Greenhouse Gas Emissions Inventory

Christchurch City Council

Prepared by (lead author): Edward Lewis, Advisor Climate Resilience - Christchurch City Council
Date: 18/09/2024

This report has been prepared in accordance with ISO 14064-1:2018.
Verification Status: Reasonable and Limited

Measurement period: 01/07/2023 to 30/6/2024
Base year period: 01/07/2022 to 30/6/2023

Contents

Introduction

This report is the annual greenhouse gas (GHG) emissions inventory report for Christchurch City Council. The purpose of this report is to quantify the GHG emissions that can be attributed to Christchurch City Council's operations within the declared boundary and scope for the July 2023 to June 2024 period.

This report has been prepared in accordance with ISO 14064-1:2018.

1. Organisation Description

The Christchurch City Council is a New Zealand Territorial Authority. It provides a variety of public services in line with its responsibilities under the Local Government Act 2002. Key activities undertaken by the Christchurch City Council include water supply, wastewater collection and treatment, storm water management, solid waste management, provision of transportation infrastructure, street lighting, arts and cultural facilities, parks, recreation and community facilities, and the provision of regulatory services.

The Council acknowledges its operations can have a direct impact on the environment, and it considers climate impacts as part of its decision-making. The Council is committed to measuring, managing, and reducing its operational greenhouse gas emissions.

2. Statement of intent

This inventory forms part of the Council's commitment to measure and manage down its greenhouse gas emissions. The intended uses of this inventory are:

- To transparently record the council's operational greenhouse gas emissions.
- To ensure compliance with the requirements of the ISO-14064:2018 greenhouse gas emissions reporting standard.
- To assist with emissions reduction planning for Council's operations.
- To monitor progress against our organisational target of 'being net carbon neutral by 2030' for our operations.

Intended users of this report include, but are not limited to:

- Council staff
- Council's Executive Leadership Team
- Council Elected Members
- Christchurch residents.

3. Person Responsible / Author

Edward Lewis - Advisor, Climate Resilience, has responsibility for authoring this report. David Griffiths - Head of Strategic Policy and Resilience, reporting to John Higgins – GM, Strategy, Planning and Regulatory, is responsible for overseeing the Council's emission inventory monitoring and reduction performance, as well as reporting results to the Executive Leadership Team.

The Executive Leadership Team has collective responsibility for managing budgets and resourcing across the organisation to meet its greenhouse gas emissions targets. The Executive Leadership Team report progress annually to Elected Members.

The Climate Resilience Team provides advice to the organisation on emissions reduction and removals opportunities.

4. Reporting Period

Measurement period of this report: 01/07/2023 – 30/06/2024
Base year measurement period: 01/07/2022 – 30/06/2023
Frequency of reporting will be annual.

This base year period was selected because it represents the first year in which we had access to a materially complete set of data records for forming the inventory for the Toitū audit. The Local Government financial year was selected to best align to our financial reporting cycles.

The Council has previously reported emissions inventories under the CEMARS and carboNZero programme for the financial years 2015/16 – 2018/19. As the methodology changed significantly in the way we measure emissions from our wastewater treatment processing (our largest source of emissions), and a wider set of emissions were captured, it was determined that using the 2022/23 period as a base year for reporting and emissions reduction planning would be most appropriate.

5. Organisational boundary and consolidation approach

Organisational boundaries are set with reference to the methodology described in the ISO 14064-1:2018. The standard allows two distinct approaches to be used to consolidate GHG emissions: the equity share or control (either financial or operational) approaches.[1]

The Christchurch City Council uses the 'operational control' consolidation approach to defining its boundaries. The Council's emissions inventory applies to all business units in the Council itself,

[1] Control: the organisation accounts for all GHG emissions and/or removals from facilities over which it has financial or operational control. Equity share: the organisation accounts for its portion of GHG emissions and/or removals from respective facilities.

including those in the following Groups: Office of the Chief Executive, Strategy, Planning and Regulatory Services, Citizens and Community Services, City Infrastructure, Finance, Risk and Performance, and Corporate Services.

All Council owned and operated facilities are included in this scope. Council premises leased to third parties, such as cafes at Council's pools and libraries, are intended to be excluded from the scope. However, unless such premises have their own dedicated electricity supply (ICP), at this time Council's BraveGen ESP dashboard will include their electricity use together with that of the Council facility that the premises are part of, as they are unable to be separated at this stage.

Since the previous inventory, separate electricity use data has been gathered for the Ilex Café and The Kiosk in the Botanic Gardens, and for the stores located in the Christchurch Bus Interchange. The electricity used by these facilities has been excluded from this inventory.

Any third parties, including Council Controlled Organisations (CCO), Council Controlled Trading Organisations (CCTO), and related Trusts are excluded from the scope, as the Council does not have day to day operational control of those organisations. CCOs, CCTOs and Trusts have their own sustainability policies and are responsible for reporting and managing their own emissions.

Table 1. below shows an overview of those companies and trusts.
Table 2. below provides an overview of Council Groups and key services and activities they provide.

