Greenhouse Gas Emissions Inventory Report - FY2022/23

Baseline year

Te Whatu Ora
Health New Zealand

Prepared in accordance with ISO 14064-1:2018

Te Whatu Ora
Health New Zealand

Prepared by (lead author): Margriet Geesink, Sustainability Lead, Te Tai Tokerau

Approved by: Vicktoria Blake, Head of Sustainability

The Head of Sustainability in the Office of the Chief Executive is responsible for this report. Inquiries on the GHG emissions inventory report can be made to hnzsustainability@health.govt.nz.

Dated: 13 September 2023

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

Measurement period: 01 July 2022 to 30 June 2023

Base year period: 01 July 2022 to 30 June 2023

Approved for release by:

Vicktoria Blake
Interim Head of Sustainability
Te Whatu Ora – Health New Zealand

Availability

This report will be used to inform the 1 July 2022 – 30 June 2023 Te Whatu Ora Annual Report. Reviewed by the Executive Leadership Team and Board, this report will be available to internal and external stakeholders through Te Whatu Ora's website publications. This report's findings will guide the organisation's sustainability work programme and inform Te Whatu Ora's inaugural 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 the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004) and ISO 14064-1:2018 Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals[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
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_2e	Tonnes of carbon dioxide equivalent, the common unit of measure for combined greenhouse gases

Executive Summary

This is the first Emissions Inventory Report for Te Whatu Ora – Health New Zealand. The measurement period covers the first financial year since the organisation's establishment, from 1 July 2022 to 30 June 2023. This will be the baseline year of emissions reporting for the organisation.

The findings will inform Te Whatu Ora's sustainability work programme and assist in meeting the directions of the Carbon Neutral Government Programme (CNGP).

Te Whatu Ora's total greenhouse gas (GHG) emissions[2] for the reporting year 1 July 2022 to 30 June 2023 were 237,822 tCO_2e.

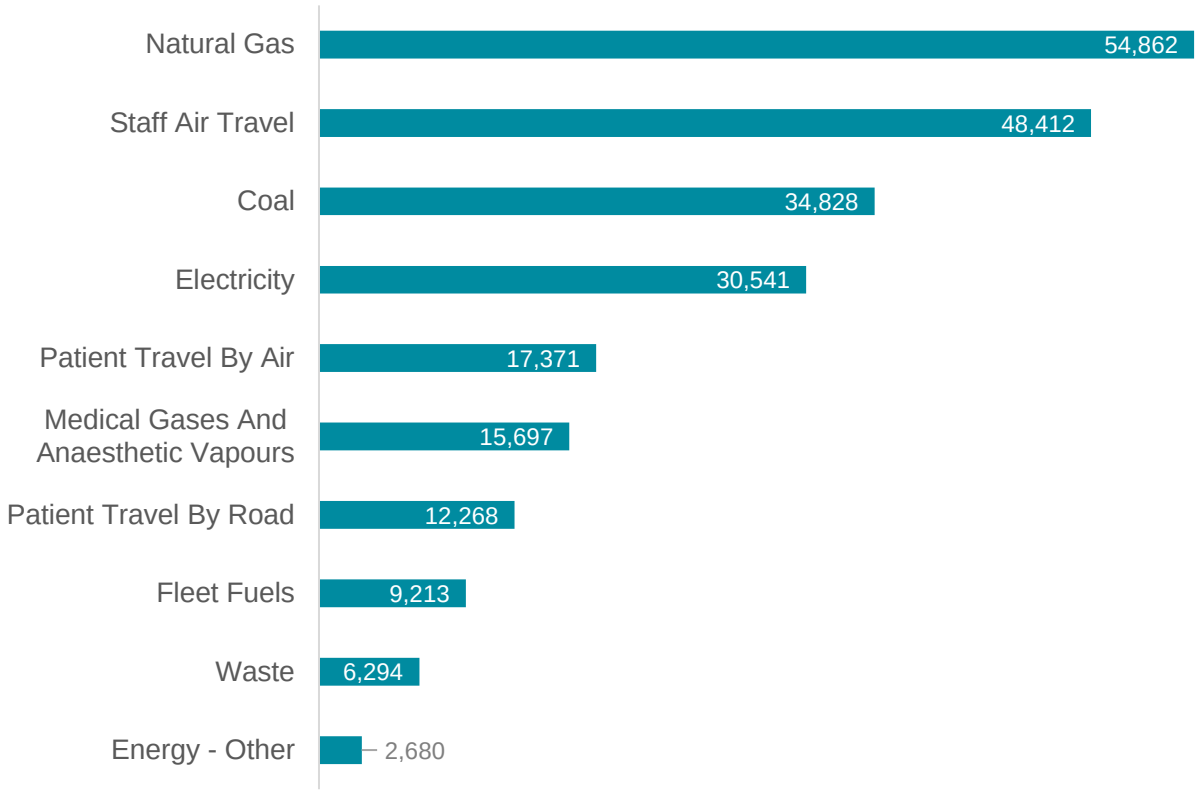

Figure 1: Top 10 emission sources

[2] Henceforth referred to as 'emissions'

Table 1: Gross organisational GHG emissions by category and activity

Te Whatu Ora Emissions Profile by Category		tCO2e	
1	Natural gas	52,909	
	Coal	20,491	
	Medical Gases - CO2, N2O, CH4, Acetylene	15,097	
	Fleet Fuels	9,213	
	Stationary Diesel	1,660	
	Refrigerants	1,424	
	LPG	1,014	
	Anaesthetic Vapours - Desflurane, Isoflurane, Sevoflurane	599	
	Biomass - CH4, N2O	5	
	Category 1 Total		**102,413**
2	Electricity	27,367	
	Purchased steam from coal	14,337	
	Purchased steam from biomass and landfill gas	1	
	Category 2 Total		**41,705**
3	Staff air travel	48,412	
	Patient travel by air - Medical plane	9,321	
	Patient travel by road - Patient travel claims (NTA)	7,728	
	Patient travel by road - Ambulances	4,540	
	Patient travel by air - Airline	4,534	
	Patient travel by air - Helicopter	3,517	
	Accommodation Patients	1,167	
	Accommodation Staff	689	
	Staff travel other - taxis, rental vehicles	437	
	Category 3 Total		**80,343**
4	Waste to landfill	6,192	
	Transmission and distribution losses gas and electricity	5,127	
	Wastewater	1,651	
	Distributed Energy	169	
	Waste incinerated	102	
	Water	120	
	Category 4 Total		**13,361**
	Total gross emissions (tCO2e)		**237,822**
	Biogenic Emissions (tCO2)		**20,154**

Chapter 1: Emissions Inventory Report

1.1. Introduction

This is Te Whatu Ora – Health New Zealand's first 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 2022 – 30 June 2023. Any exclusions from reporting have been documented and justified.

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

- Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard[3] (2004)
- ISO 14064-1:2018 Greenhouse Gases – Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals[4]
- Carbon Neutral Government Programme Direction and Guidance.

1.2. Emissions Inventory Results

Te Whatu Ora's top 10 emissions by emissions source for the reporting period 1 July 2022 - 30 June 2023 is illustrated in Figure 2, with a further summary provided in Table 1.

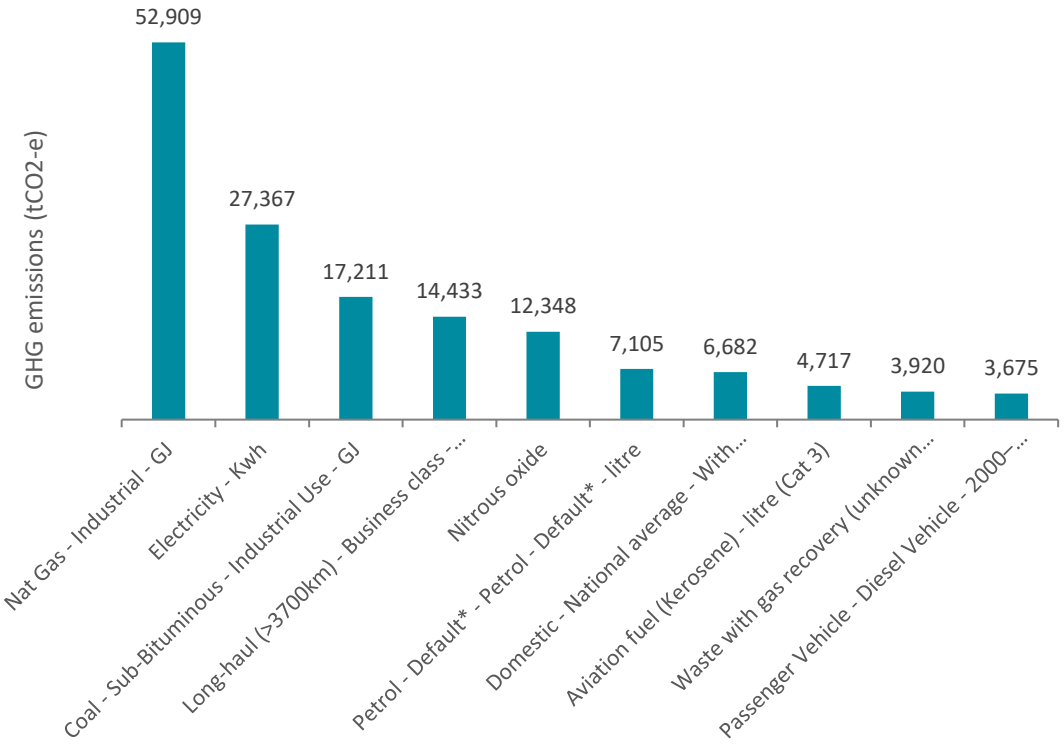

Figure 2: Top 10 emissions by emission factor

[3] Henceforth referred to as 'the GHG Protocol'.
[4] Henceforth referred to as ISO 14064-1

