

Greenhouse Gas Emissions Inventory Report - FY2023/24

Baseline year + 1

Prepared in accordance with ISO 14064-1:2018

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Dated: 23 October 2024

Verification status: Reasonable for all categories except category 3 CME travel. Limited for category 3 CME travel

Measurement period: 01 July 2023 to 30 June 2024

Base year period: 01 July 2022 to 30 June 2023

Approved for release by:

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Availability

This report will be used to inform the 1 July 2023 – 30 June 2024 Health New Zealand | Te Whatu Ora (Health NZ) Annual Report. Reviewed by the Executive Leadership Team, this report will be available to internal and external stakeholders through Health New Zealand's website. This report's findings will guide the organisation's sustainability work programme and inform Health New Zealand's Emissions Reduction Plan.

Report Content and Structure

The Emissions Inventory Report contains a complete and accurate quantification of the amount of GHG emissions and removals that can be directly attributed to the organisation's operations within the declared boundary and scope for the specified reporting period. This report has been prepared in accordance with ISO 14064-1:2018 Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals and the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004) ¹. Where relevant, the inventory reporting aligns with industry or sector best emissions measurement and reporting practices.

The inventory summary contains a high-level summary of this year's results. Chapter 1 provides information on the organisation, the organisational boundaries and the sources included and excluded in the inventory, followed by information on the emission sources, data collection and more detailed emission results. Chapter 2 briefly describes initiatives in place to reduce organisational emissions.

¹ Throughout this document 'GHG Protocol' refers to the GHG Protocol Corporate Accounting and Reporting Standard and 'ISO 14064-1:2018' means the international standard Specification with Guidance at the Organizational Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals.

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Table of Abbreviations/Glossary

CNGP	Carbon Neutral Government Programme
CME	Continuing Medical Education
DHBs	District Health Boards
EECA	Energy Efficiency and Conservation Authority
GHG	Greenhouse Gas
GJ	Gigajoule
GWP	Global Warming Potential
kWh	Kilowatt-hour
IIG	Infrastructure and Investment Group
LFGR	Landfill Gas Recovery
MfE	Ministry for the Environment Manatū Mō Te Taiao
NTA	National Travel Assistance
1.5-degree pathway	Setting targets in line with limiting the global average temperature increase to 1.5 degrees Celsius above pre-industrial levels.

PPN	Per person night
PKM	Passenger-kilometre
tCO ₂ e	Tonnes of carbon dioxide equivalent, the common unit of measure for combined greenhouse gases

Executive Summary

This is the second Emissions Inventory Report for Health New Zealand | Te Whatu Ora (Health NZ) following our baseline inventory. The measurement period covers the second financial year since the organisation's establishment, from 1 July 2023 to 30 June 2024.

This inventory will inform Health NZ's sustainability work programme and assist in meeting the directions of the Carbon Neutral Government Programme (CNGP).

Health NZ's total greenhouse gas (GHG) emissions² for the reporting year 1 July 2023 to 30 June 2024 were 205,275 tCO₂e.

Table 1 presents Health NZ's GHG emissions by ISO 14064 Category and GHG Protocol Scope.

Table 1 GHG Emissions by Category

ISO 14064-1:2018 Category	GHG Protocol Scopes	tCO ₂ e
Category 1: Direct emissions	Scope 1: Direct GHG emissions from sources owned or controlled by Health NZ	83,087
Category 2: Indirect energy emissions	Scope 2: Energy indirect emissions from purchases of electricity, heating, cooling and steam	27,015
Category 3: Indirect emissions from transportation		80,696
Category 4: indirect emissions from products or services used by Health NZ	Scope 3: All other indirect emissions that result from the organisation's activities (e.g., upstream and downstream emissions, business travel, waste, supply chain).	14,476
Category 5: Indirect emissions associated with the use of products produced by an organisation		-
Category 6: Indirect emissions from other sources		-

² Henceforth referred to as 'emissions'

Table 2 disaggregates each category emission by main emissions source.

Health NZ Emissions Profile by Category		tCO₂e
1	Natural gas	48,972
	Medical Gases - CO ₂ , N ₂ O, CH ₄ , Acetylene	13,144
	Fleet Fuels	8,493
	Coal	7,718
	Refrigerants	2,011
	Stationary Diesel	1,497
	LPG	712
	Anaesthetic Vapours - Desflurane, Isoflurane, Sevoflurane	534
	Biomass - CH ₄ , N ₂ O	7
Category 1 Total		83,087
	Electricity	26,418
2	Purchased steam from coal	586
	Purchased steam from biomass and landfill gas	10
Category 2 Total		27,015
	Staff air travel	52,415
	Patient travel by road - Patient travel claims (NTA)	8,070
	Patient travel by air - Medical plane	7,483
3	Patient travel by road - Ambulances	4,910
	Patient travel by air - Airline	4,082
	Patient travel by air - Helicopter	3,736
Category 3 Total		80,696
	Waste to landfill	6,267
	Transmission and distribution (T&D) losses gas and electricity	3,631
	Accommodation Patients	1,553
4	Waste incinerated	103
	Water supply	210
	Water & Wastewater	2,712
Category 4 Total		14,476
Total gross emissions (tCO₂e)		205,275
Biogenic Emissions (tCO₂)		27,942

Table 2 Emissions profile by category source

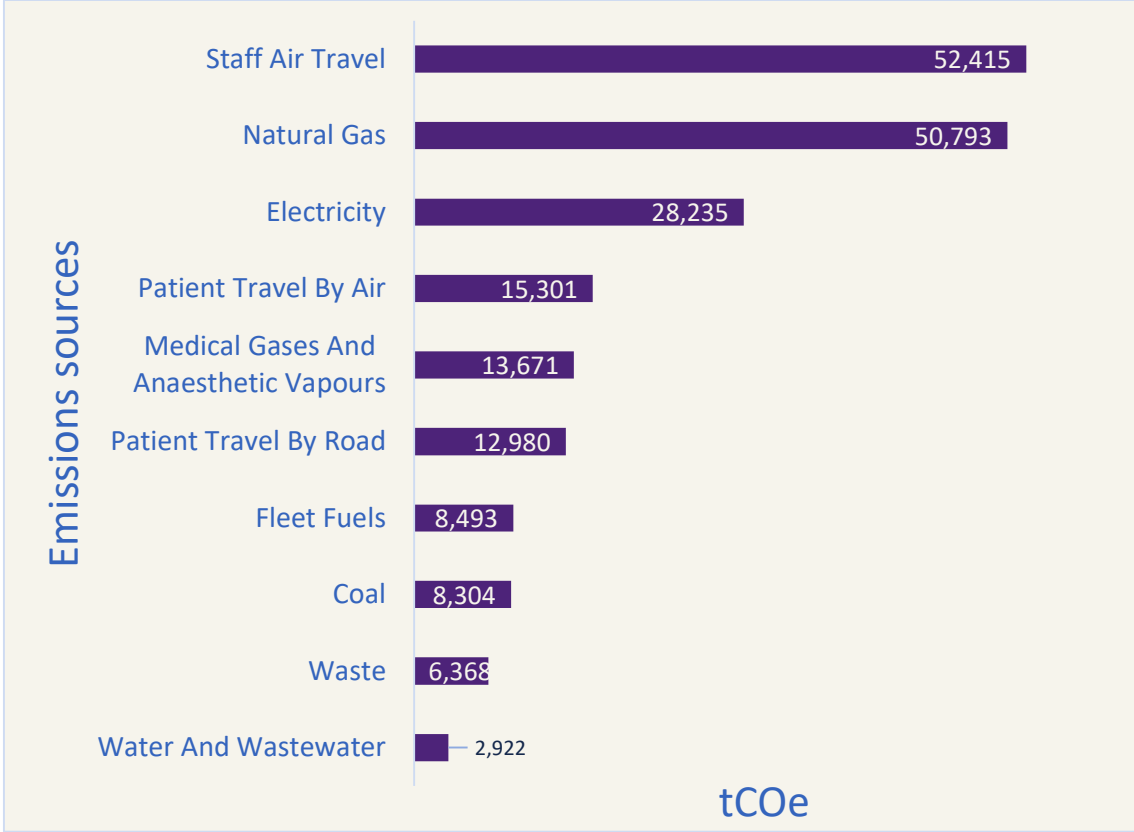


Figure 1 Emissions by main source (Gas and Electricity inc. T&D losses)

1. Chapter 1: Emissions Inventory Report

1.1. Introduction

This is the second Health New Zealand | Te Whatu Ora (Health NZ) annual greenhouse gas emissions inventory report. The emissions inventory is a complete and accurate quantification of the emissions directly attributed to the organisation's operations within the declared boundary and scope for the reporting period 1 July 2023 – 30 June 2024. Any exclusions from reporting have been documented and justified.

The inventory has been prepared in accordance with the requirements of the following:

- ISO 14064-1:2018 Greenhouse Gases – Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals³
- Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004)
- Carbon Neutral Government Programme (CNGP) latest direction and guidance.

1.2. Emissions Inventory Results

For FY2023/24, Health New Zealand's GHG Inventory totalled 205,275 tCO₂e. The top 10 emissions by emissions source for the reporting period 1 July 2023- 30 June 2024 are summarised in Table 3 and illustrated in Figure 1.

Table 3 Health New Zealand Top 10 Emissions Sources⁴

Emissions source	tCO ₂ e
Staff Air Travel	52,415
Natural Gas	50,793
Electricity	28,235
Patient Travel by Air	15,301
Medical Gases and Anaesthetic Vapours	13,671
Patient Travel by Road	12,980
Fleet Fuels	8,493
Coal	8,304
Waste	6,368
Water & Wastewater	2,920

For the reporting period, direct emissions (Category 1) totalled 83,087 tCO₂e and indirect (Category 2,3, and 4) emissions totalled 122,188 tCO₂e (Table 4)

³ Henceforth referred to as ISO 14064-1

⁴ Natural Gas and Electricity figures include transmission and distribution losses (T&D). Coal figures include steam from coal purchases.

