



GREENHOUSE GAS EMISSIONS INVENTORY REPORT

Inventory Scope: Mainfreight Global

Reporting Period: 1 January 2021 to 31 December 2021

Version: 1.0

Audit Status: Verified

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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 2021 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 305 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

1.3.1 GHG and Sustainability Policies, Strategies and Programmes

Our vision for a 100-year company is not about reaching an end-point. 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:

- Shaun Morrow, Business Development & Sustainability – New Zealand

Responsibility for the preparation of the 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
- Richard Vlasblom, Financial Controller – Australia
- Joyce Wain, Financial Accountant – Australia
- Leigh Vlasblom, National Finance Support – Australia
- Lewis Moore, Overseas Settlements – Australia
- Andrew Badalian, Business Solutions – Americas
- Joyce Guillen Cox, Financial Controller - Americas
- Erik Berger, Financial Controller – Americas
- Craig Stukey, Business Solutions – Americas
- Franky Lui, Regional Financial Controller – Asia
- Kally Yuen, Regional Financial Manager – Asia
- 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 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 2020 following the preparation and publishing of the 2018 and 2019 GHG Inventory reports 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 1st January 2021 to 31st December 2021.

GHG reports are produced annually.

1.7 Reporting Standards, Approach and Verification

1.7.1 Compliance with ISO 14064-1:2018

The GHG report for the year ending 31st December 2021 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 305 branches across five regional operations, 4 of which run our 3 key service platforms, with Asia largely focused on the Air & Ocean division along a small warehousing footprint.

The formal Group Structure is provided as appendix 2.

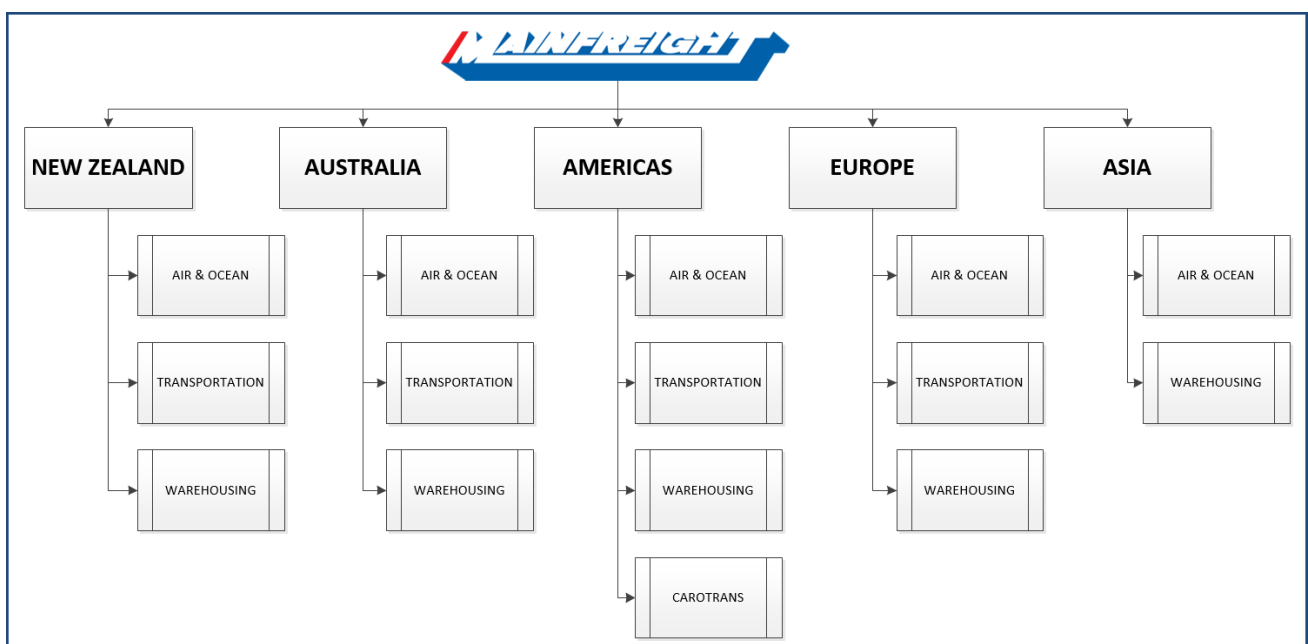


Figure 1: Mainfreight Operational Organisation Chart

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	Tkms for transport where fuel is not available	TMS reports [1]	Where fuel is sourced externally tkms are used
1	Fuel for material handling equipment	Fuel reports [2]	In litres or kgs
2	Electricity	Electricity billing	By kWh
2	Energy from gas sources (heating)	Fuel billing	In m ³
3	Tkms Road (third party carriers)	TMS reports & calculation	Summary road tkms by third party carrier
3	Tkms Rail	TMS reports [3]	Summary tkm by mode rail.
3	Fuel used by third party carriers	Supplier invoicing [4]	Invoice amount at unit rate
3	Tkms and TEU-km Sea	Shipments & Port-Port km [5]	Summary of Shipment port-port distance x weight, TEU
3	Tkms Air – Short haul (<1000km), Medium haul (1000-3700km) and Long haul (>3700km)	Shipments & Port-Port km [6]	Summary of Shipment port-port distance x weight
3	Business Travel	Provider reports on emissions/kms	Direct emissions reports or km summaries
4	Waste	Provider reports on tonnes	Tonnes of general waste (assumed)
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 [7]	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 (kgs vs litres), electric MHE would be accounted for in 2.1.
3. Diesel assumed for all rail factors
4. Calculations for 3rd party carriers use the proportion of amount invoiced compared to owner drivers.
5. 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.
6. Air freight emissions factors include radiative forcing.
7. WTT emissions are not a required inclusion per the MfE 'Measuring Emissions: Guide for Organisations'(2020). 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 305 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.
2. Approximately 10 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 has not been included, known biofuels have.