Table 2: Direct and indirect emission summary

	Category	tCO2e	Sum
Direct Emissions	Category 1	102,413	102,413
Indirect Emissions	Category 2	41,705	135,409
	Category 3	80,343	
	Category 4	13,361	
	Category 5	-	
	Category 6	-	

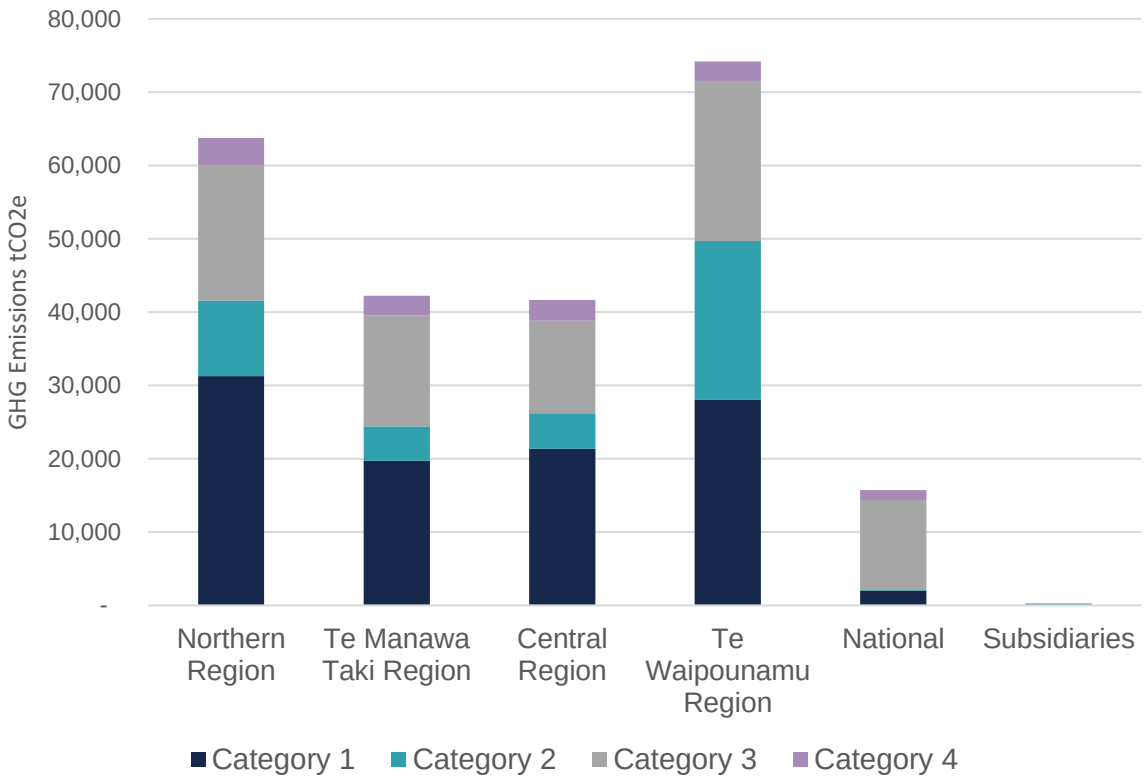

Figure 3: Emissions per region and category

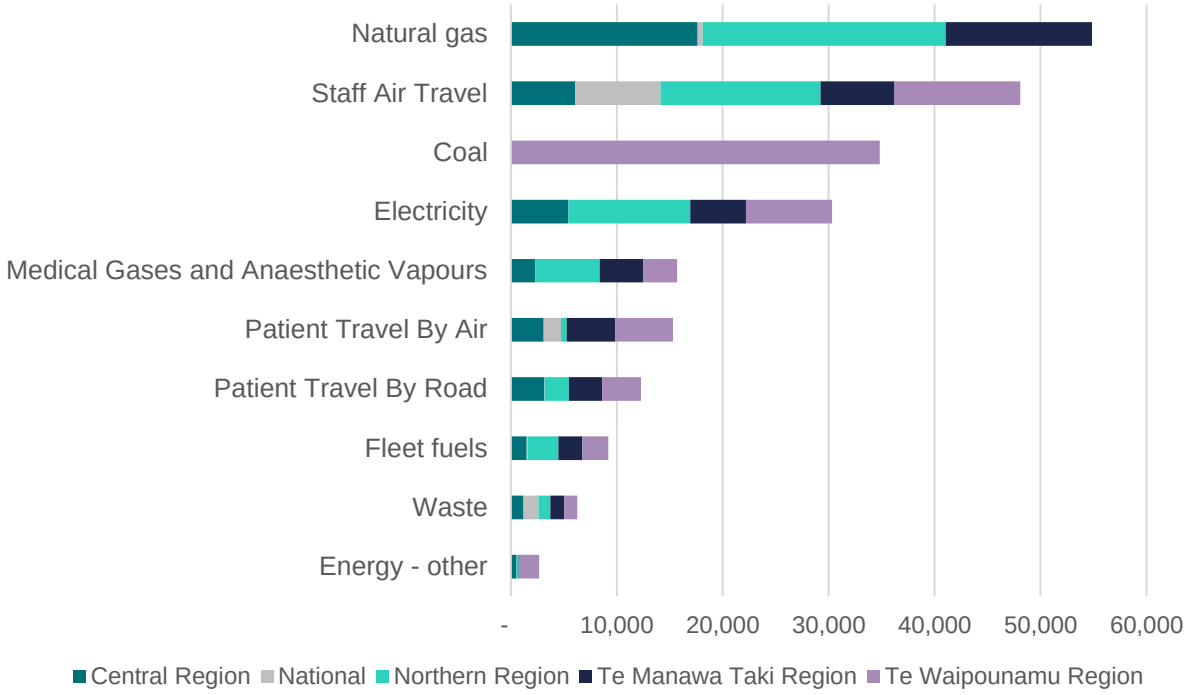

Figure 4: Top 10 emissions per region

Table 3: Direct GHG emissions quantified per gas

Direct emissions per GHG		tCO_2e	tCO_2	tCH_4	tN_2O
Stationary combustion	Coal bituminous	3,280.1	3,279.7	0.3	0.0
	Coal Sub-bituminous	17,210.9	17,209.0	1.8	0.2
	Natural gas Industrial	52,909.3	52,860.9	24.8	23.5
	LPG	1,014.2	1,013.3	0.5	0.4
	Biomass	5.2	-	4.5	0.7
	Diesel	1,660.1	1,650.2	6.3	3.6
Transport fuels	Diesel	1,776.9	1,749.6	2.6	24.7
	Petrol	7,105.5	6,810.5	89.5	205.4
	Petrol premium	330.4	316.7	4.2	9.5
Medical gases	Carbon Dioxide	45.8	45.8	-	-
	Nitrous Oxide	15,051.2	-	-	15,051.2
	Methane	0.3	-	0.3	-
	Acetylene	0.2	-	-	-
Anaesthetic vapours	Desflurane	100.2	-	-	-
	Sevoflurane	467.1	-	-	-
	Isoflurane	31.8	-	-	-
Refrigerants	Substances controlled by the Montreal Protocol	275.4	-	-	-
	Hydrofluorocarbons	1,004.4	-	-	-
	Refrigerant blends: Zeotropes	131.2	-	-	-
	Refrigerants other	12.8	-	-	-
	Total Category 1	**102,413**	**84,936**	**135**	**15,319**

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

Appendix B lists the emissions per supplier per group to identify supplier source files with significant emissions.

Appendix C summarises emissions for each CNGP activity.

1.3. Organisational Context

1.3.1. Organisational Description

Te Whatu Ora 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. Te Whatu Ora is responsible for improving services and outcomes across the health system in partnership with Te Aka Whai Ora | Māori Health Authority.

Te Whatu Ora is a large organisation with approximately 75,000 FTE 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 services, and is supported by eleven subsidiary companies.