Table 4 Direct and Indirect Emissions Sources

	Category	tCO ₂ e	Subtotal
Direct Emissions	Category 1	83,080	83,087
	Category 2	27,015	
	Category 3	80,696	
Indirect Emissions	Category 4	14,476	122,188
	Category 5	-	
	Category 6	-	

Emissions by Health NZ region is illustrated in Figure 2. The Northern region accounted for the largest share of Health NZ's GHG emissions at 28% of the total, which aligns to the region with the largest population.

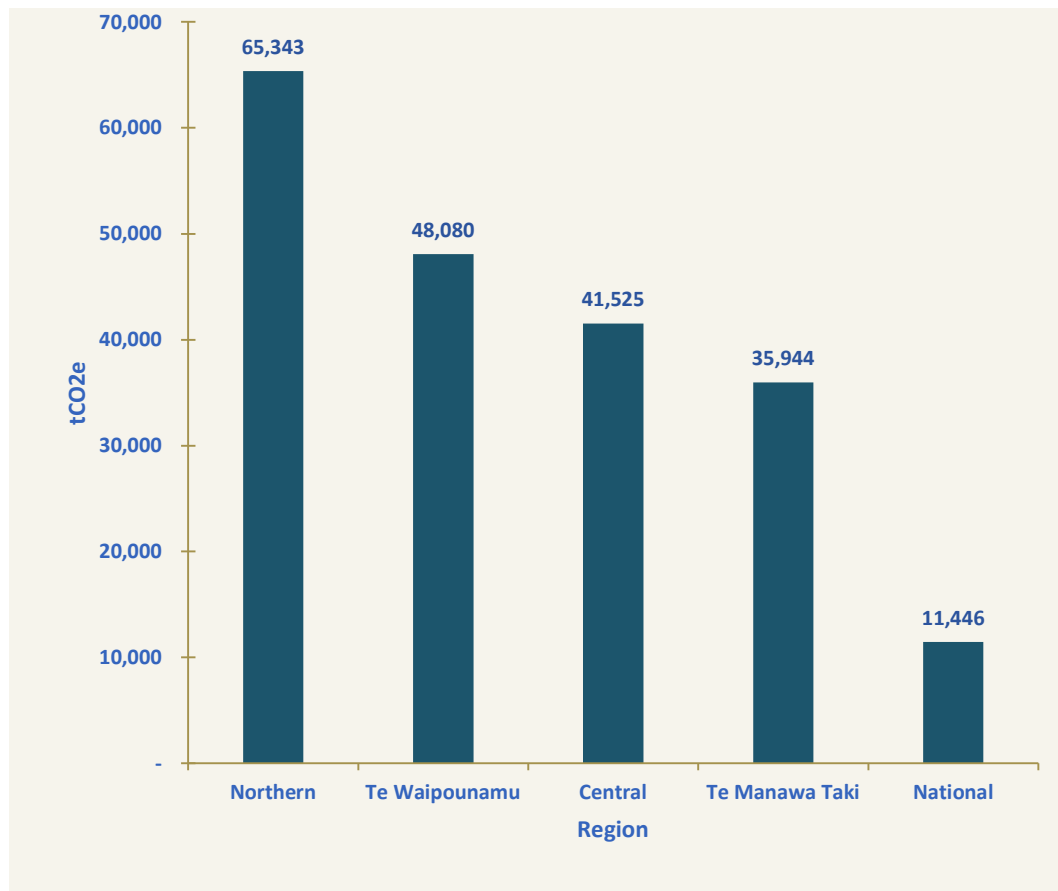


Figure 2 Emissions by region (excludes subsidiaries and corporate office emissions)

Table 5 summarises Health NZ's GHG emissions by Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), and various refrigerant categories.

Table 5 Direct GHG emissions quantified per gas

Direct Emissions per GHG		tCO ₂ e	tCO ₂	tCH ₄	tN ₂ O
GWP of gas			1	28	265
Stationary Combustion	Natural gas	48,972	47,137	79	2
	Coal Sub-bituminous	4,662	4,661	0.48	0.054
	Coal bituminous	3,055	3,055	0	0
	Diesel	1,497	1,489	3	0.05
	LPG	712	676	1	0.024
	Biomass	6.65	6.65	0.011	0.00023
Transport fuels	Petrol	6,501	6,176	10	0.22
	Diesel	1,643	1,561	3	0.06
	Petrol premium	349	332	0.52	0.01
Medical gases	Nitrous Oxide	13,094			49,410
	Carbon Dioxide	46	46		
	Methane	0.2		0.008	
	Acetylene	0.2			
Anaesthetic vapours	Sevoflurane	450			
	Desflurane	75			
	Isoflurane	9			
Refrigerants	Refrigerant blends: Zeotropes	936			
	Hydrofluorocarbons	592			
	Substances controlled by the Montreal Protocol	23			
	Refrigerants other	13			

A detailed breakdown of all emission sources is included in Appendix A.

Appendix B lists the emissions per supplier per group to identify the sources of our most significant emissions.

Appendix C summarises emissions for each CNGP activity.

1.3. Emissions Inventory Results against baseline

Health NZ's total measured GHG emissions have declined by around 32,500 tCO₂e, or 14%, from the 237,822 tCO₂e FY2022/23 baseline.

The decrease in emissions is largely driven by significant reductions in emissions associated with Category 1 and 2 stationary energy use (Figure 3). Here, a significant decline in energy from coal of 26,524 tCO₂e, or 76%, is the main contributing factor. However, there have also been significant reductions in natural gas use of 4,070 tCO₂e (7%) and electricity 2,305 tCO₂e (8%).

Much of the progress in reducing emissions associated with stationary energy sources can be attributed to Health NZ's work on removing coal as an energy source by end

FY2024/2025, early work on reducing its dependence on natural gas, and various other energy efficiency programmes

There has also been a decrease in emissions associated with fleet fuels of 722 tCO₂e, or 8%. This decrease is largely attributable to progress made as part of Health NZ's work to transition to Battery Electric Vehicles.

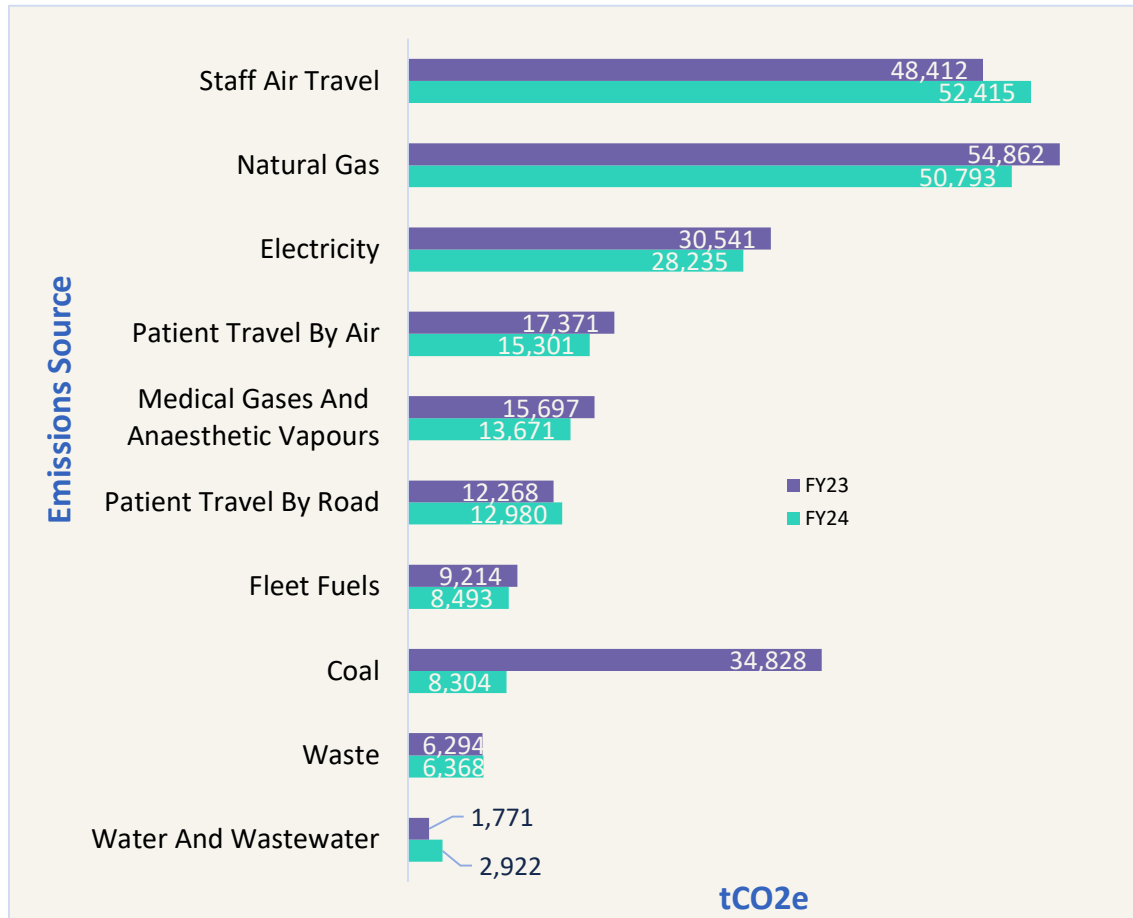


Figure 3 Health NZ Top 10 Emissions Sources FY2023/24 vs Baseline FY2022/23

1.4. Organisational Context

1.4.1. Organisational Description

Health New Zealand | Te Whatu Ora (Health NZ) was established on 1 July 2022 and leads the day-to-day running of the publicly funded health system across Aotearoa New Zealand, with functions delivered at local, district, regional and national levels. It weaves the functions of the former District Health Boards (DHBs) into its regional divisions and district offices (see Figure 4), ensuring continuity of services in the health system. Health NZ is responsible for improving services and outcomes across the health system.