CHAPTER 4: QUANTIFIED GHG INVENTORY OF EMISSIONS

4.1 Consolidated Statement of Greenhouse Gas Emissions

EMISSIONS	Notes	CO2-e			
		TOTAL (Tonnes p.a.)	Carbon Dioxide (CO2)	Methane (CH4)	Nitrous Oxide (N2O)
	1	GWP	1	28	265
1 Category 1: Direct GHG emissions and removals in tonnes CO2-e	2	278,956.70	267,335.50	330.04	3,068.37
Direct emissions from stationary combustion					
Direct emissions from mobile combustion		278,956.70	267,335.50	330.04	3,068.37
Direct process and removals from industrial processes					
Direct fugitive emissions from the release of GHGs in anthropogenic systems					
Direct emissions and removals from land use and forest change					
Direct emissions in tonnes of CO2 from biomass	3	7.26	7.26		
Indirect emissions in tonnes CO2-e		1,401,135.30			
2 Category 2: Indirect GHG emissions from imported energy		14,864.88			
Indirect emissions from imported electricity		13,519.21			
Indirect emissions from imported energy		1,345.66			
3 Category 3: Indirect GHG Emissions from Transportation		1,309,744.20			
Emissions from upstream transportation and distribution of goods	NS				
Emissions from downstream transportation and distribution of goods		1,309,515.03			
Emissions from employee commuting	NS				
Emissions from client and visitor transport	NS				
Emissions from business travels		229.17			
4 Category 4: Indirect GHG emissions associated with the use of products by the organisation		76,389.29			
Emissions from purchased goods and services	4	68,951.94			
Emissions from capital goods	NS				
Emissions from the disposal of solid and liquid waste		7,437.35			
Emissions from the use of assets	NS				
Emissions from other services not described above					
5 Category 5: Indirect GHG emissions associated with the use of products from the organisation					
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				
6 Category 6: Other indirect GHG emissions sources		136.94			
Emissions from accommodation		136.94			
TOTAL EMISSIONS CATEGORIES 1 - 6		1,680,099.25			
REMOVALS	5				
Direct removals in tonnes CO2-e					
Emissions Liabilities	6				
Total Storage as of year end in tonnes CO2-e		8,465.41			
Other Related Information					
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			4.2
Significance criteria		Greenhouse Gas Emissions Inventory Report			3.2
Uncertainty assessment		Greenhouse Gas Emissions Inventory Report			4.4

[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 CO₂, CH₄ and N₂O have been included as those relevant to direct emissions.*
2. *Fluorinated gases have very high Global Warming Potential. Although we have none to disclose over this period we do hold significant amounts as refrigerants included in our listed liabilities.*
3. *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 CO₂ emissions are recorded against biomass whereas the other gases (CH₄, N₂O etc are grouped within Category 1).*
4. *This includes electricity transmission and distribution losses. WTT (Well To Tank) emissions have also been included as emissions from purchased goods and services.*
5. *This document does not provide any recommendations or requirements for removal.*
6. *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:

- NZ Ministry for the Environment Guidance for Voluntary GHG Reporting – 2020
- USA EPA - Emission Factors for Greenhouse Gas Inventories 2021
- G20 Climate Transparency Report 2021 - China
- UK Department for Business, Energy & Industrial Strategy 2021

- National Greenhouse Accounts Factors: 2021 (Australian Department of Industry, Science, Energy and Resources)
- Australian Energy Market Operator
- US Energy Information Administration
- Corporate Traveller and EcoTransIT
- 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 FY2020

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:

- Emission factor updates
- Air freight short, medium and long haul differentiation also applied for domestic transport
- 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
- LCL sea freight updated to follow TEU-km in line with FCL sea freight

4.2.3 GWP Calculation and Source

Quantities of GHG emissions are expressed as tonnes of CO₂e (Carbon Dioxide Equivalents) using the global warming potentials (GWP) from the IPCC Fifth Assessment Report (AR5). The time horizon is 100 years.