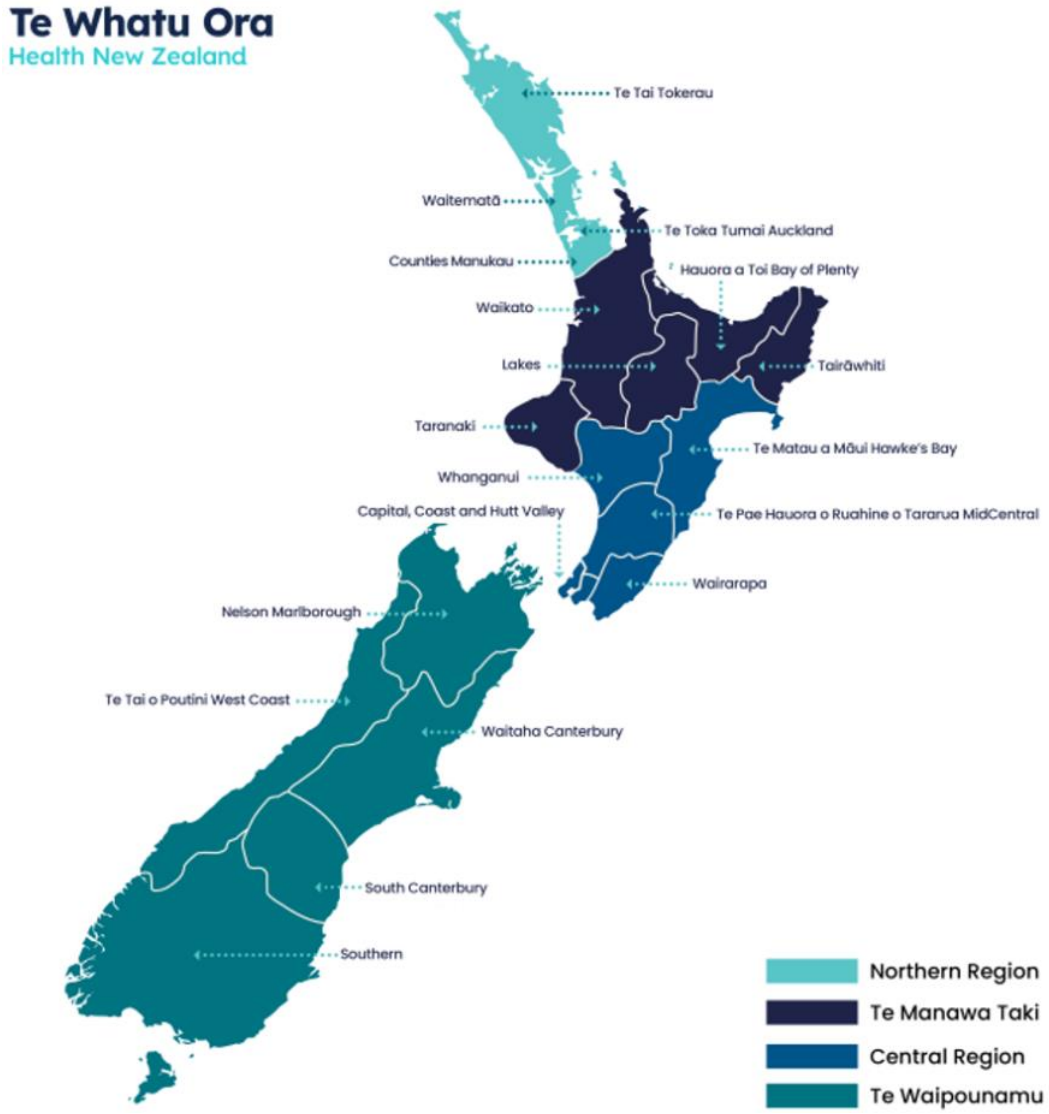

Figure 5: Te Whatu Ora Regions and Districts

Section 7 of the Pae Ora (Healthy Futures) Act 2022 requires that Te Whatu Ora address the wider determinants of population health and wellbeing, including effects that adversely impact population health, such as climate change[5]. Te Whatu Ora 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.

In 2022, Te Whatu Ora created an interim work programme leading to 2025, outlining the following work streams:

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

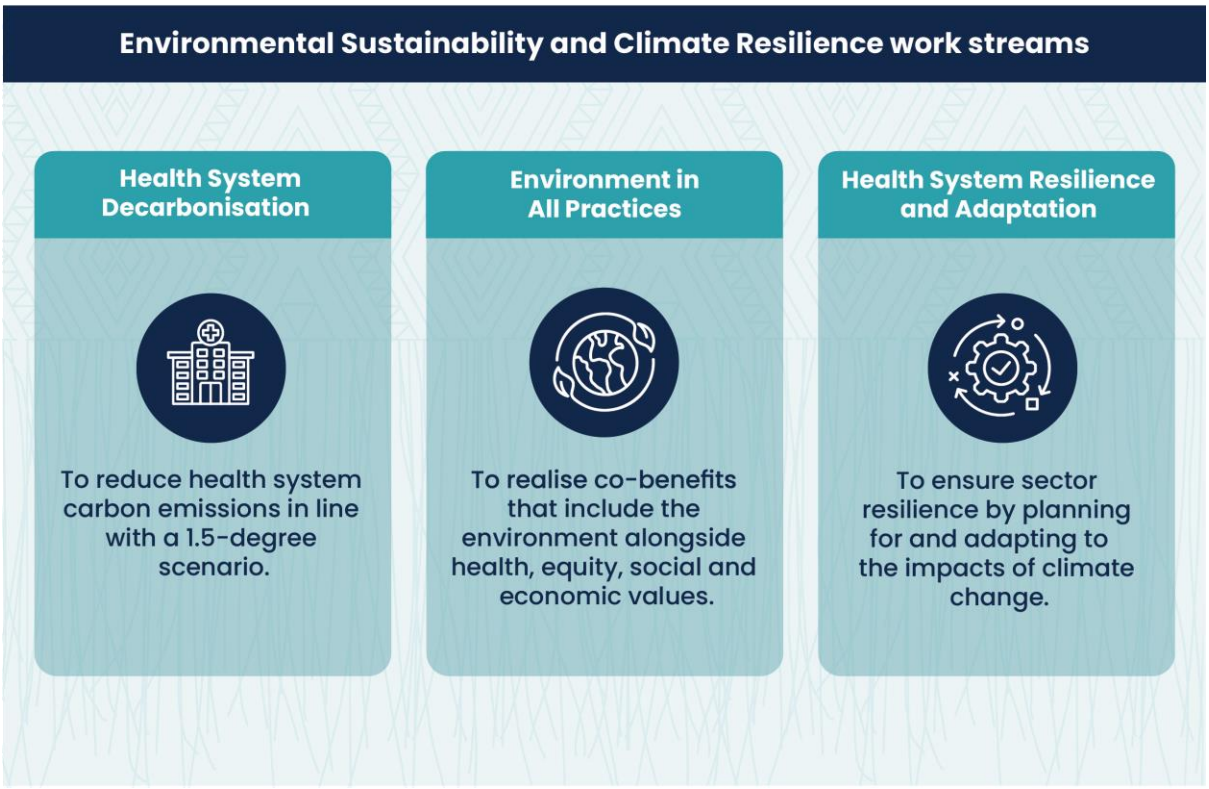

Figure 6: Te Whatu Ora sustainability interim work programme priority areas

This report is a key outcome of the health system decarbonisation work stream, assisting the organisation in complying with requirements under CNGP, and establishing a reputation as an environmentally responsible organisation, contributing toward national emissions reduction targets. This work is strongly supported and complemented by the other interim work streams. Te Whatu Ora recognises emissions reduction as an opportunity to take a whole-of-system approach.

1.3.2. Statement of intent

This inventory forms part of Te Whatu Ora's commitment to measure and manage its emissions and report in line with CNGP directions. The report outlines Te Whatu Ora's baseline year for emissions reporting, upon which the organisation will continue to report annually. The inventory has been third-party verified by Toitū Envirocare to a reasonable assurance level for all categories except category 3 CME travel. Category 3 CME travel received a limited assurance level.

1.3.3. Reporting Period

The emissions reporting period is from 1 July 2022 to 30 June 2023, aligning with CNGP requirements and Te Whatu Ora's financial year. This is the first emissions report for Te Whatu Ora and will become the baseline of emissions reporting for the organisation.

1.3.4. Organisational structure and boundary

The highlighted box in Figure 7 shows the organisational boundary for Te Whatu Ora within the national health system. This encompasses all previous organisations transferred to Te Whatu Ora, including all DHBs, Public Health Units and services transferred to Te Whatu Ora from Manatū Hauora (Ministry of Health).

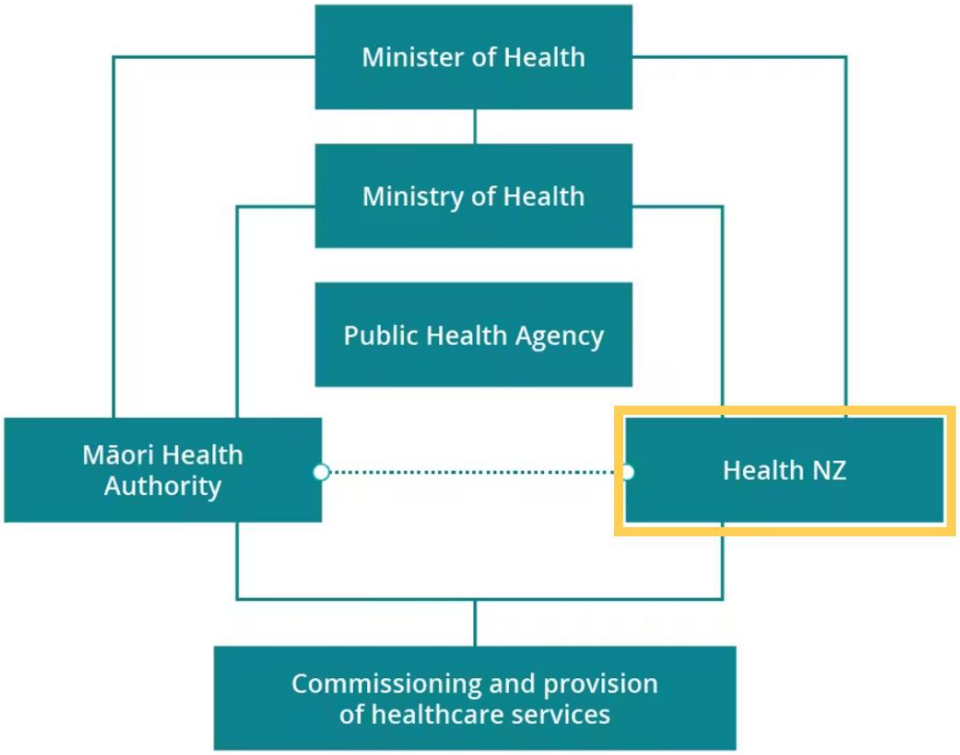

Figure 7: New Zealand health system

Figure 8 sets out Te Whatu Ora's organisational boundary. The organisation uses the operational control consolidation methodology, which allows a focus on the emissions that Te Whatu Ora can control, and thereby have the greatest level of influence through emissions reduction measures.