Figure 4 Health NZ Regions

Health NZ is a large organisation with approximately 82,000 FTE (in FY23/24) managing all publicly funded health services, including hospital and specialist services. The organisation has a significant infrastructure portfolio distributed across the motu, consisting of approximately 1,200 clinical and corporate buildings. Emissions are generally concentrated at around fifty hospital campuses.

The organisation has a range of national functional and support services, including the National Public Health Service, Finance, Data and Digital, and Procurement & Supply Chain services, and is supported by eleven subsidiary companies.

Section 7 of the Pae Ora (Healthy Futures) Act 2022 requires that Health NZ address the wider determinants of population health and wellbeing, including effects that adversely

impact population health, such as climate change⁵. Health NZ recognises that its operations directly impact the environment and that increased environmental sustainability and climate resilience are necessary to continue creating a positive impact on the population's health.

Across Health NZ there are many work programmes driving positive sustainability and climate change outcomes. Within the Office of the Chief Executive, the Sustainability Function, who are responsible for this inventory have four key workstreams:

- To integrate sustainability into core strategies and culture
- Health system decarbonisation
- Environment in all practices
- Health system resilience and adaptation

This report is a key outcome of the health system decarbonisation work stream, assisting the organisation in complying with requirements under Carbon Neutral Government Programme (CNGP), measuring and monitoring emissions reduction progress, setting emissions reduction targets and developing plans to achieve those targets. Health NZ is continually looking at how to show leadership due to the impact climate change is having and will continue to have on the health of New Zealanders. This leadership is important to contribute toward national emissions reduction targets and to bring others on the journey. To meaningfully reduce our emissions, Health NZ recognises the need to take a whole-of-system approach.

1.4.2. Statement of intent

This inventory forms part of Health NZ's commitment to measure and manage its emissions and report in line with CNGP directions. The report outlines Health NZ's second year for emissions reporting. Our objective is to use the inventory to track Health NZ's progress towards its emissions reduction targets, identify opportunities for operational improvements, and provide transparent and credible information to our stakeholders.

1.4.3. Reporting period

The emissions reporting period is from 1 July 2023 to 30 June 2024, aligning with CNGP requirements and Health NZ's financial year.

Health NZ creates emissions inventories annually, and this is the second emissions report for Health NZ; the baseline being FY2022/23. This inventory and future ones will be measured against the FY2022/23 baseline.

1.4.4. Organisational boundary and consolidation approach

The highlighted box in Figure 4 shows the organisational boundary for Health NZ within the national health system. This encompasses all previous organisations transferred to Health NZ, including all DHBs, Public Health Units and services transferred to Health NZ from Ministry of Health | Manatū Hauora. Te Aka Whai Ora transitioned to the Hauora Māori

⁵ Pae Ora (Healthy Futures) Act 2022, s 7(e)

Services Directorate within Health New Zealand during the course of FY2023/24. This transition did not require change in data collection or reporting for this inventory as emissions sources that fell within the bounds of Te Aka Whai Ora had already been accounted for in Health New Zealand data due to many shared services and office locations. Figure 5 sets out Health NZ’s organisational boundary during the reporting year.

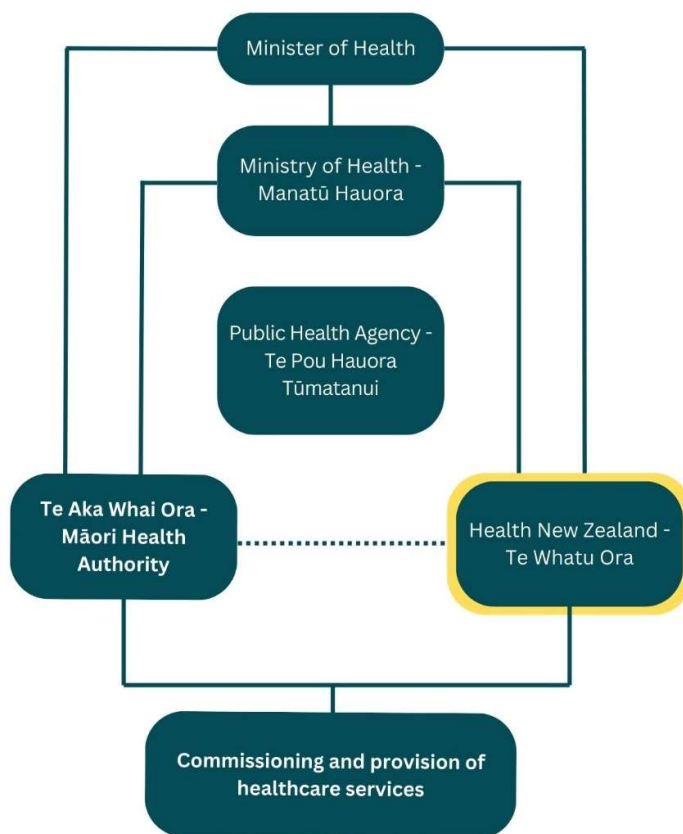


Figure 5 Health New Zealand organisational boundary FY2023/24

Consolidation approach

In this GHG Inventory report, Health NZ has adopted the operational approach for consolidating our emissions data. This method aligns with Health NZ’s primary control and management practices, allowing for a comprehensive and accurate representation of our greenhouse gas emissions. The operational approach is particularly suitable because:

- Health NZ can accurately capture the emissions from facilities, assets, and operations where there is authority to implement operational policies and measures.
- The approach complies with relevant reporting requirements, ensuring that this GHG Inventory meets external standards and expectations. This approach also supports transparency and accountability commitments, as it provides a clear and straightforward framework for reporting emissions from controlled operations.

- By focusing on operations where we have control, the operational approach enables us to identify and prioritise emission reduction opportunities effectively. This focus allows Health NZ to implement targeted initiatives that can significantly impact the overall carbon footprint.

A breakdown of the hospitals, specialist services and office locations are included in Appendix D.

It is difficult to ascertain the boundaries of several hospital sites regarding contracted services and leased spaces within hospital campuses. Therefore, all onsite laundries (whether operated in-house, as a subsidiary or as a contracted service), retail spaces and clinical spaces shared with external organisations are included in the inventory.

1.4.5. Business units excluded from inventory

Health NZ works collaboratively with local primary health, wellbeing, and community-based services to improve community health, however, has no operational control over these services; therefore, these are excluded from the inventory.

Table 6 outlines the subsidiary exclusions. Companies of which Health NZ does not hold a majority share have been excluded due to a lack of operational control. The other excluded subsidiaries are insignificant due to their size and operation.

Table 6 Business Unites Excluded from Inventory

Subsidiary	Reason for Exclusion
Opotiki Health Centre Ltd	15% share of ownership and de minimis
Tlab Ltd	50% share of ownership and de minimis
Health one Ltd	50% share of ownership and de minimis
Brackenridge Services Ltd	De minimis
Spectrum Health Ltd	De minimis
South Canterbury Eye Clinic Ltd	De minimis
NZ Health Innovation Hub	A virtual subsidiary with no emissions associated with its activity

1.5. GHG Emissions sources

1.5.1. Significance and Materiality

For a GHG inventory under ISO 14064-1 the determination of significant emission sources for inclusion and exclusion is guided by specific criteria. Criteria that Health NZ uses to determine the significance of emissions sources for inclusion or exclusion include:

- **Materiality:** a materiality threshold has been established, where emissions sources can be excluded if they account for less than 1% of the total inventory. Cumulatively, de minimis exclusions should not exceed 5% of the total inventory.
- **Operational control and influence:** this refers to Health NZ's ability to influence or control emissions from a source. Emission sources over which there is direct operational control or significant influence over included. For instance, excluded sources include from subsidiaries where Health NZ does not have a controlling stake (i.e. 51%>).
- **Stakeholder Interest:** consideration is given to the inclusion and retention of emissions sources based on the interest and concerns of our stakeholders. Here energy sources and some waste categories are included because of their importance to stakeholders.
- **Regulatory requirements:** emission sources subject to regulatory reporting, compliance obligations, or specific reduction targets are considered significant. For example, under the CNGP Health NZ is obliged to report on all direct energy source emissions. Consequently, sources like stationary diesel used for backup generators is included even though it is de minimis.

1.5.2. Emissions sources included

The emissions sources included in this inventory were identified with reference to the methodology in the GHG Protocol and ISO 14064-1:2018 standards.

An emissions reporting working group was established in December 2021 to standardise emissions reporting across DHBs. A product of this work was the Te Whatu Ora Emissions Reporting Framework, now the Health New Zealand | Te Whatu Ora Emissions Reporting Framework, which guides and supports the progressive inclusion of emissions sources. This framework is now under review, as there is continued change within publicly funded health system; the value, robustness, timeline and feasibility for wider emissions sources to be formally included in the inventory is being assessed. This review is expected to be complete in FY24/25 and will inform if and how future inventories will be expanded.

Table 7 Emissions sources included in inventory FY2023/24

Emission activities in scope	
Category 1	Coal, natural gas, LPG, diesel stationary, biomass, refrigerants, medical gases (N ₂ O, Entonox, CO ₂ , CH ₄ , Acetylene), Anaesthetic vapours (Desflurane, Isoflurane, Sevoflurane), fleet fuels.
Category 2	Electricity, purchased steam from coal, biomass and landfill gas sources.
Category 3	Staff air travel. Patient air travel by airline, helicopter and medical aeroplanes. Patient travel by ambulance. Patient National Travel Assistance claims (mileage, air travel, public transport, accommodation). Accommodation for patients paid for directly by Health NZ.