Direct emissions sources (Category 1) are expressed as both CO₂e and their detailed GHG breakdown, including the GWP (Global Warming Potential) value. The most notable GHGs include:

GHG	Chemical Formula	GWP
Carbon dioxide	CO ₂	1
Methane	CH ₄	28
Nitrous oxide	N ₂ O	265

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 and Australia. 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	401kgs	731.83t
New Zealand	Auckland – Chiller System 2	R404A	3,922	180kgs	705.96t
New Zealand	Auckland – Chiller System 3	R134A	1,430	190kgs	271.70t
New Zealand	Christchurch - Chiller	R407F	1,825	212kgs	386.90t
Australia	Sydney – Chiller	R404a	3,922	640kgs	2,510.08t
Australia	Brisbane – Chiller	R404a	3,922	300kgs	1,176.60t
Australia	Melbourne – Chiller	R404a	3,922	680kgs	2,666.96t
Europe	Born – Warehousing Chiller	R449A	1,282	12kgs	15.38t
Global	Total				8,465.41

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)
- Diesel in backup generators (covered under category 1 purchased fuel)
- Fire extinguishers (numerous but small holding and low GWPs)

New emissions liabilities and changes:

- The GWP for R134A has been updated from 1,300 ([GHG Protocol](#)) to 1,430 ([Gov.UK guidance on F gas](#))
- Born Warehousing has been added in this year’s liabilities despite a relatively small holding. It has a GWP of 1,282 (AR5). <https://www.climalife.co.uk/r449a>

4.2.5 Review, Internal Audit and Improvement

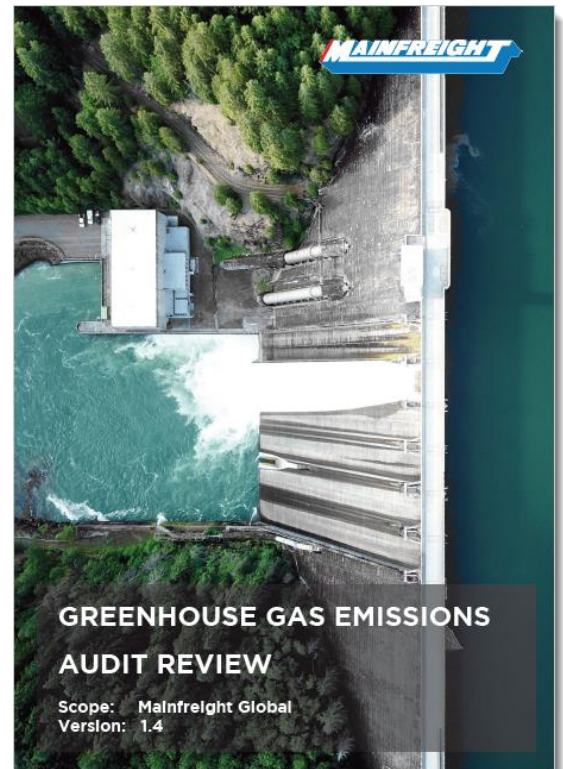
Primary data has been sought for all significant emissions sources. Where data is unavailable or not comparable, conservative estimation methods have been applied such that incentives lie in continually improving the ratio of primary data to estimation approaches.

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 2018 and 2019 years, a post audit review document was prepared in 2020 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
- Better data quality and completeness
- More comprehensive and better organised source data
- Transition to better units of measure
- Addition of biomass
- Shared online platform for all regions
- Detailed explanation of methodologies and assumptions against each emission source
- A data source index was provided for auditors to easily locate relevant documents



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.