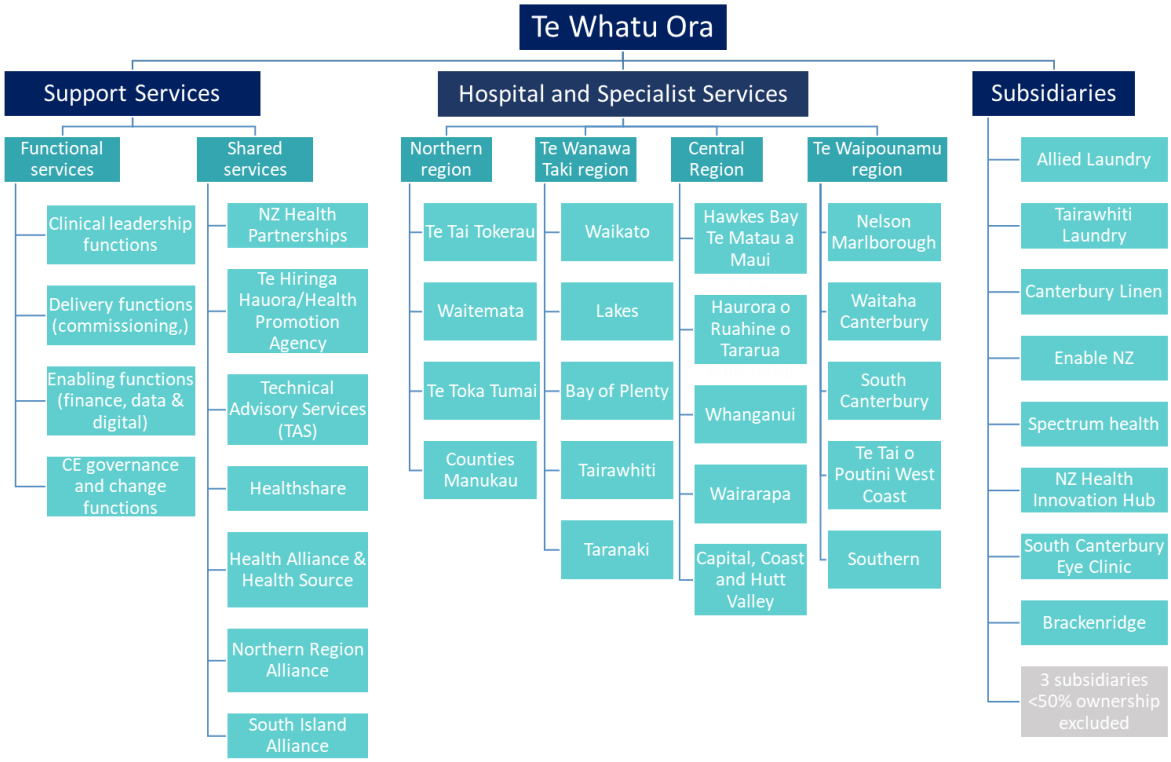

Figure 8: Organisational boundary for Te Whatu Ora

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.

Due to the transfer of several functions from Manatū Hauora to Te Whatu Ora (including staff and leased office space from the former), this inventory accounts for these emission activities, from the point the contracts were transferred to Te Whatu Ora.

Where relevant, boundary details specific to emissions sources are detailed in Appendix F.

1.3.5. Business units excluded from inventory

Te Whatu Ora 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 4 outlines the subsidiary exclusions. Companies of which Te Whatu Ora 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 4: Subsidiary Exclusions

Subsidiary	Reason for Exclusion
Opotiki Health Centre Ltd	15% share of ownership
Tlab Ltd	50% share of ownership
Health one Ltd	50% share of ownership
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

1.4. GHG emissions sources

1.4.1. 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.

The health system in Aotearoa New Zealand has been undertaking emissions reporting for several years across some of the larger DHBs, albeit using somewhat inconsistent methodologies.

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, which guides and supports this baseline inventory.

The framework provides a robust and standardised means of capturing and reporting on emissions, in response to the CNGP requirements for emissions measurement and reporting. It also provides parameters to improve consistency, reporting optimisation and practical support on data collection.

Due to the significant change within the publicly funded health system during its first financial year and the scale of emissions data gathering for all newly combined entities, the Te Whatu Ora framework embarks on a phased approach to emissions reporting. This allows the organisation to grow its maturity in emission reporting and work on known data gaps over time. Figure 9 illustrates the phased delivery approach.

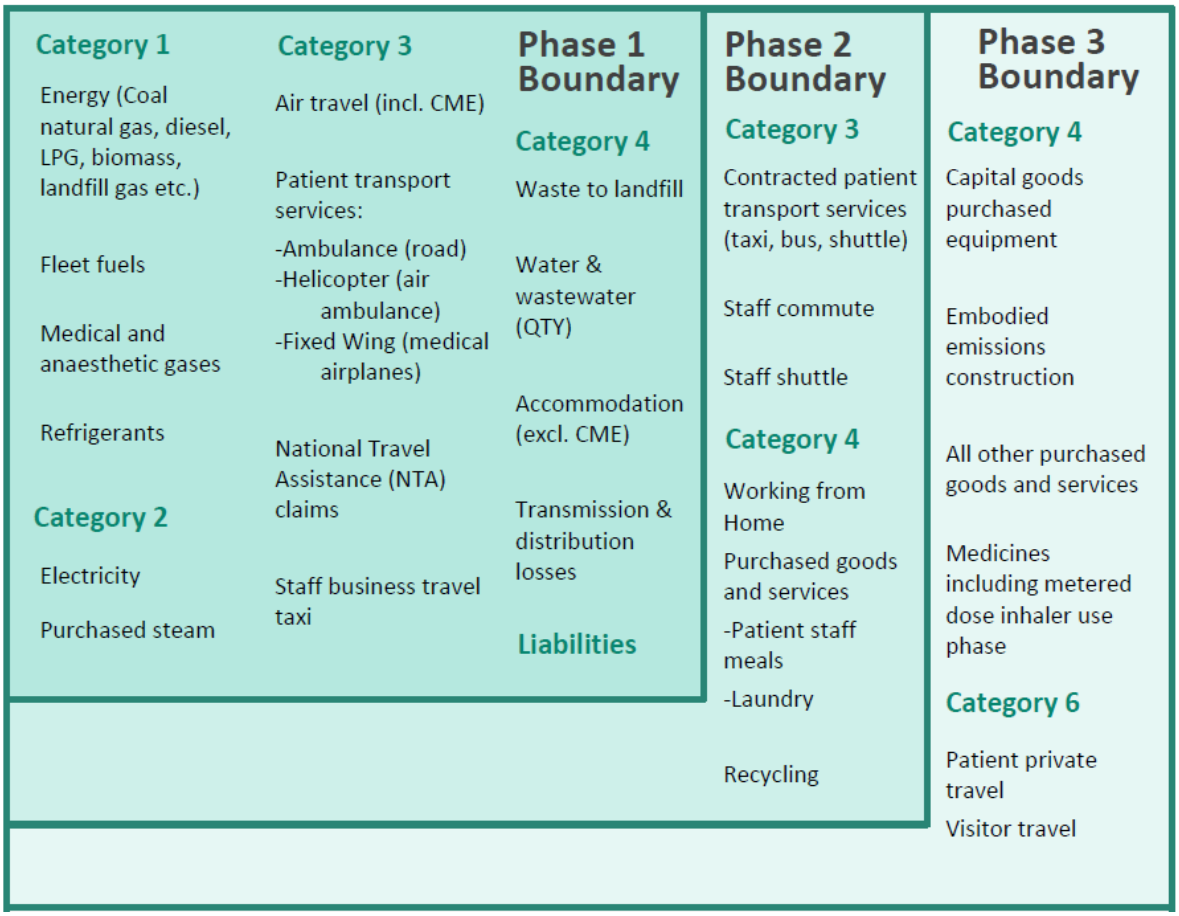

Figure 9: Phased emission reporting approach

A summary overview of the emissions included in this year's inventory based on phase one is given in Table 5:

Table 5: Summary of emission activities included in this reporting year

	Emission activities in scope
Category 1	Coal, natural gas, LPG, diesel stationary, biomass, refrigerants, medical gases (N_2O, Entonox, CO_2, CH_4, Acetylene), Anaesthetic vapours (Desflurane, Isoflurane, Sevoflurane), fleet fuels, refrigerants
Category 2	Electricity, purchased steam from coal, biomass and landfill gas
Category 3	Staff air travel, taxi travel and rental cars. 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 staff and patients
Category 4	Waste to landfill, incinerated waste, transmission and distribution losses gas and electricity, distributed energy, water and wastewater.

1.4.2. Emissions sources excluded

Activities that contribute significantly to Te Whatu Ora's total emissions and are not included in this baseline inventory include staff commute, private patient travel, procurement activities, and food. These sources have not been included in phase one reporting due to a lack of available data. Table 6 lists the emissions sources that have been identified and excluded. De minimis sources will be reviewed after establishing the baseline year inventory.