Category 4

Waste to landfill, incinerated waste, transmission and distribution losses for natural gas and electricity, distributed energy, water and wastewater.

1.5.3. Emissions sources excluded

Activities that contribute significantly to Health NZ's total emissions and are not included in this baseline inventory; typically called the 'Footprint Plus' these include staff commuting, patient and visitor private travel, purchased goods and services inclusive of commissioned healthcare services, and the embodied emissions arising from capital works and new buildings. As alluded to above, these sources have not been included in this year's inventory due to data sources and data collection methodologies lack sufficient maturity to provide reasonable assurance of their accuracy. They do nonetheless remain a priority for reduction activities.

Health NZ is also subject to the requirements of the CNGP, which lists several emissions sources that would ordinarily be considered de minimis as mandatory for inclusion. These include:

- Energy sources such as stationary diesel, LPG, biomass and purchased steam from biomass or landfill gas.
- Refrigerants
- Water

In addition to de minimis sources included due to CNGP requirements, all sources related to National Travel Assistance programme (NTA) funded patient transport and accommodation was retained. This includes NTA funded accommodation, taxis, public transport, and flight reimbursements. These sources were retained to ensure complete reporting on emissions relating to funded patient travel and accommodation.

The only emissions sources that were excluded therefore are sources associated with staff accommodation (0.3%) and staff travel related to taxis and rental vehicles (0.2%). Consequently, de minimis emission source exclusions total approximately 0.5% of FY2022/23 baseline.

1.5.4. Changes to emissions factors

'Te ine tukunga: He tohutohu pakihi – Measuring Emissions: A Guide for Organisations' (MEG) is a comprehensive database released by New Zealand's Ministry for the Environment | Manatū Mō Te Taiao (MfE) to aid organisations in calculating and reporting their greenhouse gas (GHG) emissions. This guide aligns with international standards, such as the ISO 14064-1:2018 and the GHG Protocol Corporate Accounting and Reporting Standard, ensuring that the methods used are consistent and transparent.

The guide is periodically updated with revised emissions factors. Reasons for revising emissions factors include:

- The incorporation of the latest scientific research and findings. As scientific understanding of GHG emissions improves, the data used to calculate emission

factors is refined to ensure accuracy and relevance. This includes adopting more sophisticated models or techniques that provide a better representation of actual emissions

- Improved data collection methods and the availability of more comprehensive datasets can lead to more accurate emission factors.
- Changes in technology, such as improvements in fuel efficiency or the development of new energy sources, can impact emission factors.
- Electricity emissions factors can change based on annual changes in rainfall and the concurrent change in the proportion of electricity produced through hydro generation, natural gas and coal.

Significant changes to emissions factors provided in the 2024 release of MEG are provided have resulted in a 4.8% decrease in Health NZ's baseline inventory. The primary drivers in this change are changes to emissions factors for domestic flights, and transmission & distribution (T&D) for electricity and natural gas.

An error associated with the calculation of flights booked through Orbit has also resulted in an understatement of the FY2022/23 baseline of 0.4%.

1.5.5. Decision on the restatement of Baseline FY2022/23

Health NZ has a restatement threshold of 7.5%. That is, where changes in the baseline inventory—due to emissions source additions or changes in emission factor calculation methodologies—exceeds 7.5%, the baseline will be restated. Where changes in emissions sources or emissions factors relate to regulatory requirements, are important for emissions reduction planning, or are of particular interest to our stakeholders, this threshold may be lower.

Cumulatively, the exclusion of staff travel (rental cars and taxis) and accommodation as emissions sources (+0.5%), the understatement of Orbit flight emissions (+0.4%), and MEG24 emissions factor changes (+4.8%) has resulted in a total potential change in Health NZ's baseline inventory of +5.6%.

In the absence of an emission source additions to the inventory for FY2023/24, this change has been determined to be insufficient to warrant a restatement of our baseline inventory.

Where changes in emissions factors have resulted in significant changes in emissions associated with specific sources, such as domestic flights and electricity T&D losses, the impact of these changes will be communicated in reporting.

1.6. Liabilities

HFCs, PFCs and SF₆ represent GHGs with high global warming potentials. Other GHG stocks, including coal, stationary diesel, medical gases and biomass, are held on several Health NZ sites. Their accidental release or combustion could result in a large increase in emissions for the reporting period.

Health NZ continues to work on establishing a baseline for all liabilities present at its sites. The Infrastructure Investment Group (IIG) is responsible for all aspects of infrastructure

asset management, planning, capital investment, procurement, delivery and ongoing maintenance and facilities management within Health NZ. IIG has developed a National Asset Management Strategy with a proposed work programme to increase the asset management maturity, strategic capability and operational insights, over the next 3 years and beyond, subject to confirmed funding and resourcing. This includes the implementation of a national Asset Management Information System as a critical first step to provide a more comprehensive measurement of refrigerant and stationary fuel liabilities.

It is important to highlight that over the last year work undertaken to transition from coal as an energy source and replace old chiller units with new models that use refrigerants with relatively low GWPs has already had a significant impact on Health NZ's liabilities.

Table 8 provides stocktake from sites where data was available for liabilities from different holdings. Based on the significance of refrigerants and diesel holdings, further work will be undertaken to gain more detailed insights into holdings per site to assist in implementing procedures to minimise the risk of accidental release.

Table 8 Health NZ GHG Liabilities

Holdings	Quantity	Unit	Potential liability (tCO ₂ e)
Refrigerants HFCs	26,690	Kg	34,329
Refrigerants blends	6,380	Kg	12,447
Diesel	1,230,593	Litres	3,298
Refrigerants controlled by the Montreal protocol	4,554	Kg	2,426
Medical gases	6,753	Kg	2,107
Refrigerants other	1,329	Kg	1,720
Coal	142,000	Tonne	284
LPG	36,167	Kg	107
Anaesthetic vapours	900	Kg	101
Biomass	362,000	Tonne	5
Total potential liability tCO₂e			56,825

1.7. Land-use change

Land-use change has not been included in this inventory as Health NZ does not own land subject to significant land use change.

1.8. Supplementary results

- Contractual instruments are not applicable for this reporting period.
- No offsets have been purchased for this reporting period.

1.9. Data collection and uncertainties

The following approaches were used during data gathering:

- National data collection – involving engagement with companies holding contracts or providing services to several Health NZ sites to provide activity data such as waste to landfill, electricity and fuel consumption.
- Regional and local data collection – involving engagement with key contacts at regional and local sites and companies where national data collection was not possible, to provide activity data such as refrigerant, stationary diesel, liabilities and top-ups.

Emissions are calculated by multiplying emissions activity data with appropriate emissions factors. Most emission factors are sourced from the Te ine tukunga: He tohutohu pakihi – Measuring emissions: A guide for organisations (Ministry for the Environment [MfE], 2024) (MEG). Custom emission factors were created or derived where not available in the MfE MEG and recorded in the Health NZ emission conversions and calculation documentation. Tables 9 to 11 summarise the custom emission factors used in this inventory. Unless otherwise specified, all calculations in this report are expressed in total tonnes of carbon dioxide equivalent (tCO_{2e}).

Table 9 Custom created or derived emissions factors

Created custom or derived factor name	Unit	Emission factor kgCO _{2e} / unit
Biomass (CH ₄ -N ₂ O) - Wood chip Industry - GJ	GJ	0.023
Biogenic (CO ₂) - Wood chip Industry - GJ	GJ	89.47
Coal - Bituminous - Industrial Use - GJ	GJ	89.1405
Coal - Sub-Bituminous - Industrial Use - GJ	GJ	92.0005
Biogas - Landfill Gas - GJ	GJ	0.00000072
HFE-236ea2 (Desflurane) - Bottle	Bottle	630.31
HCFE-235da2 (Isoflurane) - Bottle	Bottle	183.634
HFE-347mmz1 (Sevoflurane) - Bottle	Bottle	82.242
Public Transport - \$	\$	0.649
Medical waste – Kg	Kg	0.442
Cytotoxic waste – Kg	Kg	0.879
Acetylene - kg	Kg	3.385

Table 10 Derived emissions factors for aviation

Created custom or derived factor name	Aircraft Reg / type	Fuel litres/ hour	Jet A1 EF	kgCO ₂ e/ hr
Aviation fuels - B350 - hours	B350	450	2.52	1,132
Aviation fuels - B200 - hours	B200	380	2.52	956
Aviation fuels - C90 - hours	C90	330	2.52	830
Aviation fuels – Mustang - hours	Mustang	400	2.52	1,006
Aviation fuels - 400XT - hours	400XT	600	2.52	1,510
Aviation fuels – Sovereign - hours	Sovereign	950	2.52	2,390

Table 11 Refrigerant GWP

Refrigerant name	GWP
R448a	1,273
R412A	2,286
R449A	1,282
R508	13,214
R132A	338
R170	10.2
R1324	338
R438A	2,265
R455A	146

Appendix F lists the data sources, collection methods, uncertainties and assumptions for each emissions source and factor. Health NZ utilises the ‘Accelerate to Zero’ emission reporting tool, developed by Deloitte, for emissions data management, monitoring, reporting and planning.

1.10 Engagement and communication

Health NZ is a member of the Sustainable Business Council⁶ and the Global Green and Healthy Hospitals⁷ international network, as well as being connected across the motu through engagement with networks such as Sustainable Healthcare Aotearoa⁸.

Health NZ’s Sustainability Advisory Panel, made up from internal and external sustainability and healthcare sector members, are regularly updated on progress in relation to emissions reporting and emissions reduction. The Panel provides challenge and enablement of Health NZ’s sustainability work programme; inclusive of the annual Emissions Inventory Report.,

⁶ <https://sbc.org.nz/>

⁷ <https://greenhospitals.org/>

⁸ <https://www.linkedin.com/company/sustainable-health-sector-national-network-aotearoa/?originalSubdomain=nz>

Health NZ has an internal sustainability network of over 350 kaimahi. This network is updated via webinar on a bi-monthly basis of progress against the interim work programme and is regularly invited to share its issues and ideas.