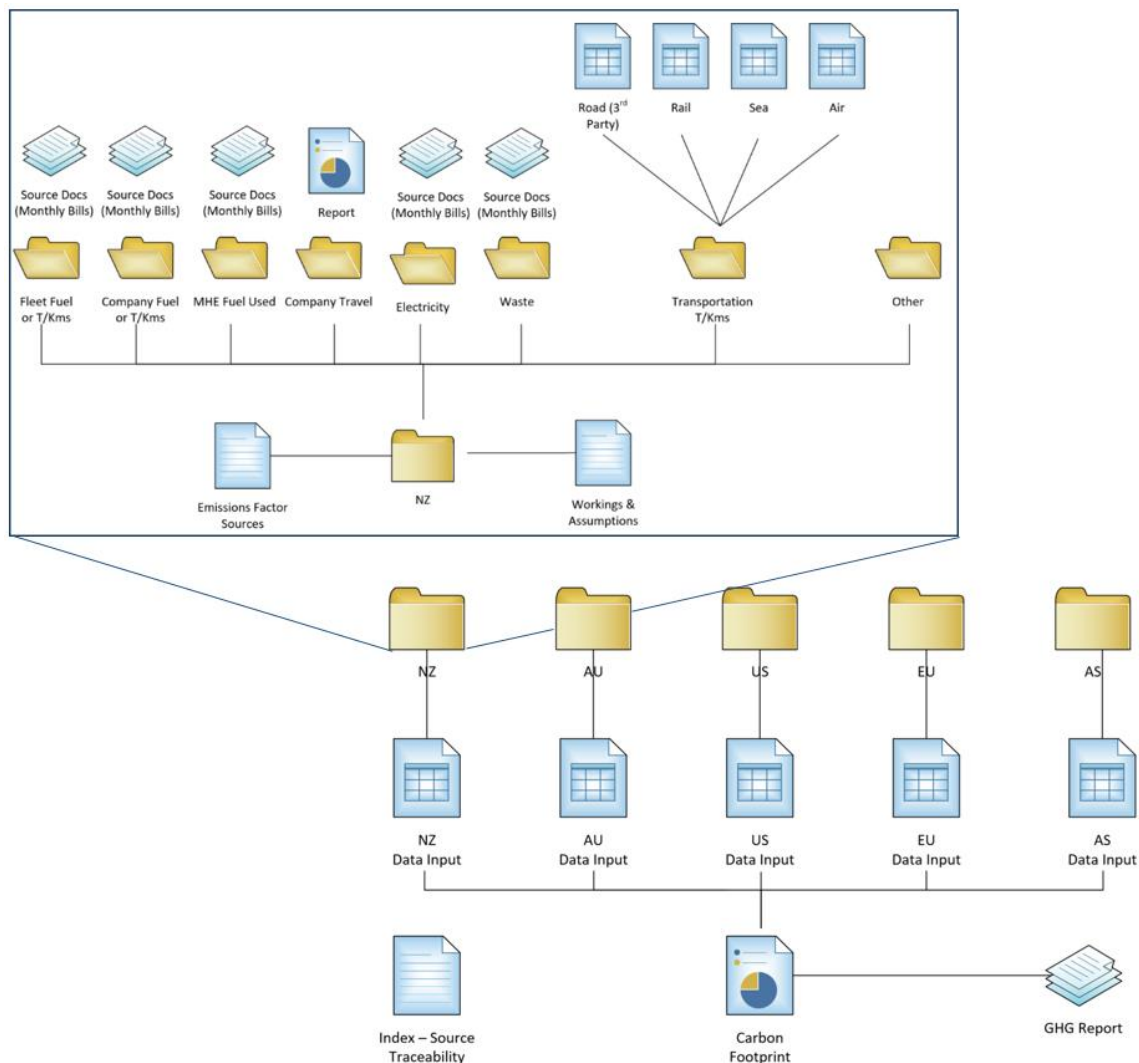


Figure 2: Documentation and Source Information Structure

4.4 Assessment of Uncertainty

For this 2021 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 305 branches operating across some 24 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, as limitations on data availability would delay publishing by several months (and outside our core-reporting window).
2. In our first effort to publish to the ISO standard, we elected to investigate two years of emissions (2018 and 2019) to examine initial trend.
3. The two years with the most reliable and available data at the time were 2019 followed by 2018.
4. 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-nz/investor/reports-library>

4.5.1 Recalculation of 2020 Inventory

During examination and sampling of Australian domestic linehaul data at audit, a material issue was identified in the compilation methodology. Specifically the method used to compile the data from our Australian Transport Management System had some deficiencies, including:

- Range set by 'created date' rather than actual 'departure date'
- 'Paperwork only' manifests were excluded but should not have been
- Secondary manifests were not included in the linehaul job weight total but should have been

The sum of these changes exceeded the significance threshold for a single emission source (of greater than 1%), we have therefore chosen to re-publish an updated 2020 calendar year inventory as appendix 3 within this report for clarity and comparability. The affected emissions source categories were; Categories 1 and 3: road freight, Category 3: rail freight and Category 4: the well-to-tank portion of changes above.

Specific references to year on year emissions changes will in this report and elsewhere now refer to the recalculated 2020 value.

The 2021 inventory uses the improved methodology here.

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

For the 2021 year, we have seen reductions across all 5 of our tracked emissions intensity measures (see 5.3). In respect to the significant business growth over this period we have recorded a **211,053 tonne increase** in carbon dioxide equivalents, across our global business representing a **14.37%** increase in gross greenhouse gas emissions.