Te Whatu Ora recognises its value chain emissions are significant. The Emissions Reporting Framework guides the progression and maturity of reporting by developing methodologies to gather missing data and include sources not currently within this reporting year's scope. Furthermore, increased engagement with suppliers will improve data availability and quality.

Table 6: Emission activities excluded from this reporting year

	Emission exclusions
Category 1	-
Category 2	-
Category 3	Staff commute Staff working from home Staff travel related reimbursement claims other than air travel (mileage, rental cars, taxi, public transport) Contracted patient services (taxi, shuttle, bus services) Staff transport services Accommodation in staff reimbursement claims Freight
Category 4	Purchased goods and services (e.g. staff and patient meals, laundry, all products purchased) Embodied emissions from construction
Category 6	Patient private travel Visitor travel

It should also be noted that the Christchurch Energy Centre is under operational control of Te Whatu Ora; however, the energy is also purchased by the University of Otago. To avoid double counting of emissions from CNGP participants, energy on-charged to the university is excluded from the inventory.

1.5. Liabilities

HFCs, PFCs and SF_6 represent GHGs with high global warming potentials. Other GHG stocks, including coal, stationary diesel, medical gases and biomass, are held on several Te Whatu Ora sites. Their accidental release could result in a large increase in emissions for the reporting period.

Te Whatu Ora is working on establishing a baseline for all liabilities present at its sites. Table 7 provides an initial 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 7: GHG estimated stock liability per holding

Holdings	Quantity	Unit	Potential liability
Refrigerants HFCs	26,690	Kg	34,329
Refrigerants blends	6,380	Kg	12,447
Refrigerants controlled by the Montreal protocol	4,554	Kg	2,426
Refrigerants other	1,329	Kg	1,720
Diesel	1,230,593	Litres	3,298
Medical gases	-	Kg	2,107
Coal	142,000	Tonne	284
LPG	36,167	Kg	107
Anaesthetic vapours	-	Kg	101
Biomass	362,000	Tonne	5
	Total potential liability tCO_2e		**56,825**

1.6. Land-use change

Organisations that own land subject to land-use change may achieve sequestration of carbon dioxide through a change in the carbon stock on that land. Where a sequestration is claimed, then this also represents a liability in future years should fire, flood, or other management activities release the stored carbon.

Land-use change has not been included in this inventory as Te Whatu Ora does not own land subject to significant land use change.

1.7. Supplementary results

Holdings and transactions in GHG-related financial or contractual instruments such as permits, allowances, renewable energy certificates or equivalent, verified offsets or other purchased emissions reductions from eligible schemes recognised by the Programme are reported separately here.

Contractual instruments are any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims. This includes Renewable Energy Certificates.

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

1.8. 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 Te Whatu Ora sites to provide activity data such as waste to landfill, electricity or 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], 2023). Custom emission factors were created or derived where not available in the MfE guide and recorded in the Te Whatu Ora emission conversions and calculation documentation. Tables 8, 9 and 10 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 (tCO2e).

Table 8: Summary of custom-created or derived emissions factors

Created custom or derived factor name	Unit	Emission factor $kgCO2_e$/ unit
TWO Biomass (CH_4-N_2O) - Wood chip Industry - GJ	GJ	0.023
TWO Biogenic (CO_2) - Wood chip Industry - GJ	GJ	89.47
TWO Coal - Bituminous - Industrial Use - GJ	GJ	89.1405
TWO Coal - Sub-Bituminous - Industrial Use - GJ	GJ	92.0005
TWO Biogas - Landfill Gas - GJ	GJ	0.00000072
TWO HFE-236ea2 (Desflurane) - Bottle	Bottle	630.31
TWO HCFE-235da2 (Isoflurane) - Bottle	Bottle	183.634
TWO HFE-347mmz1 (Sevoflurane) - Bottle	Bottle	82.242
TWO Public Transport - $	$	0.649
TWO Medical waste – Kg	Kg	0.442
TWO Cytotoxic waste – Kg	Kg	0.879
TWO Acetylene - kg	Kg	3.385

Table 9: Skyline Aviation aircraft custom emissions factors per hour flown

Created custom or derived factor name	Aircraft Reg / type	Fuel litres/ hour	Jet A1 EF	$kgCO_2e$/ hr
TWO Aviation fuels - B350 - hours	B350	450	2.56	1,152
TWO Aviation fuels - B200 - hours	B200	380	2.56	973
TWO Aviation fuels - C90 - hours	C90	3,330	2.56	8,525
TWO Aviation fuels – Mustang - hours	Mustang	400	2.56	1,024
TWO Aviation fuels - 400XT - hours	400XT	600	2.56	1,536
TWO Aviation fuels – Sovereign - hours	Sovereign	950	2.56	2,432

Table 10: Refrigerant GWP emissions

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. Te Whatu Ora utilises the ‘Accelerate to Zero’ emission reporting tool, developed by Deloitte, for emissions data management, monitoring, reporting and planning.

1.9. Disclosure

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

Base year – 01 July 2022 to 30 June 2023

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*

Chapter 2: Emissions Management Report

Te Whatu Ora has commenced its journey in emissions management, not least of which is creating its emissions baseline. This section aims to discuss with more detail progress and intentions.

2.1. Organisational emissions reduction targets

Over the next financial year, Te Whatu Ora will create its first organisation-wide Emissions Reduction Plan in line with CNGP directions. This will include a formalised reporting and governance structure, with quarterly reporting mechanisms and updates on key projects and investments.

The reported baseline from this inventory will be used to set emission reduction targets in line with a 1.5-degree pathway.

The three focus areas set through the interim work programme (Figure 5) will continue to guide work until a broader sustainability approach is created and the formal Emissions Reduction Plan is in place.

2.2. Key performance indicators

To be able to compare emissions across organisations and industries, and to comply with CNGP and ISO standards, Te Whatu Ora considers its emissions against funding received and FTE. Average daily bed occupancy is also used as an intensity metric to enable benchmarking against other healthcare facilities globally. It is a metric recommended in Global Green and Healthy Hospitals reporting initiatives.

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

Table 11: Emissions per intensity metric

Emission intensity metric	Intensity Unit	tCO_2e per unit	
Expenditure	$24.6 billion	**9.67**	tCO_2e / M$
FTE	74,971[6]	**3.17**	tCO_2e / FTE
Average daily bed occupancy	8,411[7]	**28.28**	tCO_2e / bed

2.3. Initiatives

While Te Whatu Ora has yet to set emission reduction targets, several operational and strategic initiatives have taken place over the past year to achieve emission reductions and set direction. Figure 10 outlines the primary initiatives and achievements that have taken place during this reporting year.

[6] Based on recorded FTE in the Health Workforce Information Programme as at 31 March 2023. FTE total excludes FTE from subsidiaries.
[7] Based on recorded patient Length of Stay days in the National Minimum Dataset of hospital events (NMDS) as at 31 July 2023.

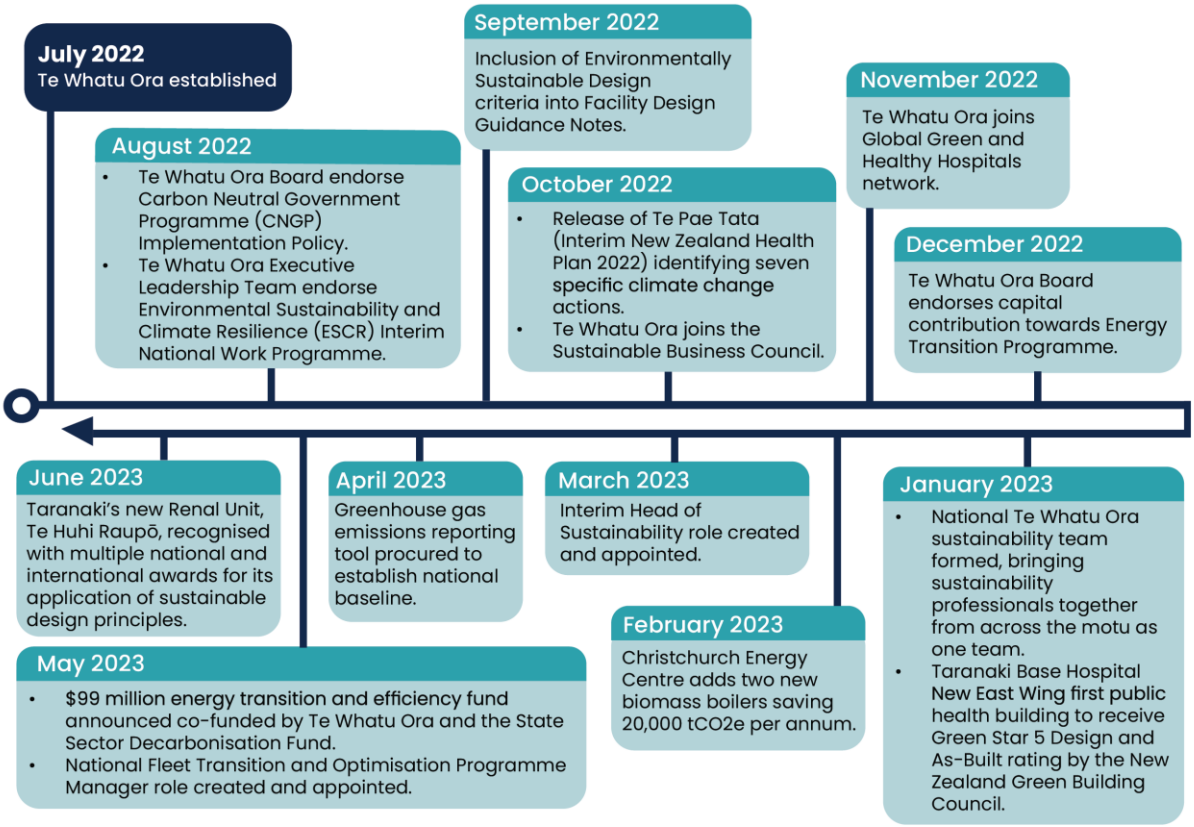

Figure 10: Sustainability year overview

Sustainability work has taken a national approach since the implementation of Te Whatu Ora, which will benefit the work undertaken in prioritised areas such as infrastructure, procurement and supply chain, and circular economy and waste.