Health NZ is also a member of WasteMINZ⁹. As a WasteMINZ member, Health NZ can actively support discussions and initiatives that deliver circular economy outcomes, and waste minimisation benefits, and promote waste education and awareness.

1.11. Continuous improvement

Health NZ is committed to continuously improving its GHG inventory processes. This includes improving data collection processes, reporting practices and stakeholder engagement. Specific actions taken during FY2023/24 include:

- Supplied data improvements: working with suppliers to produce monthly reports from their finance systems instead of needing to rely on invoices for data. For instance, working with Air New Zealand to develop a report in their customer portal system that detail flights taken by staff and patients which have been purchased directly from them.
- Emissions factor revisions: emissions factors and calculations are periodically reviewed to ensure that they are up to date with the latest guidance. Emissions factors were reviewed and changed following the release of MfE's Measuring Emissions Guidance in June 2024.
- Data accuracy: we are continuously developing processes for ensuring the data we received is checked internally before loading into our emissions reporting tool. For some datasets, specifically those that relate to Category 1 and 2 sources, this happens monthly.
- Quality control: significant data sets received and entered by team members is peer-reviewed. Updates and corrections are made timeously when required.
- Stakeholder engagement: in addition to reporting on and publishing data from main emissions sources in Health NZ's quarterly reports, inventory data is increasingly being used internally to communicate progress in sustainability actions and to guide planning for future activities.

While good progress has been made in the last year, improvements to our systems and processes for collecting, calculating and then reporting on our GHG emissions is ongoing. Immediate actions in this regard include:

- Updates to the Health New Zealand GHG Emissions Standard Operating Procedure (SOP) will be made to account for emission source changes and data management processes are continually improved. This SOP will continue to detail the approaches to data collection, processing and reporting for each emissions source. The purpose of this SOP is to ensure accuracy, consistency and continuity in Health NZ's approach to GHG emissions reporting over time.

⁹ <https://www.wasteminz.org.nz/>

- Implement a process for routine peer review of data entered into Health New Zealand's emissions source templates and processing in its GHG Emissions reporting tool.
- Work closely with district stakeholders and their respective line-function structures to develop an approach that ensures the complete, accurate and timely submission of district level data. This data includes, amongst others: refrigerant liabilities and top-ups, stationary diesel liabilities and use, and water consumption.

1.12. Monitoring and reporting

Health NZ's sustainability reporting aligns with CNGP guidance, Aotearoa New Zealand Climate Standards, ISO 14064-1:2018 and the Greenhouse Gas Protocol, and is verified by Toitū Envirocare.

This report covers Health NZ's second inventory following our baseline year FY2022/23. It is the first to establish how we are progressing toward targets detailed in our Emissions Reduction Plan (ERP).

Health NZ also publishes quarterly Sustainability Reports, which detail in-year trends of key emissions sources like natural gas, electricity, fleet fuels and waste

1.13. Disclosure

The GHG inventory has been third-party verified by Toitū according to ISO 14064-1:2018.

Financial year 01 July 2023 to 30 June 2024

Level of assurance – Reasonable for all categories except category 3 CME travel. Limited for category 3 CME travel

From the analysis conducted, the inventory is classified as: Good

As part of the audit the organisational boundaries, GHG Emissions Inventory Report and application of accounting principles were reviewed and classified as: meets the requirements.

2. Chapter 2: Emissions Management Report

2.1. Organisational emissions reduction targets

Te Pae Tata | Interim New Zealand Health Plan 2022-2024 stated the following reduction targets:

- 25% reduction to Category 1 emissions between FY2022/23 and FY24/25
- 25% reduction to Category 2 emissions between FY2022/23 and FY24/25

Te Pae Waenga | New Zealand Health Plan 2024-2027 and the 2024 Statement of Performance Expectations states a combined 25% gross reduction target for Category 1 & 2 emissions between FY2022/23 and FY2024/25.

Health NZ is in the process of finalising its first organisation wide detailed Emissions Reduction Plan (ERP) in line with CNGP direction. This is due to be submitted to Ministry for the Environment | Manatū Mō Te Taiao at end of 2024 and published in 2025. Future iterations of the Emissions Reduction Plan are likely to set emissions reduction targets beyond FY24/25.

2.2. Key performance indicators

To be able to compare emissions across organisations and industries, and to comply with CNGP and ISO standards, Health NZ considers its emissions against funding received and FTE. Patient Bed Days is also used as an intensity metric to enable benchmarking between regions and against other healthcare facilities globally. It is a metric recommended in Global Green and Healthy Hospitals reporting initiatives.

Every 2-3 years Health NZ sets out a Statement of Performance Expectations (SPE) 2024-2027 details a specific gross emissions reduction KPI to track progress against the 25% Category 1 & 2 emissions reduction target.

The baseline year's emissions per intensity metrics are defined in Table 11.

Table 11 Emissions intensity metrics

Emission intensity metric	Intensity Unit	tCO _{2e} per unit	
Expenditure	\$27.9 billion	7.36	tCO _{2e} / \$m
FTE	87,000 ¹⁰	2.36	tCO _{2e} / FTE
Bed Day Equivalent (BDE)	3.5 million ¹¹	58	kgCO _{2e} / BDE

2.3. Initiatives

During the reporting year, Health New Zealand has implemented several emissions reduction initiatives that have contributed significantly emissions reductions against our baseline year. The most impactful initiatives and their contribution to emissions reductions include:

- Substantial progress in removing coal as a source of energy. The removal of coal boilers from 3 Health NZ sites has resulted in direct emissions reductions from coal of 12,700tCO_{2e} or 63% from baseline FY2022/23.
- Additional coal emissions reductions of 13,900 tCO_{2e}, or 96% from baseline, were achieved by partnering with a supplier of steam to switch their boilers to biomass.
- Over the course of FY2023/24 Health NZ has transitioned 325 of its internal combustion engine fleet vehicles to battery electric variants. This has resulted in fleet

¹⁰ Based on recorded FTE in the Health Workforce Information Programme as of 31 March 2023. FTE total excludes FTE from subsidiaries.

¹¹ Based on recorded patient Length of Stay days in the National Minimum Dataset of hospital events (NMDS) as at 31 July 2024.

fuel emissions reductions of 1,290 tCO₂e, which represents a decrease of 14% against baseline FY2022/23.

In addition to initiatives that have already delivered emissions reductions, Health NZ continues to implement programmes and initiatives that will continue to drive down our emissions in the next few years. The detail of these initiatives will be included in our first detailed Emissions Reduction Plan, due to be published in 2025.

Appendix A emissions inventory and total Units of Measure (UOM)

Emissions Source	Unit of Measure	tCO2e
Nat Gas - Industrial - GJ	GJ	48,972
Electricity - Kwh	Kwh	26,425
Long-haul (>3700km) - Business class - With Radiative Forcing	Passenger Kms	16,290
TWO Air travel Default - KgCO2-e	KgCO2-e direct	13,425
Nitrous oxide	Kg	13,094
TWO Air travel Default - tCO2-e	tCO2-e direct	11,735
Petrol - Default* - Petrol - Default* - litre	Litre	6,501
Passenger Vehicle - Petrol Vehicle - Default - Km (NTA)	Km	5,391
Long-haul (>3700km) - Economy class - With Radiative Forcing	Passenger Kms	5,135
Aviation fuel (Kerosene) - litre (Cat 3)	Litres	5,106
Coal - Sub-Bituminous - Industrial Use - GJ	GJ	4,662
Waste with gas recovery (unknown composition) - General Waste - Kg	Kg	4,068
Passenger Vehicle - Diesel Vehicle - 2000- <3000 cc - Post 2015 - Km	Km	3,883
Helicopter Eurocopter AS350B3 Squirrel - Hrs	Hours	3,736
Coal - Bituminous - Industrial - GJ	GJ	3,055
Ave. Wastewater Treatment Plants	M3	2,712
Long-haul (>3700km) - Premium economy class - With Radiative Forcing	Passenger Kms	2,603
TWO Public Transport \$ (NTA)	\$	2,412
TWO Clinical / medical / sharps waste autoclaving and landfilling - Kg	Kg	2,196
Domestic - Large aircraft - With Radiative Forcing	Passenger Kms	2,150
Domestic - Medium aircraft - With Radiative Forcing	Passenger Kms	2,039
Natural Gas T&D - GJ	GJ	1,821
Electricity T&D - kWh	Kwh	1,810
Diesel - Diesel - litre	Litre	1,643
TWO Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - B200 - hours	Hours	1,526
Diesel - Commercial use - litre	Litre	1,497
New Zealand - MfE (Cat 4)	Room Per Night	1,355
Short-haul (<3700km) - Economy class - With Radiative Forcing	Passenger Kms	1,114
Vehicle KgCO2e direct	KgCO2-e direct	1,014