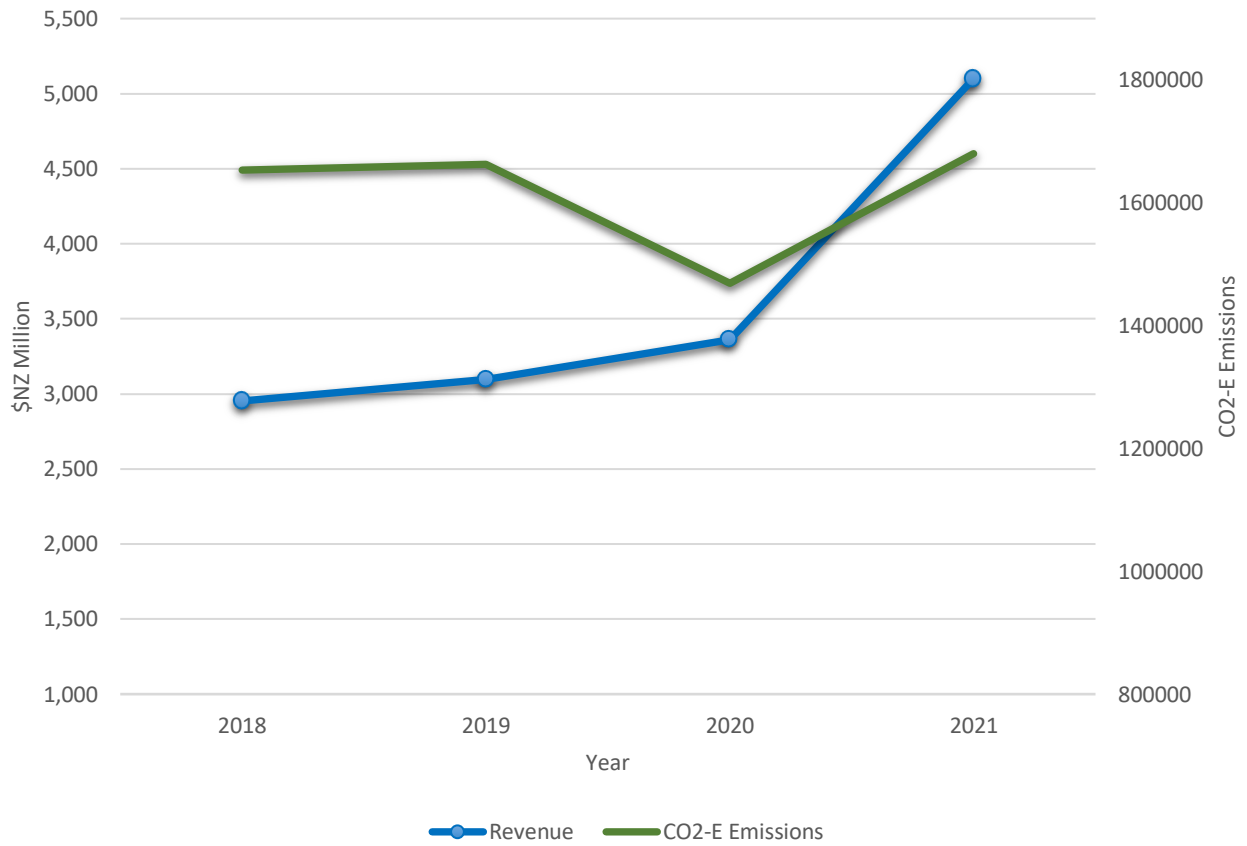
This increase is reflective of the ongoing reverberations across global supply chain. In particular a shift in customer preference to airfreight due to congestion, price increases and poor reliability in ocean based alternatives and the return of belly freight capacity in passenger aviation.

Emissions for customer **airfreight alone rose 237,098 tonnes in 2021**, almost 30,000 tonnes more than the increase in our global inventory year on year.

This represents a mixed result; an increase is disappointing, however excluding the impacts of airfreight, Mainfreight would have seen a second year of reductions in gross emissions. This comes despite significant business growth and market share gains over these last two years, reflected in our improved performance in tracked intensity measures.

Unfortunately we do not see a normalisation of global supply chain in 2022, although the dynamics may shift somewhat. We continue to target reductions in emissions intensity year on year (see 5.3) while aiming to reduce gross emissions wherever possible.

Year on Year Trends - Revenue & Emissions



CHAPTER 5: INTERNAL REPORTING & PERFORMANCE

5.1 Emissions by Category, Gas and Freight Mode

Emissions Category



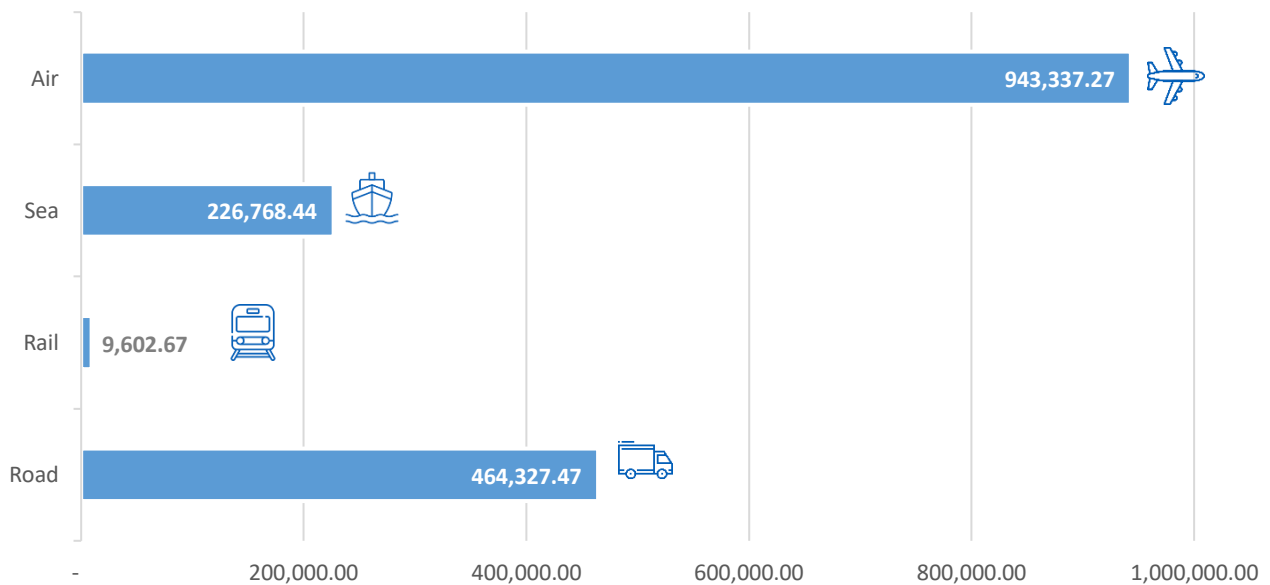
Category 1 16.6%	Category 2 0.88%
Category 3 77.96%	Category 4 4.55%
Category 5 0.00%	Category 6 0.01%

