibility includes the design, implementation and maintenance of internal controls relevant to the preparation of a GHG statement that is free from material misstatement.

### VERIFIERS' RESPONSIBILITIES

Our responsibility as verifiers is to express a verification opinion to the agreed level of assurance on the GHG statement, based on the evidence we have obtained and in accordance with the audit criteria. We conducted our verification engagement as agreed in the audit letter, which define the scope, objectives, criteria and level of assurance of the verification.

The International Standard ISO 14064-3:2019 requires that we comply with ethical requirements and plan and perform the verification to obtain the agreed level of assurance that the GHG emissions, removals and storage in the GHG statement are free from material misstatement.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit carried out in accordance with the ISO 14064-3:2019 Standards will always detect a material misstatement when it exists. The procedures performed on a limited level of assurance vary in nature and timing from, and are less in extent compared to reasonable assurance, which is a high level of assurance. Misstatements are differences or omissions of amounts or disclosures, and can arise from fraud or error. Misstatements are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of readers, taken on the basis of the information we audited.

GHG quantification is subject to inherent uncertainty because of incomplete scientific knowledge used to determine emissions factors and the values needed to combine emissions of different gases.



## BASIS OF VERIFICATION OPINION

Our responsibility is to express an assurance opinion on the GHG statement based on the evidence we have obtained. We conducted our assurance engagement as agreed in the Contract which defines the scope, objectives, criteria and level of assurance of the verification.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

## VERIFICATION

We have undertaken a verification engagement relating to the Greenhouse Gas Emissions Inventory Report (the 'Inventory Report')/Emissions Inventory and Management Report of the organisation listed at the top of this statement and described in the emissions inventory report for the period stated above.

The Inventory Report provides information about the greenhouse gas emissions of the organisation for the defined measurement period and is based on historical information. This information is stated in accordance with the requirements of International Standard ISO 14064-1 Greenhouse gases – Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals (ISO 14064-1:2018).

## VERIFICATION STRATEGY

Our verification strategy used a combined data and controls testing approach. Evidence-gathering procedures included but were not limited to:

- activities to inspect the completeness of the inventory;
- interviews of site personnel;
- walkthrough testing on freight system;
- detailed retracing and sampling of freight (FCL shipping and air freight) and fuel (diesel) data;
- sense checks for remaining emissions.

The data examined during the verification were historical in nature.

## QUALIFICATIONS TO VERIFICATION OPINION

The following qualifications have been raised in relation to the verification opinion:

No site visit could be undertaken to confirm activities undertaken by the client. A site visit was arranged but the client contact was not available on the agreed date. A site visit will be performed at next verification.

## VERIFICATION LEVEL OF ASSURANCE

	tCO <sub>2</sub> e	Level of Assurance
Category 1	239,241.39	Reasonable
Category 2	18,385.44	Reasonable
Category 3	1,170,368.50	Reasonable
Category 4	68,500.95	Reasonable
Category 6	130.98	Reasonable
<b>Total inventory</b>	<b>1,496,627.26</b>	

## RESPONSIBLE PARTY'S GREENHOUSE GAS ASSERTION (CERTIFICATION CLAIM)

Mainfreight Limited has measured its greenhouse gas emissions in accordance with ISO 14064-1:2018 in respect of the operational emissions of its organisation.

## VERIFICATION CONCLUSION



We have obtained all the information and explanations we have required. In our opinion, the emissions, removals and storage defined in the inventory report, in all material respects:

- comply with ISO 14064-1:2018 ; and
- provide a true and fair view of the emissions inventory of the Responsible Party for the stated inventory period.

## OTHER INFORMATION

The responsible party is responsible for the provision of Other Information. The Other Information may include emissions management and reduction plan and purchase of carbon credits, but does not include the information we verified, and our auditor's opinion thereon.

Our opinion on the information we verified does not cover the Other Information and we do not express any form of audit opinion or assurance conclusion thereon. Our responsibility is to read and review the Other Information and consider it in terms of the ISO 14064-1: 2018 and ISO 14064-3: 2019. In doing so, we consider whether the Other Information is materially inconsistent with the information we verified or our knowledge obtained during the verification.

Verified by:		Authorised by:	
Name:	Neil Gilbert	Name:	Billy Ziemann
Position:	Verifier, Constantia Consulting Limited	Position:	Certifier, Toitū Envirocare
Signature:		Signature:	
Date verification audit:	19-20 April 2023	Date:	26 May 2023
Date opinion expressed:	28 April 2023		