HFC-134a (R-134a) - Kg	Kg	949
Domestic - National average - With Radiative Forcing	Passenger Kms	798
LPG - Commercial use - kg	Kg	712
410A - Kg	Kg	630
TWO Purchased Steam from coal - GJ	GJ	586
Domestic - National average - With Radiative Forcing (NTA)	Passenger Kms	585
TWO HFE-347mmz1 (Sevoflurane) - Bottle	Bottle	450
TWO Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - B350 - hours	Hours	425
Premium Petrol - Premium Petrol - litre	Litre	349
TWO Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - C90 - hours	Hours	338
Taxi travel - regular - dollars spent (\$3.20/kilometre) - \$ (NTA)	\$	267
TWO Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - Mustang - hours	Hours	236
Water Supply Emission Factors (Unit m3) - m3	m3	210
New Zealand - MfE	Room Per Night	192
Domestic - Small aircraft - With Radiative Forcing	Passenger Kms	182
407C - Kg	Kg	181
404A - Kg	Kg	165
Short-haul (<3700km) - Business class - With Radiative Forcing	Passenger Kms	162
TWO Cytotoxic waste incineration - Kg	Kg	103
TWO Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - 400XT - hours	Hours	85
TWO HFE-236ea2 (Desflurane) - Bottles	Bottle	75
HCFC-22 (R-22) - Kg	Kg	67
Carbon dioxide	Kg	43
Long-haul (>3700km) - First class - With Radiative Forcing	Passenger Kms	29
HFC-32 (R-32) - Kg	Kg	19
Short-haul (<3700km) - Average passenger - With Radiative Forcing	Passenger Kms	14
Passenger Vehicle - Diesel Vehicle - 2000–<3000 cc - 2010 to 2015 - Km	Km	12
TWO HCFE-235da2 (Isoflurane) - Bottle	Bottle	9
HFE-449sl (HFE-7100) - Kg	Kg	7
TWO Biomass (CH4-N2O) - GJ	GJ	7
Australia - MfE	Room Per Night	6
Long-haul (>3700km) - Average passenger - With Radiative Forcing	Passenger Kms	4

TWO Purchased Steam from biomass - GJ	GJ	3
Singapore - MfE	Room Per Night	2
Waste without gas recovery (unknown composition) - General Waste - Kg	Kg	0.43
TWO Custom Acetylene - Kg	Kg	0.26
Methane - Kg	Kg	0.23
United Kingdom - MfE	Room Per Night	0.13
United States - MfE	Room Per Night	0.12
Netherlands - MfE	Room Per Night	0.027
TWO Biogas - Landfill Gas - GJ (CAT2)	GJ	0.003
Steel, structural, columns and beams - Kg	Kg	0
Average - MfE	Room Per Night	0
TWO Recycling - placeholder	Kg	0
TWO Oxygen	Kg	0
Grand Total		205,275

Appendix B Emissions per supplier

Emissions source	Supplier	Total tCO ₂ e
Fuel	Allied Petroleum	31
	Birchfield	5,658
	BOC	20
	BP Fuel Cards	8,283
	Canterbury District Energy Inputs	2,065
	District Inputs	2,171
	Genesis	49,980
	Kiwi Fuel Cards	3
	Mobil	123
	NZ Fuel Cards	41
	Other Supplier	821
	Subsidiary Inputs	22
	Medical Gases, Refrigerant & Other	Air Liquide
Baxter		534
BOC		10,546
Purchased Energy	Canterbury District Energy Inputs	-170
	Contact (Simply Energy)	23,456
	Genesis	2,943
	Pioneer Energy	589
	Smart Power	71
	Meridian	1,462
	Subsidiary Inputs	601
Travel Vehicle	Free Wellington Ambulance	1,014
	National Travel Assistance Programme (NTA)	8,070
	Pro Med	12
	St John Ambulance Service	3,883
Travel Air	Air Gisborne	523
	Air Napier	39
	Air Wanganui	1,064
	AirNZ (Direct)	11,735
	District inputs	22,301
	FcM	5,003
	HNZ National Ambulance Services Office (NASO)	3,736
	LifeFlight	1,480
	Mainland Air	54
	National Travel Assistance Programme (NTA)	585
	Orbit (House of Travel)	13,428
	Philips Search and Rescue	232
	Skyline Aviation	2,609
	Stewart Island Flights	2
	Sunair	140
	Tandem	2,997
You Travel	218	
GCH Aviation	1,572	

Materials & Waste	District Inputs	266
	Envirowaste	1,458
	Interwaste	1,433
	Northland Regional Landfill	86
	Northland Waste	29
	Waste Management	3,068
	Subsidiary Inputs	22
	Corporate Office Inputs	4

Appendix C Overview per CNGP activity group

CNGP Activity Groups	tCO ₂ e
Scope 1 - Agriculture (all emissions)	-
Scope 1 - Biofuel (fossil fuel emissions and N ₂ O and CH ₄ component for the biofuel portion)	-
Scope 1 - Biomass (fossil fuel emissions and N ₂ O and CH ₄ component for the biofuel portion)	10
Scope 1 - Forestry - harvest/deforestation	-
Scope 1 - Refrigerants, medical and other gases	15,682
Scope 1 - Other	-
Scope 1 - Stationary combustion - coal	7,718
Scope 1 - Stationary combustion - natural gas and LPG	49,684
Scope 1 - Stationary combustion - other (e.g. diesel)	1,497
Scope 1 - Transport fuels - aviation	-
Scope 1 - Transport fuels - other (e.g. shipping fuel)	-
Scope 1 - Transport fuels - vehicle fleet	8,493
Scope 2 - Electricity	26,425
Scope 2 - Other (e.g. purchased steam)	586
Scope 3 (mandatory) - Air travel domestic	30,329
Scope 3 (mandatory) - Air travel international	25,350
Scope 3 (mandatory) - Business travel other (e.g. taxi, hotel, rental cars)	2,570
Scope 3 (mandatory) - Freight	-
Scope 3 (mandatory) - Staff working from home	-
Scope 3 (mandatory) - Transmission and distributions losses (electricity)	1,810
Scope 3 (mandatory) - Transmission and distributions losses (natural gas)	1,821
Scope 3 (mandatory) - Waste (to landfill)	6,368
Scope 3 (mandatory) - Wastewater	2,712
Scope 3 (mandatory) - Water	210
Scope 3 (other material) - Emissions from purchased goods and services	15,347
Scope 3 (other material) - Emissions from purchased capital goods	-
Scope 3 (other material) - Other (e.g. staff commuting, investments, leased assets)	8,655
Scope 1 Biogenic emissions - Biofuel CO ₂ component (considered carbon neutral)	-
Scope 1 Biogenic emissions - Biomass CO ₂ component (considered carbon neutral)	27,942
Removals - Forest growth removals	-

Appendix D Overview of location/sites

Included locations in the emissions inventory		
National	Northern Regional Alliance Ltd	Auckland, Penrose, Level 2, 650 Great South Road
	Central Region's Technical Advisory Services Limited (TAS)	Auckland, Takapuna, Level 3, Barrys Point Road
		Wellington, 69 Tory Street
	HealthShare	Hamilton, 16 Clarence Street
	New Zealand Health Partnerships (NZHP)	Auckland Ellerslie, Level 1, Building 7, Central Park, 666 Great South Road
	Health Alliance & Health Source	Auckland, Penrose, 581-585 Great South Road
	South Island Alliance	Business Unit within Canterbury district
	Te Hiringa Hauora/ Health Promotion Agency	Auckland, Ellerslie, Level 2, Ascot Central, 7 Racecourse Drive
		Wellington, The Terrace, Level 14/15/16 101
		Christchurch, BNZ Building Hereford Street
	National offices	Whanganui, Level 2, 179 Hill Street
		Wellington, Level 5-6, 42-52 Willis Street (Spark Central)
		Wellington, Levels 4-7, 83 Molesworth Street (Shamrock House)
		Wellington, 133 Molesworth Street (Manatū Hauora)
Christchurch, Level 2, 48 Hereford Street		
Dunedin, Level 9, 481 Moray Place		
Auckland Manukau, Level 4, Kotuku House, 4 Osterley Way		
Northern region	Te Tai Tokerau	Bay of Islands Hospital
		Dargaville Hospital
		Kaitiaki Hospital
		Whangarei Hospital
		Various community locations
	Waitematā	Mason Clinic
		North Shore Hospital
		Waitakere Hospital
		Various community locations
	Te Toka Tumai	Auckland City Hospital
		Greenlane Clinical Centre
		Auckland Spinal Rehabilitation
		Various community locations
	Counties Manukau	Middlemore Hospital
		Manukau Surgery Centre
		Pukekohe
Various community locations		
Te Manawa Taki region	Waikato	Matariki Hospital
		Rhoda Read Hospital

		Thames Hospital
		Tokoroa Hospital
		Waikato Hospital
		Various community locations
	Lakes	Rotorua Hospital
		Taupo Hospital
		Various community locations
	Hauora a Toi Bay of Plenty	Tauranga Hospital
		Whakatane Hospital
		Various community locations
	Tairāwhiti	Gisborne Hospital
		Various community locations
Taranaki	Hawera Hospital	
	Taranaki Base Hospital	
	Various community locations	
Central Region	Te Pae Hauora o Ruahine o Taranaki MidCentral	Horowhenua Hospital
		Palmerston North Hospital
		Various community locations
	Whanganui	Whanganui Hospital
		Various community locations
	Capital Coast	Kenepuru Hospital
		Wellington Hospital
		Various community locations
	Hutt Valley	Hutt Valley Hospital
		Various community locations
	Te Matau a Māui Hawke's Bay	Hawkes Bay Hospital
		Various community locations
Wairarapa	Wairarapa Hospital	
	Various community locations	
Te Waipounamu region	Waitaha Canterbury	Ashburton Hospital
		Burwood Hospital
		Christchurch Hospital
		Hillmorton Hospital
		Kaikoura Integrated Family Health Centre
		Princess Margaret Hospital
		Various community locations
	Te Tai o Poutini West Coast	Grey Base Hospital
		Various community locations
	Nelson Marlborough	Mental Health Admissions Unit - Nelson
		Nelson Hospital
		Wairau Hospital
		Various community locations
	South Canterbury	Timaru Hospital
		Various community locations
	Southern	Dunedin Hospital

		Lakes District Hospital
		Southland Hospital
		Wakari Hospital
		Various community locations
Subsidiaries	Allied Laundry Services Ltd	Allied Laundry Services Ltd
	Tairāwhiti Laundry Services Ltd	Tairāwhiti Laundry Services Ltd
	Enable New Zealand Ltd	Enable New Zealand Ltd
	Canterbury Linen Services Ltd	Canterbury Linen Services Ltd