Category 1 Gas Breakdown

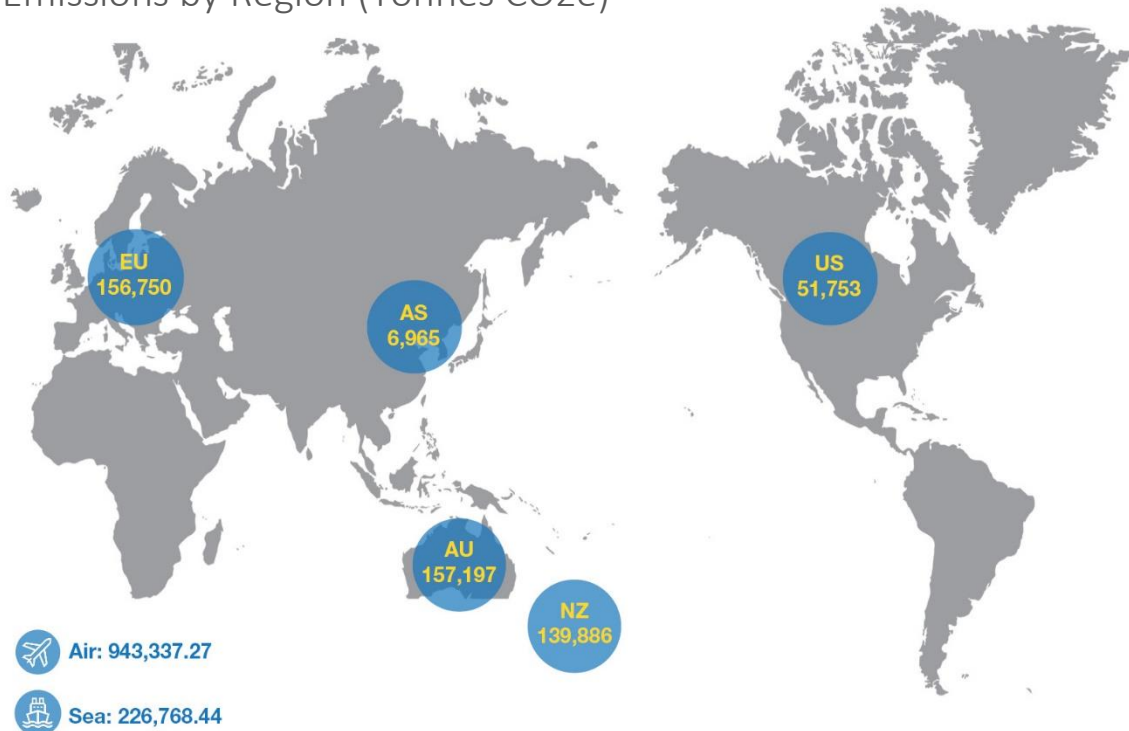


Carbon Dioxide - CO2 98.78%
Methane - CH4 00.12%
Nitrous Oxide - N2O 1.10%

Freight Mode



5.2 Emissions by Region (Tonnes CO2e)



Note: International air and ocean freight (previously included against region of origin) has been separated in this year's report

5.3 Emissions Intensity Measures



5.4 Freight Emissions by Mode (Year on Year)

Emissions Source	2021 Tonnes CO2-E	2020 Tonnes CO2-E
Road	464,327	460,063
Rail	9,603	7,038
Air	943,337	706,239
Sea	226,769	261,739
Total Freight Emissions	1,644,036	1,435,079
Direct Operational Emissions	36,063	33,967
Total Emissions	1,680,099	1,469,056
Direct Operational Emissions % of Total	2.15%	2.31%

5.5 Performance Measures, Targets and Benchmarks

Performance against fixed emissions targets are 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