One example of the national approach is the transition and optimisation of Te Whatu Ora's fleet. The current fleet composition is outlined in Appendix E, with the transition to battery electric vehicles expected to improve over the coming year.

2.4. Engagement and communication

Te Whatu Ora is a proud member of the Sustainable Business Council[8] and the Global Green and Healthy Hospitals[9] international network, as well as being connected across the motu through engagement with networks such as Sustainable Healthcare Aotearoa[10] and OraTaiao Climate and Health Council[11].

Te Whatu Ora has an internal sustainability network of over 340 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.

[8] https://sbc.org.nz/
[9] https://greenhospitals.org/
[10] https://www.linkedin.com/company/sustainable-health-sector-national-network-aotearoa/?originalSubdomain=nz
[11] https://www.orataiao.org.nz/

Te Whatu Ora has also recently joined WasteMINZ[12]. As a WasteMINZ member, Te Whatu Ora can actively support discussions and initiatives that deliver circular economy outcomes, and waste minimisation benefits, and promote waste education and awareness.

2.5. Monitoring and reporting

Te Whatu Ora'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 inventory report forms the baseline year for the organisation. It will be followed by annual emission reports, which will establish how the organisation is progressing toward targets from the impending Emissions Reduction Plan.

References

Greenhouse Gas Protocol Corporate Accounting and Reporting Standard
https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

International Organization for Standardization. 2018. Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals (ISO Standard No.14064-1:2018). (Standard on file)

Pae Ora (Healthy Futures) Act 2022
https://www.legislation.govt.nz/act/public/2022/0030/latest/LMS575484.html

Te Whatu Ora. 2022. Te Whatu Ora – Health New Zealand Emissions Reporting Framework – A guide to measuring and reporting greenhouse gas emissions for Te Whatu Ora (framework on file)

Te ine tukunga: He tohutohu pakihi | Measuring emissions: A guide for organisations, 2023 detailed guide , Manatū Mō Te Taiao | Ministry for the Environment
https://environment.govt.nz/assets/publications/Measuring-Emissions-Guidance_DetailedGuide_2023_ME1764.pdf

Carbon Neutral Government Programme: A guide to managing your greenhouse gas emissions – measuring, reporting, target-setting and reduction planning. Version 3.0 May 2023, Manatū Mō Te Taiao | Ministry for the Environment

Carbon Neutral Government Programme: A guide to measuring and reporting greenhouse gas emissions | Ministry for the Environment

[12] https://www.wasteminz.org.nz/

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

Emission source	Unit Measure	Factor	Total QTY	Total KgCO2e
Nat Gas - Industrial - GJ	GJ	53.658	986,048	**52,909,278**
Electricity - Kwh	Kwh	0.074	368,940,973	**27,367,175**
Coal - Sub-Bituminous - Industrial Use - GJ	GJ	92.001	187,074	**17,210,920**
Long-haul (>3700km) - Business class - With Radiative Forcing	Passenger Kms	0.429	33,658,510	**14,433,442**
Purchased Steam from coal - GJ	GJ	92.001	155,838	**14,337,215**
Air travel Default - KgCO2-e	KgCO2-e direct	1.000	13,557,595	**13,557,595**
Air travel Default - tCO2-e	tCO2-e direct	1,000.000	12,440	**12,440,000**
Nitrous oxide	Kg	265.000	46,594	**12,347,505**
Petrol - Default* - Petrol - Default* - litre	Litre	2.455	2,894,087	**7,105,477**
Domestic - National average - With Radiative Forcing	Passenger Kms	0.306	21,842,852	**6,681,580**
Passenger Vehicle - Petrol Vehicle - Default - Km (NTA)	Km	0.252	23,045,362	**5,801,806**
Aviation fuel (Kerosene) - litre (Cat 3)	Litres	2.561	1,842,095	**4,716,909**
Waste with gas recovery (unknown composition) - General Waste - Kg	Kg	0.232	16,911,330	**3,919,565**
Passenger Vehicle - Diesel Vehicle - 2000–<3000 cc - Post 2015 - Km	Km	0.223	16,498,968	**3,675,194**
Helicopter Eurocopter AS350B3 Squirrel - Hrs	Hours	482.740	7,285	**3,516,693**
Coal - Bituminous - Industrial - GJ	GJ	89.141	36,797	**3,280,060**
Electricity T&D - kWh	Kwh	0.009	368,940,973	**3,173,454**
Entonox	Kg	153.435	17,621	**2,703,728**
Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - C90 - hours	Hours	8,526.870	294	**2,506,047**
Clinical/medical / sharps waste autoclaving and landfilling - Kg	Kg	0.442	4,688,539	**2,072,334**
Natural Gas T&D - GJ	GJ	1.981	986,048	**1,953,188**
Long-haul (>3700km) - Economy class - With Radiative Forcing	Passenger Kms	0.148	12,579,947	**1,860,197**
Long-haul (>3700km) - Premium economy class - With Radiative Forcing	Passenger Kms	0.237	7,630,143	**1,805,216**
Diesel - Diesel - litre	Litre	2.715	654,510	**1,776,910**
Diesel - Commercial use - litre	Litre	2.689	617,326	**1,660,075**

Domestic - Avg Wastewater Treatment Plants (Unit m3) - m3	m3	0.508	3,251,780	**1,650,826**
Public Transport $ (NTA)	$	0.649	2,457,823	**1,595,127**
Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - B200 - hours	Hours	973.036	1,498	**1,457,316**
New Zealand - MfE (Cat 4)	Room Per Night	9.400	109,334	**1,027,739**
LPG - Commercial use - kg	Kg	2.972	341,282	**1,014,167**
HFC-134a (R-134a) - Kg	Kg	1,300.000	767	**996,840**
Short-haul (<3700km) - Economy class - With Radiative Forcing	Passenger Kms	0.151	6,301,646	**951,675**
Vehicle KgCO2e direct	KgCO2-e direct	1.000	943,330	**943,330**
Domestic - National average - With Radiative Forcing (NTA)	Passenger Kms	0.306	3,015,965	**922,563**
New Zealand - MfE	Room Per Night	9.400	69,213	**650,602**
Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - B350 - hours	Hours	1,152.280	455	**523,711**
HFE-347mmz1 (Sevoflurane) - Bottle	Bottle	82.242	5,680	**467,135**
Taxi travel - regular - dollars spent ($3.20/kilometre) - $ (NTA)	$	0.051	6,440,824	**331,058**
Premium Petrol - Premium Petrol - litre	Litre	2.457	134,463	**330,402**
Taxi travel - regular - dollars spent ($3.20/kilometre) - $	$	0.051	5,793,343	**297,778**
HCFC-22 (R-22) - Kg	Kg	1,760.000	157	**275,440**
Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - Mustang - hours	Hours	1,024.249	256	**261,798**
Distributed energy - Electricity	kWh	0.074	2,281,634	**169,246**
Waste without gas recovery (unknown composition) - General Waste - Kg	Kg	0.724	259,944	**188,274**
Water Supply Emission Factors (Unit m3) - m3	m3	0.037	3,251,780	**120,104**
Cytotoxic waste incineration - Kg	Kg	0.879	116,335	**102,259**
HFE-236ea2 (Desflurane) - Bottles	Bottle	630.309	159	**100,219**
Average - MfE	Room Per Night	20.000	4,619	**92,380**
Short-haul (<3700km) - Business class - With Radiative Forcing	Passenger Kms	0.227	352,852	**79,928**
Australia - MfE	Room Per Night	38.900	1,694	**65,897**
404A - Kg	Kg	3,943.000	15	**59,500**
Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - 400XT - hours	Hours	1,536.373	37	**57,153**
Passenger Vehicle - Petrol Vehicle - Rental - Km	Km	0.186	302,892	**56,245**
410A - Kg	Kg	1,923.500	28	**53,858**
Carbon dioxide	Kg	1.000	45,778	**45,778**
HCFE-235da2 (Isoflurane) - Bottle	Bottle	183.634	173	**31,769**
407C - Kg	Kg	1,624.210	11	**17,866**