Appendix E Emissions sources, data collection and uncertainty per category

Category 1					
Source	Data source	UOM	Emission factor	Boundary or dataset comments	Uncertainty
Coal	Canterbury district Inputs	GJ	Custom Coal -Sub-bituminous - Industrial- GJ	Steam generated at Christchurch Hospital is delivered and sold to Otago University School of Medicine (SoM). As CNGP participant consumption by the university is deducted from Christchurch hospital consumption. Other site Ashburton Hospital	High quality - Based on delivered coal on invoice in tonnes and caloric value testing to calculate consumption in GJ
	Birchfield		Custom Coal -Bituminous - Industrial- GJ Custom Coal -Sub-bituminous - Industrial- GJ	Nelson Marlborough and Westcoast sites	High quality - Based on delivered coal on invoice in tonnes and caloric value testing to calculate consumption in GJ
Biomass CH ₄ &N ₂ O	Southern district inputs	GJ	Custom Biomass CH ₄ - N ₂ O Category (Cat) 1 - GJ	Wakari Hospital (Lumber)	High quality - It is assumed the supplier reports are complete and accurate
	Canterbury district Inputs			Christchurch Hospital changed over from coal to biomass in February 2023.	High quality - Based on delivered energy in GJ from invoices

Natural gas	Genesis	GJ	Natural Gas - Industrial use - GJ	Includes all ICPs under contract of Health NZ. Includes ICPs of leased buildings, included as Cat 1 emissions under operational control. Subsidiary Allied Laundry has dedicated natural gas ICP, but ICP is billed under Mid-Central # ICP 0001426078QT-A51. Tairawhiti Laundry is a 100% subsidiary. Energy use is included under Tairawhiti sites. Waikato Hospital supplies steam to the onsite hospital laundry operated by Taylors for the hospital. Consumption included under Waikato Hospital. 25 time of use (TOU) ICPS around 95% consumption, 53 non-half hourly (NHH) ICPs 5% consumption	High quality - Meter readings. It is assumed the supplier reports are complete and accurate.
Diesel stationary	District inputs, various suppliers	L	Diesel - Commercial Use - litre	Some sites have not submitted data or have not needed to top-up tanks.	High quality - It is assumed the local staff inputs are complete and accurate and based on invoiced deliveries
LPG	District inputs, various suppliers	kg	Stationary fuels - LPG Commercial use - Kg	Christchurch has reticulated LPG measured in GJ, converted to kg	High quality - It is assumed the district staff inputs are complete and accurate
Medical gases	BOC Gas New Zealand (BOC)	kg	CO ₂ - kg N ₂ O - kg Custom Acetylene - kg LPG - kg CH ₄ - kg	Datasets supplied by BOC record kgs and only include the GHG emissions of the relevant medical gas where these are mixtures. This means the kg data for Entonox is the KGs of N ₂ O of that bottle size, not the full KG content of the Entonox bottle. Column N displays Entonox and Nitrous Oxide as contained GHG, but both are the KGs of N ₂ O, not Entonox's KG. BOC also supplies some LPG.	High quality - It is assumed the supplier reports and conversions based on bottles sold are complete and accurate

	Air Liquide		CO ₂ - kg N ₂ O - kg Entonox - kg	Data in the tool converted from bottles to kg GHG per bottle	High quality - It is assumed the supplier reports and conversions based on bottles sold are complete and accurate
Anaesthetic vapours	Baxter	kg	Custom HFE-347mmz1 (Sevoflurane) - Bottle; Custom HFE-236ea2 (Desflurane) - Bottle; Custom HCFE-235da2 (Isoflurane) - Bottle	Custom emission factors were created to record emissions per bottle sold	High quality - It is assumed the supplier reports based on bottles sold are complete and accurate
Fleet fuels	BP fuel cards	L	Diesel - Diesel - litre; Regular Petrol - litre; Premium Petrol - litre;	All regions	High quality - It is assumed the supplier reports based on fuel card transactions are complete and accurate
	Mobil Fuel cards			Te Tai Tokerau and Nelson Marlborough sites only	
	Allied petroleum			Bay of Plenty and West Coast sites only	
	LeasePlan (Mobil)			Midcentral sites only	
	NZ fuel cards			Bay of Plenty sites only	

	Kiwi fuel cards			Corporate	
Refrigerants	District Inputs, various suppliers	kg	Various refrigerants AR5	Includes refrigerants of hospital sites. Leased offices or smaller community buildings are excluded.	Medium to low quality. Not all sites report on refrigerant top-ups, had no data available or had to make assumptions. Recorded data likely underestimates real leakage.
Category 2					
Source	Data source	UOM	Emission factor	Boundary or dataset comments	Uncertainty
Electricity AoG TOU and NHH contract	Simply Energy	kWh	Electricity - kWh	Includes all ICPs under contract of Health NZ. Includes ICPs on our account of leased buildings and are included as Cat 2 emissions under operational control. Consumption is booked in the previous month of invoice month. ICP 0007195596RN638 belongs to Subsidiary Canterbury Linen. Christchurch Hospital invoices electricity on to the University of Otago, booked as cat 4. About 139 TOU ICPs with consumption of around 90%-95% of electricity.	High quality - Meter readings. It is assumed the supplier reports are complete and accurate.
	Genesis			Per May FY2023/24 Counties Manukau changed TOU meters from Simply to Genesis.	
	Meridian			Reconciliation of Meridian ICPs at Health NZ sites. List is now complete. Meridian has produced an annual report for TOU and NHH meters for FY2023/24.	

Electricity other contracts	Mercury			NZ Health Partnerships (NZHP) leased office building. No charges for level 1 for Sep and October, as no ICP was in place. Level 1 ICP consumption is for the full floor; NZHP occupies half. Full consumption was reported, but insignificant impact.	
	Smart Power			Direct readings from smart meters, so electricity use directly apportioned to Health NZ activity at leased sites.	
	Corporate or shared services direct inputs				
Purchased Landfill gas	Nelson City Council	GJ	Custom Biogas - Landfill Gas - GJ	Nelson Hospital. Health NZ owns the landfill gas boiler house and operates the boiler, but Nelson Council owns the boiler assets. Included as Cat 2.	Medium quality - based on tonnes of steam recorded and conversion to GJ
Purchased heat and steam	Pioneer Energy	GJ	Custom Coal -Sub-bituminous - Industrial- GJ	Dunedin and Southland sites. Steam on sold to Health NZ Southern moved from coal to biomass early FY2023/24. Limited numbers still allocated to coal. Dunedin Energy Centre: Pioneer owns both the boiler house and associated assets. The land on which the boiler house is located is leased from Southern to Pioneer. Southland Hospital Energy Centre: The boiler house and the assets are leased to Pioneer. Both emissions reported under Cat 2 purchased steam as Pioneer has operational control over both energy centres. This now	High quality - Based on used coal and steam sold. It is assumed the supplier reports are accurate. Based on caloric value testing to calculate consumption in GJ

				falls under steam purchased from biomass. Dunedin Hospital changed over from coal to biomass in May 2023	
		GJ	Custom Biomass CH ₄ - N ₂ O CAT2 - GJ	Dunstan and Dunedin sites. Dunstan Hospital Energy Centre: The land is leased but Pioneer owns assets. Included as Cat2. In May 2023, the coal boiler of Dunedin Energy Centre was converted from coal to biomass woodchip.	
Category 3					
Source	Data source	UOM	Emission factor	Boundary or dataset comments	Uncertainty
Air travel staff (contracted providers)	Orbit - House of Travel	kgCO ₂ e	Direct KgCO ₂ e	Direct kgCO ₂ e used as most accurate source of emissions directly attributable to flight emissions associated with flights paid for by Health NZ. Difficult to attribute flights by class and type, so will need to be updated and improved for FY2023/24.	High quality - It is assumed the supplier reports are complete and accurate.
	FcM			Separate files and uploads for patient and staff flights. Emissions calculated from pkms travelled by class and flight type.	
	Tandem	pkm	Domestic - National average - With Radiative Forcing; Short-haul (<3700km) - Economy, Business class	Limited to staff travel as no patient travel under this provider.	

	You Travel - local provider.		- passenger - With Radiative Forcing; Long-haul (>3700km) - Economy, Premium, Business class passenger - With Radiative Forcing	Short-haul premium economy flights linked to short-haul - Business class EF	
	Air NZ - direct	tCO ₂ e	AirNZ's default tCO ₂ e.	Accuracy has improved as data now generated in monthly reports directly from AirNZ carbon tool.	
	Sunair	L	Aviation fuel (kerosene) / Jet A1 - litre	Doctor flights Te Tai Tokerau	High quality - based on trips, flight hours and plane fuel consumption
	Air Napier			Doctor flights Hawkes Bay	
	Mainland air			Doctor flights Southern.	
Air travel staff reimbursed claims.	Through District reimbursement claims, finance and payroll extracts	\$ (translated to pkm estimate)	Domestic - National average - With Radiative Forcing; Short-haul (<3700km) - Economy, Premium (Average), Business class - passenger - With Radiative Forcing; Long-haul (>3700km) - Economy, Premium,	No actual flight data is available for most Districts. Emissions are based on expenditure data and translated into estimates for PKM per flight type.	Low quality - The flight expenditure within staff reimbursement claims is often not extractable in the various finance systems, and flight data is mostly not collected. For several Districts, assumptions must be made to estimate % flight expenditure within total staff reimbursed expenditure. Estimated breakdown PKM for different air travel sources is based on the %