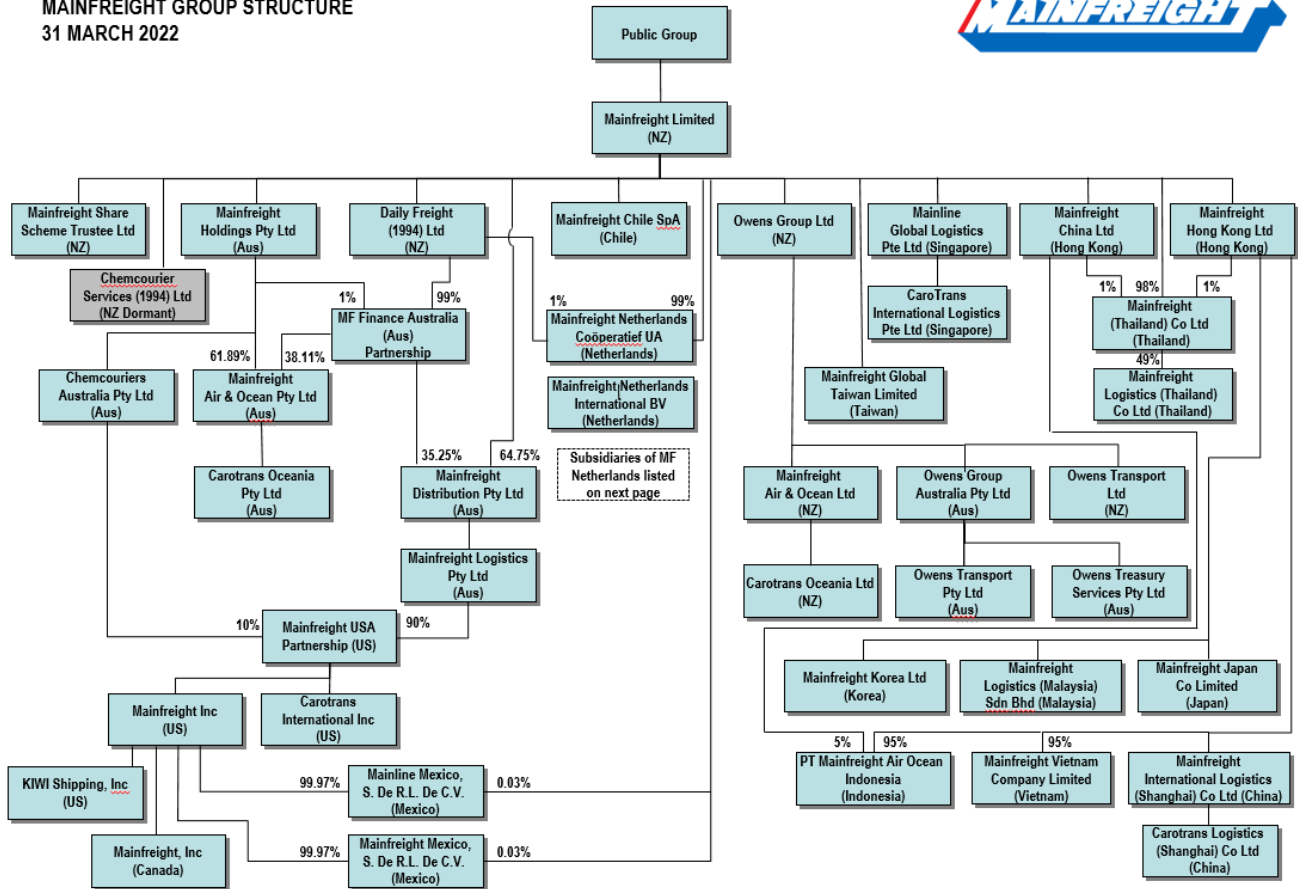
ISO Reporting	Section in this Report
9.3.1 (a)	1.3
9.3.1 (b)	1.4
9.3.1 (c)	1.6
9.3.1 (d)	2
9.3.1 (e)	3
9.3.1 (f)	4.1
9.3.1 (g)	4.1
9.3.1 (h)	4.6
9.3.1 (i)	3.3
9.3.1 (j)	4.1
9.3.1 (k)	4.5
9.3.1 (l)	4.5
9.3.1 (m)	4.2
9.3.1 (n)	4.2
9.3.1 (o)	4.2
9.3.1 (p)	4.4
9.3.1 (q)	4.4
9.3.1 (r)	1.7
9.3.1 (s)	1.7
9.3.1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

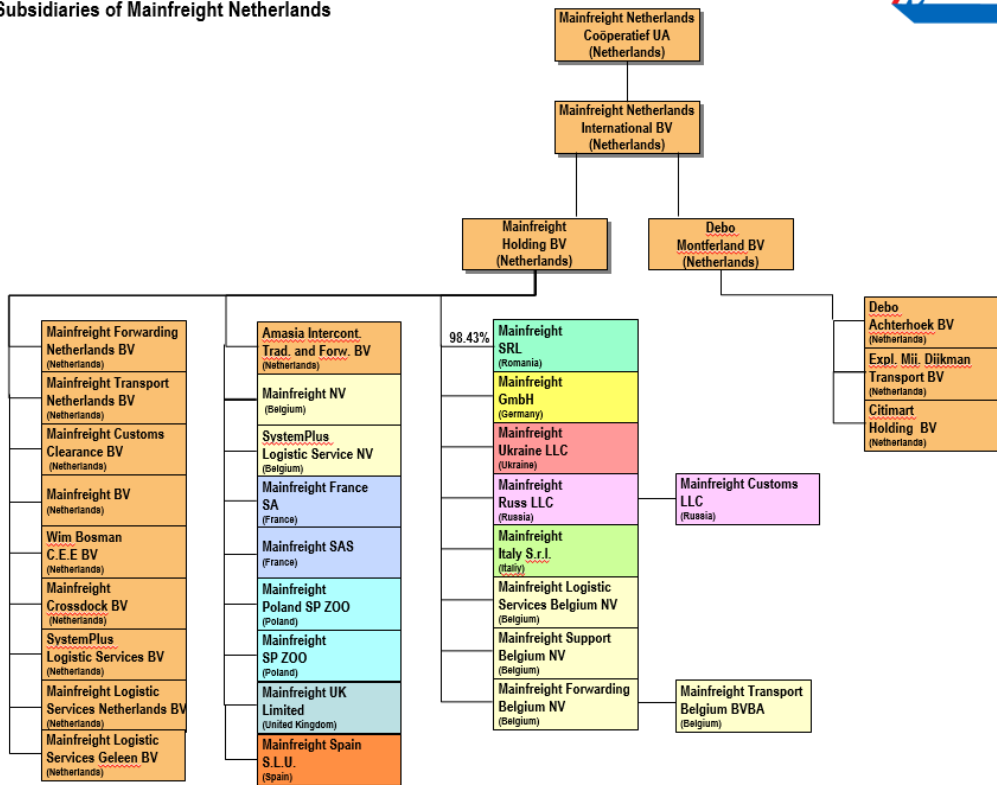
Appendix 2 – Mainfreight Group Structure