Refrigerants - Kg Co2e direct - Kg	Kg Co2-e Direct	1.000	12,820	**12,820**
Waste with gas recovery (unknown composition) - Office Waste - Kg	Kg	0.666	17,596	**11,716**
Short-haul (<3700km) - Average passenger - With Radiative Forcing	Passenger Kms	0.154	57,956	**8,898**
HFC-32 (R-32) - Kg	Kg	677.000	11	**7,609**
United States - MfE	Room Per Night	19.800	327	**6,475**
Biomass - Wood & Residuals - GJ	GJ	0.023	225,262	**5,181**
Passenger Vehicle - Diesel Vehicle - 2000–<3000 cc - 2010 to 2015 - Km	Km	0.238	14,944	**3,560**
Fiji - MfE	Room Per Night	54.800	55	**3,014**
Aviation fuel (Kerosene) - Aviation fuel (Kerosene) - Sovereign - hours	Hours	2,432.591	1	**2,676**
Singapore - MfE	Room Per Night	28.500	49	**1,397**
United Kingdom - MfE	Room Per Night	13.400	91	**1,219**
Indonesia - MfE	Room Per Night	88.200	9	**794**
India - MfE	Room Per Night	66.000	11	**726**
United Arab Emirates - MfE	Room Per Night	95.900	7	**671**
Netherlands - MfE	Room Per Night	21.200	31	**657**
Purchased Steam from woodchips - GJ	GJ	0.023	26,666	**613**
Canada - MfE	Room Per Night	17.100	34	**581**
Japan - MfE	Room Per Night	54.700	10	**547**
Germany - MfE	Room Per Night	18.200	30	**546**
Thailand - MfE	Room Per Night	55.900	8	**447**
Philippines - MfE	Room Per Night	62.900	7	**440**
Passenger Vehicle - Diesel Vehicle - Rental - Km	Km	0.181	1,905	**345**
Methane - Kg	Kg	28.000	11	**307**
Spain - MfE	Room Per Night	16.300	17	**277**
Italy - MfE	Room Per Night	23.900	11	**263**
Israel - MfE	Room Per Night	51.800	5	**259**
Switzerland - MfE	Room Per Night	7.400	23	**170**
South Africa - MfE	Room Per Night	56.600	3	**170**
Custom Acetylene - Kg	Kg	3.385	47	**159**
France - MfE	Room Per Night	7.500	10	**75**
Austria - MfE	Room Per Night	11.900	5	**60**
Colombia - MfE	Room Per Night	11.000	2	**22**

Belgium - MfE	Room Per Night	11.600	1	**12**
Isobutane(R-600a) - Kg	Kg	3.000	3	**9**
Passenger Vehicle - Electric Vehicle - Rental - Km	Km	0.017	64	**1**
Biogas - Landfill Gas - GJ (CAT2)	GJ	0.0000007	51,182	**0**
Grand Total				**237,822,265**

Appendix B Emissions per Supplier

Emission Source	Supplier	Total Emissions KgCO2e
Fuel	Allied Petroleum	35,060
	Birchfield	6,074,147
	BOC	18,053
	BP Fuel Cards	8,961,986
	Canterbury District Energy Inputs	14,420,910
	District Inputs	2,652,611
	Genesis	54,862,467
	Kiwi Fuel Cards	7,594
	Mobil	140,130
	NZ Fuel Cards	53,374
	Subsidiary Inputs	19,328
Medical Gases, Refrigerant & Other	Air Liquide	4,582,303
	Baxter	599,122
	BOC	10,515,174
	District Inputs	1,423,943
Purchased Energy	Canterbury District Energy Inputs	- 188,872
	Contact (Simply Energy)	27,836,095
	District Inputs	33,540
	Genesis	693,049
	Mercury	11,192
	Nelson City Council	0
	Pioneer Energy	14,337,829
	Smart Power	17,276
	Subsidiary Inputs	207,295
	Meridian	1,931,055
Travel Vehicle	District Inputs	297,778
	FcM	24,603
	Free Wellington Ambulance	861,048
	National Travel Assistance Programme (NTA)	1,926,185
	Orbit (House of Travel)	82,282
	Pro Med	3,560
	St John	3,675,194
Travel Air	Air Gisborne	567,666
	Air Napier	34,414
	Air Wanganui	948,359
	AirNZ (Direct)	12,440,000
	Corporate Office Inputs	94,851

	District Inputs	21,675,118
	FcM	4,683,205
	Garden City Helicopters	1,502,908
	HNZ National Ambulance Services Office (NASO)	3,516,693
	LifeFlight	1,058,561
	Mainland Air	44,340
	National Travel Assistance Programme (NTA)	922,563
	Orbit (House of Travel)	8,874,390
	Philips Search and Rescue	428,754
	Skyline Aviation	4,808,702
	Stewart Island Flights	6,268
	Subsidiary Inputs	4,941
	Sunair	125,638
	Tandem	3,888,788
	You Travel	157,237
Materials & Waste	District Inputs	311,771
	Envirowaste	1,308,155
	Interwaste	1,550,089
	Northland Regional Landfill	86,224
	Northland Waste	40,894
	Subsidiary Inputs	15,994
	Waste Management	2,981,021
Wastewater & Water Supply	AZ - Supplier (Uncategorized)	1,770,930
Hotel Stay	Corporate Office Inputs	4,266
	FcM	265,376
	National Travel Assistance Programme (NTA)	6,829,545
	Orbit (House of Travel)	431,371
	Tandem	134,564
	You Travel	24,111

Appendix C Overview per CNGP activity group

CNGP Activity Groups	$tC02_e$
Scope 1 - Agriculture (all emissions)	-
Scope 1 - Biofuel (fossil fuel emissions N2O & CH4 for biofuel portion)	-
Scope 1 - Biomass (fossil fuel emissions N2O & CH4 for biofuel portion)	5
Scope 1 - Forestry - harvest/deforestation	-
Scope 1 - Refrigerants, medical and other gases	17,121
Scope 1 - Other	-
Scope 1 - Stationary combustion - coal	20,491
Scope 1 - Stationary combustion - natural gas and LPG	53,923
Scope 1 - Stationary combustion - other (e.g., diesel)	1,660
Scope 1 - Transport fuels - aviation	-
Scope 1 - Transport fuels - other (e.g., shipping fuel)	-
Scope 1 - Transport fuels - vehicle fleet	9,213
Scope 2 - Electricity	27,367
Scope 2 - Other (e.g., purchased steam)	14,338
Scope 3 (mandatory) - Air travel domestic	24,508
Scope 3 (mandatory) - Air travel international	23,904
Scope 3 (mandatory) - Business travel other (e.g., taxi, hotel, rental cars)	1,125
Scope 3 (mandatory) - Freight	-
Scope 3 (mandatory) - Staff working from home	-
Scope 3 (mandatory) - Transmission and distributions losses (electricity)	3,173
Scope 3 (mandatory) - Transmission and distributions losses (natural gas)	1,953
Scope 3 (mandatory) - Waste (to landfill)	6,294
Scope 3 (mandatory) - Wastewater	1,651
Scope 3 (mandatory) - Water	120
Scope 3 (other material) - Emissions from purchased goods and services	21,911
Scope 3 (other material) - Emissions from purchased capital goods	-
Scope 3 (other material) - Other (e.g., staff commuting, investments, leased assets)	9,064
Scope 1 Biogenic emissions - Biofuel CO2 component (considered carbon neutral)	-
Scope 1 Biogenic emissions - Biomass CO2 component (considered carbon neutral)	20,154
Removals - Forest growth removals	-

Appendix D Overview of locations/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
		Kaitaia 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 Tararua 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 Fleet composition of Te Whatu Ora

As at 30 June 2023, Te Whatu Ora has the following fleet composition.

This includes light fleet, heavy fleet including mobile clinics, trailers, and other specialist vehicles.

District	Total fleet	BEVs	PHEVs	Hybrids	ICE
Te Toka Tumai Auckland	338			39	299
Counties Manukau	418	80			338
Te Tai Tokerau	375	113	36		255
Waitemata	451	85	2	1	363
Hauora a Toi Bay of Plenty	320	32		28	260
Lakes	92			60	32
Tairawhiti	108	39	6		58
Taranaki	116			41	75
Waikato	165	8			165
Capital Coast & Hutt Valley	404	7		300	160
Te Matau a Māui Hawkes Bay	175	7		147	21
Whanganui	76				76
Te Pae Hauora o Ruahine o Tararua Mid Central	174	41	2	81	50
Wairarapa	41	20			21
Waitaha Canterbury	356	33		3	284
Nelson Marlborough	237	8		50	229
South Canterbury	72	1		52	19
Southern	299	5	14	136	154
West Coast	151		6	45	100
	4,368	**479**	**66**	**983**	**2,959**

Note: BEV – battery electric vehicle, PHEV – plug-in hybrid electric vehicle, ICE – internal combustion engine

Appendix F Emissions sources, data collection and uncertainty overview per category