			Business class passenger - With Radiative Forcing		breakdown of a small set of actual flight data available. A large set of assumptions must be made based on a small dataset of available flight data to estimate emissions.
Rental cars AoG	FcM	km	Passenger Vehicle - Petrol Vehicle - Rental - Km Passenger Vehicle - Diesel Vehicle - Rental - Km Passenger Vehicle - Electric Vehicle - Rental - Km	FY2023/24 inventory excludes rental cars as considered de minimis	High quality - It is assumed the supplier reports are complete and accurate.
Rental cars AoG Ambulance - patients	Tandem	km	Passenger Vehicle - Petrol Vehicle - Rental - Km	St John data based on E-road emission extract of vehicles providing frontline services. Includes Emergency (EAS) and patient transfer services (PTS) for Health New Zealand Te Whatu Ora. ACC trips cannot not be filtered out for EAS. % deduction in mileage based on joint funding agreement with ACC and Health NZ. EAS split 46 % ACC and 54% Health NZ. PTS is 100% Health NZ.	High quality - It is assumed the supplier reports are complete and accurate. High quality - It is assumed the supplier reports are complete and accurate. Small uncertainty over the allocation of Km to ACC
	Orbit		Vehicle KgCO _{2e} direct		
	St John		Passenger Vehicle - Diesel Vehicle - 2000-		

			<3000 cc - 2015 to 2020 - Km		
Ambulance - patients Patient National Travel Assistance (NTA) Claims	Free Wellington Ambulance	kgCO ₂ e	kgCO ₂ e	Data based on E-road emission extract of vehicles providing frontline services. Includes Emergency and patient transfer services for Health NZ. Distribution over districts based on % on number of jobs.	High quality - It is assumed the supplier reports are complete and accurate.
	Pro Med	km	Passenger Vehicle - Diesel Vehicle - 2000–<3000 cc - 2010 to 2015 - Km	Southern only	High quality - It is assumed the supplier reports are complete and accurate.
	Health NZ-SOS	km	Private car default - petrol- km	NTA mileage reimbursement claim is 28 cents per total km travelled until end May and then 34 cents for the remainder of FY2023/24. Units to the whole are return trips, 0.5 reflects a one-way, 1 is a return. NTA expenditure is ex GST, too.	High quality - It is assumed the NTA reports are complete and accurate.
Patient National Travel Assistance (NTA) Claims	Te Whatu Ora- SOS	Pkm	Domestic - National average - With Radiative Forcing;	Air travel Minor expenditure within NTA claims. Air Travel reimbursement of dollar value. Currently included as 1 km flown domestically per \$. Requires further refinement	High quality - It is assumed the NTA reports are complete and accurate.
	HNZ National Ambulance Services	Pkm	Taxi	Reimbursement of taxi claims. Data is ex-GST	High quality - It is assumed the provided reports are complete and accurate.

Helicopter - patients	Office (NASO)	\$	Custom emission factor - Public transport - \$	Public Transport: Bus, Ferry, and train on providing a receipt. This also includes transport providers like St. Johns, Driving Miss Daisy, and Shuttle services that aren't taxi services.	
		ppn	Accommodation domestic - nights	Accommodation. NTA accommodation numbers are based on the number of units in the data extract. Whole units are one night of accommodation at a reimbursement rate of \$100 per night. Anything over this, the client will need to pay	
		Hrs	Helicopter Eurocopter AS350B3 Squirrel - Hrs	Helicopter hours include all hours paid by Health NZ. National contract, which includes subcontracted services. Data inputs on the District/department that commissioned the flight, not on retrospective flight billing. Hours of SOSO - skids off, skids on	
Patient air travel – Fixed Wing and airlines	Skyline Aviation	Hrs	TWO Aviation fuels - B350 - hours	Flights for ACC, Ministry of Health (MoH), Organ donation, and transport are filtered out of datasets as they are not invoiced to Health NZ.	High quality - It is assumed the supplier reports are complete and accurate.
Patient air travel – Fixed Wing and airlines Accommodation Travel contracts	Skyline Aviation Life Flight Trust	Hrs Litres	TWO Aviation fuels - B200 - hours TWO Aviation fuels - C90 - hours TWO Aviation fuels - 400XT - hours	Flights for ACC, MoH, Organ donation, and transport are filtered out of datasets as they are not invoiced to Health NZ. Patient data is divided by the number of patients on the flight and disaggregated into districts based on domicile.	High quality - It is assumed the supplier reports are complete and accurate.

			TWO Aviation fuels – Sovereign - hours		
			TWO Aviation fuels – Mustang - hours		
			Aviation fuel (kerosene) - litre (Cat 3)		
	Stewart Island Flights	Litres	Aviation fuel (kerosene) - litre (Cat3)	All flights recorded as 0.85 hours	
	Garden City Aviation	Litres tCO ₂ e	Aviation fuel (kerosene) - litre (Cat 3) AirNZ's tCO ₂ e number.	ACC and training flights were removed. Some flights do not have district charges entered, so some assumptions made based on airport codes to allocate to district-level	
	Philips Search and Rescue			Receive aggregated totals for each quarter, not individual flights. Monthly data is the quarterly data divided by the number of months.	
	Air NZ - direct patient credit cards			Data pulled directly from AirNZ portal	
	Tandem-Health NZ	pkm	Domestic - National average - With Radiative	Patient data is included in Tandem set with staff data.	

	patients NTA		Forcing; Short-haul (<3700km) - Economy, Premium, Business class - passenger - With Radiative Forcing; Long-haul (>3700km) - Economy, Premium, Business class passenger - With Radiative Forcing		
	Orbit - Patients	kgCO ₂ e	Direct KgCO ₂ e	Patient data included in Tandem set with staff data	
	Air Wanganui	Litres	Aviation fuel (kerosene) - litre (Cat 3)		
	Air Gisborne	Litres	Aviation fuel (kerosene) - litre (Cat 3)	Tairawhiti District only	
	Orbit - House of Travel	ppn	Accommodation factors MfE per night domestic and international	Accommodation is included only for accommodation booked with our contracted travel service providers. It excludes accommodation reimbursed through staff reimbursement claims, including Continuing Medical Education claims.	
Accommoda tion Travel contracts	FcM	ppn	Accommodation factors MfE per night domestic and international	Accommodation is included only for accommodation booked with our contracted travel service providers. It excludes	High quality - It is assumed the supplier reports are complete and accurate.
	Tandem				

	You Travel - local provider.			accommodation reimbursed through staff reimbursement claims, including Continuing Medical Education claims.	
Source					
Waste to landfill – General waste	Waste Management	Kg	Waste General Waste with LFGR - kg Waste General Waste without LFGR - kg.	Lakes – Taupo and West Coast – Greymouth waste goes to landfill without gas recovery. All other landfill sites used by Waste Management have landfill gas recovery (LFGR)	High quality - It is assumed the supplier reports are complete and accurate.
Waste to landfill – General waste	Envirowaste	Kg	Waste General Waste with LFGR - kg.	Assumed all waste goes to landfill with landfill gas recovery	High quality - It is assumed the supplier reports are complete and accurate.
	Northland Waste		Waste General Waste with LFGR - kg	Northland waste Puwera landfill with LFGR	
Medical waste to landfill and incineration	Northland regional landfill	Kg	Waste General Waste with LFGR - kg.	Puwera landfill with LFGR	High quality - It is assumed district inputs were recorded accurately
	District inputs		Waste General Waste with LFGR - kg.	Hawkes Bay: Hastings District Oamaru with LFGR, Wairoa no LFGR.	

Data source

	various templates.		Waste General Waste without LFGR - kg		
	Corporate offices		Waste with gas recovery (unknown composition) - Office Waste - Kg	For several corporate leased offices where waste is part of the lease or unavailable, waste has been estimated at 8.3 kg/desk/year.	Medium - some estimated office waste
	Interwaste		Custom emission factors cytotoxic - kg Custom emission factors medical/clinical/ sharps waste - kg Waste General Waste with LFGR -kg.	All landfills used for medical waste and sharps have landfill gas recovery. Cytotoxic waste is incinerated in Australia. The Interwaste dataset includes the pharmacy waste category, including waste from hospitals pharmacies, covid centres and community pharmacies. Community pharmacies are out of scope but are included in waste inventory as it is unclear which is which. Overestimation of estimated 10-30 tonnes of waste total.	High quality - It is assumed the supplier reports are complete and accurate.
Medical waste to landfill and incineration Distributed energy	Waste Management	Kg kWh	Custom emission factors cytotoxic - kg Custom emission factors medical/clinical/ sharps waste - kg Waste General Waste with LFGR -kg.	All landfills used for medical waste and sharps have landfill gas recovery. The dataset of Waste Management includes some community pharmacies. Community pharmacies are out of scope but are included in waste inventory as it is unclear which is which.	High quality - It is assumed the supplier reports are complete and accurate.
	West Coast District		Custom emission factors cytotoxic - kg	Greymouth Hospital. Onsite incinerator for medical waste. Volumes per year based on audit 70 bags per day x 5kg each x 365 days = 127,750 kg per year or 10,646 kg/month. Emission factor cytotoxic incineration is used.	Medium - estimation of volumes based on audit
	Canterbury District		Electricity - kWh	Electricity purchased by Canterbury District but on charged and distributed to the University of Otago.	High – based on submeter reading

Transmissions and distribution losses	Derived from electricity inputs	kWh	Electricity - kWh	Calculated in tool based on electricity consumption using T&D loss EF	High quality - derived from energy meter data
Transmissions and distribution losses	Derived from gas inputs	GJ	GJ	Calculated in tool based on gas consumption using T&D loss EF	High quality - derived from energy meter data
	Water and wastewater	Water	m3	Water Supply - m3	Includes water of all district hospital sites and sites under direct contract. Leased offices excluded. No data is available for several sites.
Water and wastewater	Wastewater	m3	Domestic Wastewater average - m3	Based on water inputs, assumed water in is water out	Low to medium quality. Several hospitals have no water recordings, or water readings are only read at infrequent intervals. Estimates based on NABERSNZ Hospital benchmark formulas have been used to estimate predicated water consumption to complete gaps.