MAINFREIGHT GROUP STRUCTURE
31 MARCH 2022



All subsidiaries 100% ownership except where otherwise indicated

MAINFREIGHT GROUP STRUCTURE
Subsidiaries of Mainfreight Netherlands



Appendix 3 – Republished Consolidated Statement of Greenhouse Gas Emissions 2020 Calendar Year

EMISSIONS	Notes	CO2-e			
		TOTAL (Tonnes p.a.)	Carbon Dioxide (CO2)	Methane (CH4)	Nitrous Oxide (N2O)
	1	GWP	1	28	265
1 Category 1: Direct GHG emissions and removals in tonnes CO2-e	2	263,759	260,471	290	2,998
Direct emissions from stationary combustion					
Direct emissions from mobile combustion		263,759	260,471	290	2,998
Direct process and removals from industrial processes					
Direct fugitive emissions from the release of GHGs in anthropogenic systems					
Direct emissions and removals from land use and forest change					
Direct emissions in tonnes of CO2 from biomass	3	0.761	0.761		
Indirect emissions in tonnes CO2-e		1,205,286			
2 Category 2: Indirect GHG emissions from imported energy					
Indirect emissions from imported electricity		14,168			
Indirect emissions from imported energy		1,245			
3 Category 3: Indirect GHG Emissions from Transportation					
Emissions from upstream transportation and distribution of goods					
Emissions from downstream transportation and distribution of goods		1,113,902			
Emissions from employee commuting					
Emissions from client and visitor transport					
Emissions from business travels		1,233			
4 Category 4: Indirect GHG emissions associated with the use of products by the organisation	4				
Emissions from purchased goods and services		68,127			
Emissions from capital goods					
Emissions from the disposal of solid and liquid waste		6,551			
Emissions from the use of assets	NS				
Emissions from other services not described above					
5 Category 5: Indirect GHG emissions associated with the use of products from the organisation					
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				
6 Category 6: Other indirect GHG emissions sources					
Emissions from accommodation		61			
TOTAL EMISSIONS CATEGORIES 1 - 6		1,469,045.93			
REMOVALS	5				
Direct removals in tonnes CO2-e					
Emissions Liabilities	6				
Total Storage as of year end in tonnes CO2-e					
Other Related Information					
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			4.2
Significance criteria		Greenhouse Gas Emissions Inventory Report			3.2
Uncertainty assessment		Greenhouse Gas Emissions Inventory Report			4.4

[NS] Non significant.



INDEPENDENT AUDIT OPINION

Toitū Verification

TO THE INTENDED USERS

Organisation subject to audit:	Mainfreight Limited
Audit Criteria:	ISO 14064-1:2018 ISO 14064-3:2019 Audit & Certification Technical Requirements 3.0
Responsible Party:	Mainfreight Limited
Intended users:	Mainfreight managers, team, customers, investors and all other stakeholders
Registered address:	2 Railway Lane, Otahuhu Auckland, 1741, New Zealand
Inventory period:	01/01/2021 to 31/12/2021
Inventory report:	GHG Report - 2021 V0.5.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 validation and 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. 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;
- controls testing on freight system;
- sampling of freight and fuel data;
- sense checks for remaining categories

The data examined during the verification were historical in nature.

QUALIFICATIONS TO VERIFICATION OPINION

None

VERIFICATION LEVEL OF ASSURANCE

	tCO ₂ e	Level of Assurance
Category 1	278,956.70	Reasonable
Category 2	14,864.88	Reasonable
Category 3	1,309,744.20	Reasonable
Category 4	76,389.29	Reasonable
Category 5	0.00	Reasonable
Category 6	136.94	Reasonable
Total inventory	1,680,099.25	

RESPONSIBLE PARTY'S GREENHOUSE GAS ASSERTION

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

VERIFICATION AND VALIDATION CONCLUSION


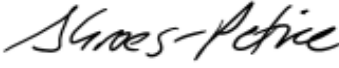
We have obtained all the information and explanations we have required. In our opinion, the emissions, removals and storage defined in the inventory report, in all material respects:

- 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 to meet Programme requirements. 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 programme requirements. 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:	Rhea Selwan	Name:	Sonia Groes-Petrie
Position:	Verifier, Toitū Envirocare	Position:	Certifier, Toitū Envirocare
Signature:		Signature:	
Date verification audit:	23-24 March 2022	Date:	11 May 2022
Date opinion expressed:	29 April 2022		