Emissions sources, data collection and uncertainty overview 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_2O	Southern district inputs	GJ	Custom Biomass CH_4 - N_2O CAT1 - 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. Other sites, Hillmorton and Burwood Hospital	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 Te Whatu Ora. Includes ICPs of leased buildings, included as CAT1 emissions under operational control. Auckland Hospital Co-gen plant is no longer in operation, no deduction or adjustment is required in the gas/electricity bill from Simply and Genesis. 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 District. Waikato Hospital supplies steam to the onsite hospital laundry operated by Taylors for the hospital. Consumption included under Waikato Hospital. 25 TOU ICPS around 95% consumption, 53 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		High quality - It is assumed the district 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	kg	CO_2 - kg N_2O - 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_2O 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 N2O, 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_2O - 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 districts	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 districts only	
	Allied petroleum			BOP and West Coast districts only	
	Leaseplan (Mobil)			Midcentral district only	
	NZ fuel cards			BOP district only	
	Kiwi fuel cards			Corporate	
Refrigerants	District Inputs, various suppliers	kg	Various refrigerants AR5	Includes refrigerants of district 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 Te Whatu Ora. Includes ICPs on our account of leased buildings and are included as CAT2 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 Counties Manukau changed TOU meters from Simply to Genesis.	
	Meridian			For NHH electricity ICPs where the invoice and consumption period doesn't match the monthly invoice bill (e.g., ICP invoice period 12 April to 11 May), the consumption data is included in the previous month of the monthly invoice. Total around 760 ICPS. In April, several ICPs of Whanganui changed from Simply to Meridian.	
Electricity other contracts	Mercury			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			Accounts from Smartpower were transferred from MoH to Te Whatu Ora at the end of January 2023. MoH will include consumption for emissions inventory when still invoiced to MoH, Te Whatu starts including these emissions at start of contract transfer and invoicing going forward.	
	Corporate or shared services direct inputs			Two corporate offices where electricity consumption is on charged and not available have been included with estimations of 200kWh/leased m2	
Purchased Landfill gas	Nelson City Council	GJ	Custom Biogas - Landfill Gas - GJ	Nelson Hospital. Nelson Marlborough District owns the landfill gas boiler house and operates the boiler, but Nelson Council owns the boiler assets. Purchased from Pioneer Energy in November. Included as CAT2.	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 generated by sub-bituminous 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 CAT2 purchased steam as Pioneer has operational control over both energy centres. Dunedin Hospital changed over from coal to biomass in May 2023	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
		GJ	Custom Biomass CH_4 - N_2O 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	$kgCO_2e$	Direct $KgCO_2e$	Some districts have separate patient accounts. Different codes are to be allocated to patient travel. Waikato, Hawkes Bay, Canterbury and Nelson Marlborough have separate accounts. Internal patient codes in other sets: South Canterbury and West Coast no patient flights. Southern purchase order code 480 6816250 4960 00000 (not seen or used in the dataset). Capital Coast purchase order column codes 4960, 4961,4962, and 4963. Wairarapa purchase order code 4960.00000. Capital Coast code 4962 occasionally has some staff members escorting patients, but code is booked as patient and considered de minimis. Per June 2023, Orbit supplies separate datasets for patients and staff flights	High quality - It is assumed the supplier reports are complete and accurate.
	FcM				
	Tandem	pkm	Domestic - National average - With Radiative Forcing; Short-haul (<3700km) - Economy, Business class - passenger - With Radiative Forcing; Long-haul (>3700km) - Economy, Premium, Business class passenger - With Radiative Forcing	Air travel still has some cost centres booked under MoH in 2022 that are now part of Te Whatu Ora. Included in MoH inventory. Considered de minimis. Tandem datasets also contain patient flights (including patient NTA Whanganui) and Te Aka Whai Ora.	
	You Travel - local provider.			Short-haul premium economy flights linked to short-haul - Business class EF	

	Air NZ - direct	tCO_2e	Custom AirNZ's default tCO_2e.	Currently, Air NZ can only provide quarterly tCO_2e reports. Carbon neutral report summarises emissions from domestic and international and different classes of travel combined. There is no further breakdown this year, but as they are implementing a new software system, we can do this for next year and backtrack for this financial year.	
	Sunair	L	Aviation fuel (kerosene) / Jet A1 - litre	Doctor flights Te Tai Tokerau district	High quality - based on trips, flight hours and plane fuel consumption
	Air Napier			Doctor flights Hawkes Bay district	
	Mainland air			Doctor flights Southern District.	
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, Business class passenger - With Radiative Forcing	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 % 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.

Taxi travel staff	District and national inputs - taxi cards and vouchers	$	Taxi travel - dollar spent - $	This only includes data from contracted Taxi services and taxi cards. It excludes data from staff reimbursement claims; for some districts, patient data is included in the dataset. Some estimations had to be made on this percentage, or patient data is included.	Medium quality - uncertainties and variability on patient taxi inclusion.
Rental cars AoG	FcM	km	Passenger Vehicle - Petrol Vehicle - Rental - Km Passenger Vehicle - Diesel Vehicle - Rental - Km Passenger Vehicle - Electric Vehicle - Rental - Km	Inventory only includes rental car data from AoG travel providers. It excludes data from staff reimbursement claims or other contracts with rental car providers. Where no km data is available, a default value of 50 km per rental day is used (Source FcM car rental files)	High quality - It is assumed the supplier reports are complete and accurate.
	Tandem		Passenger Vehicle - Petrol Vehicle - Rental - Km		
	Orbit		Vehicle KgCO2e direct		

Ambulance - patients	St John	km	Passenger Vehicle - Diesel Vehicle - 2000–<3000 cc - 2015 to 2020 - Km	Data based on E-road emission extract of vehicles providing frontline services. Includes Emergency (EAS) and patient transfer services (PTS) for Te Whatu Ora. ACC trips cannot not be filtered out for EAS. % deduction in mileage based on joint funding agreement with ACC and Te Whatu Ora. EAS split 46 % ACC and 54% Te Whatu Ora. PTS is 100% Te Whatu Ora	High quality - It is assumed the supplier reports are complete and accurate. Small uncertainty over the allocation of KM to ACC
	Free Wellington Ambulance	$kgCO_2e$	$kgCO_2e$	Data based on E-road emission extract of vehicles providing frontline services. Includes Emergency and patient transfer services for Te Whatu Ora. 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 District only	
Patient National Travel Assistance (NTA) Claims	Te Whatu Ora- SOS	km	Private car default - petrol- km	NTA mileage reimbursement claim is 28 cents per total km travelled using the distance calc and is exclusive of GST. Units to the whole are return trips, .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.
		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	
			Taxi	Reimbursement of taxi claims. Data is ex-GST	
		$	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	
Helicopter - patients	HNZ National Ambulance Services Office (NASO)	Hrs	Helicopter Eurocopter AS350B3 Squirrel - Hrs	Helicopter hours include all hours paid by Te Whatu Ora. 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	High quality - It is assumed the provided reports are complete and accurate.
Patient air travel – Fixed Wing and airlines	Skyline Aviation	Hrs	TWO Aviation fuels - B350 - hours	Flights for ACC, MoH, Organ donation, and transport are filtered out of datasets as they are not invoiced to Te Whatu Ora.	High quality - It is assumed the supplier reports are complete and accurate.
			TWO Aviation fuels - B200 - hours		
			TWO Aviation fuels - C90 - hours		
			TWO Aviation fuels - 400XT - hours		
			TWO Aviation fuels – Sovereign - hours		
			TWO Aviation fuels – Mustang - hours		
	Life Flight Trust	Litres	Aviation fuel (kerosene) - litre (CAT3)	Patient data is divided by the number of patients on the flight and disaggregated into districts based on domicile.	

	Stewart Island Flights	Litres	Aviation fuel (kerosene) - litre (CAT3)	All flights recorded as 0.85 hours	
	Garden City Aviation			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	tCO_2e	AirNZ's tCO_2e number.		
	Tandem- Te Whatu Ora patients NTA	pkm	Domestic - National average - With Radiative Forcing; Short-haul (<3700km) - Economy, Premium, Business class - passenger - With Radiative Forcing; Long-haul (>3700km) - Economy, Premium, Business class passenger - With Radiative Forcing	Patient data is included in Tandem set with staff data.	
	Orbit - Patients	$kgCO_2e$	Direct $KgCO_2e$	Patient data included in Tandem set with staff data	

	Air Wanganui	Litres	Aviation fuel (kerosene) - litre (CAT3)	July 22 not received, so it is estimated based on the average of other months.	
	Air Gisborne	Litres	Aviation fuel (kerosene) - litre (CAT3)	Tairawhiti District only	
Accommodation Travel contracts	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.	High quality - It is assumed the supplier reports are complete and accurate.
	FcM				
	Tandem				
	You Travel - local provider.				

Category 4

Source	Data source	UOM	Emission factor	Boundary or dataset comments	Uncertainty
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 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.
	Envirowaste		Waste General Waste with LFGR - kg.	Assumed all waste goes to landfill with landfill gas recovery	
	Northland Waste		Waste General Waste with LFGR - kg	Northland waste Puwera landfill with LFGR	

	Northland regional landfill		Waste General Waste with LFGR - kg.	Puwera landfill with LFGR	
	District inputs various templates.		Waste General Waste with LFGR - kg. Waste General Waste without LFGR - kg	Hawkes Bay: Hastings District Omaranui with LFGR, Wairoa no LFGR.	High quality - It is assumed district inputs were recorded accurately
	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
Medical waste to landfill and incineration	Interwaste	Kg	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.
	Waste Management			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.	
	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

Distributed energy	Canterbury District	kWh	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			High quality - derived from energy meter data
	Derived from gas inputs	GJ			
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. Estimates made for data gaps based on the developed NABERSNZ for public hospital water calculator.	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.
	Wastewater	m3	Domestic Wastewater average - m3	Based on water inputs, assumed water in is water out	

Data sources, collection and uncertainties for liabilities

Liabilities				
Source	**Data source**	**UOM**	**Emission factor**	**Uncertainty**
Coal	District inputs	Tonnes	Coal - kg	High quality - assumed holdings based on delivered quantities
Stationary Diesel	District inputs	Litres	Diesel – Industrial Litres	High quality - assumed recorded diesel storage tank data was reported accurately.
Medical gases	BOC inputs	Kg	N_2O, CO_2, CH_4, Entonox	Medium - No stocktake available, based on two months of purchased bottles
Anaesthetic vapours	Derivation	Kg	Bottles	Medium - No stocktake available, based on two months of purchased bottles
Refrigerants	District inputs	Kg	Various AR5 refrigerant GWPs	Low to medium - not all sites have recorded refrigerant holdings yet. Value underestimation of actual liabilities