Table 1. Organisational boundary

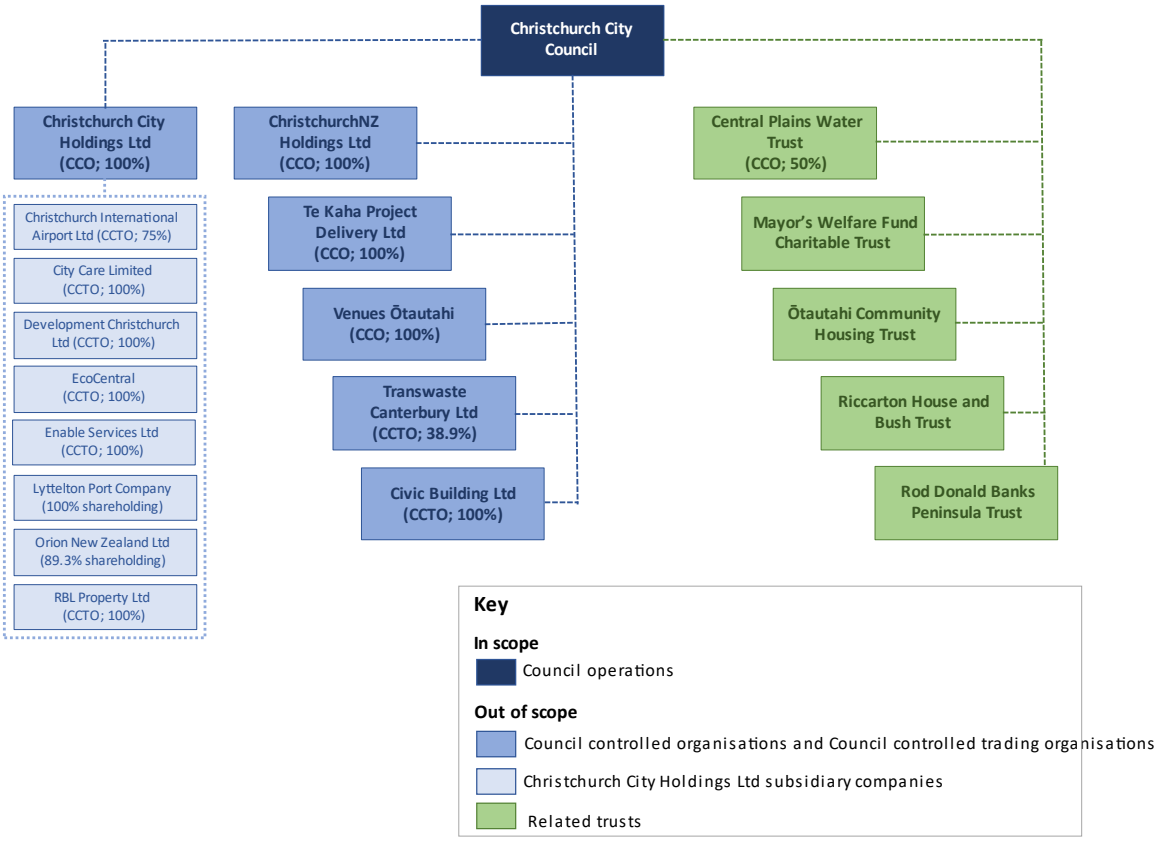

Table 2. Council Groups and key activities

Council Group	Unit	Key Functions and Activities
Office of the Chief Executive Group	Te Tiriti Partnerships, Legal & Democratic Services, People & Capability, Office of Mayor & Civic Services.	Mana whenua and Te Tiriti relationships, administrative support, Council and committee support, advisors to CE and Mayor, Organisation development, Recruitment, democratic services, legal services.
Strategy, Planning and Regulatory Services Group	Building Consenting, Planning & Consents, Regulatory Compliance, Strategic Policy & Resilience, Greater Christchurch Partnerships.	Residential and commercial building consents and inspections, Code compliance with building consent conditions, LIMs and PIMs, Climate change policy development and advice, Strategic asset management planning & advice, Policy and strategy development and advice, and Bylaw reviews, Planning and Strategic Transport, Resource Consents, RMA Compliance, Case Management & Relationships, Heritage, Urban Design, Coastal Hazards Adaptation Planning, Development Support/Business Support, Alcohol licensing, Animal management, Customer services and triage, Compliance and investigations, Food safety and environmental health.

Council Group	Unit	Key Functions and Activities
Citizens and Community Services Group	Art Gallery, Citizen & Customer Services, Parks, Recreation, Sports & Events, Vertical Capital Delivery, Libraries & Information, Community Support & Partnerships.	Christchurch Art Gallery and Akaroa Museum, Customer services, including Call centre, Walk-in customer services, payments etc., Regional and community park operations-planting & maintenance, Biodiversity, Botanic Gardens, Hagley Park planning, operations and maintenance, Nursery planning and operations, Sports facilities planning, operations & maintenance, Sports programmes, Tūranga (central Library) and community libraries, Community board governance support, Community development and engagement, Community partnerships and funding, Civil defence & emergency management.
City Infrastructure Group	Three Waters. Transport & Waste, Technical Services & Design, Programme Management Office.	Transport policy & planning, Environmental health officers, Animal control, Land surveying, Road transport design, Architectural design, structural engineering, Geotechnical and natural hazards advice, Water supply planning and delivery, Wastewater planning and delivery, Wastewater treatment plant operations, Stormwater and flood management, Freshwater ecology – water quality and ecology monitoring and reporting, Water investigations and advice, including backflow prevention and trade waste, Transport asset planning, Roading projects management, maintenance renewals, Contract management for Kerbside waste collection, Recycling, Transfer stations, and Organics processing. Monitoring Burwood landfill and closed landfills, Waste minimisation projects.
Finance, Risk and Performance Group	Finance, Procurement & Contracts, Risk & Assurance, Corporate Planning & Performance.	Internal corporate services, Corporate financial planning, Accounting, CCO performance monitoring and reporting, Human resources, Procurement and contract support, Health, safety & wellbeing, risk and assurance, Research & monitoring,
Corporate Services Group	Communications & Engagement, Digital/CIO, Innovation & Improvement, Facilities & Property, Business Support.	Media response and advice, Marketing, Community engagement, Public and internal communications, Long Term Plan, Annual Plan processes, LGOIMA/official information requests, Civic & international relations, business support, IT, Cyber security, Facilities planning, Contract management including facilities maintenance and repairs, facilities operations, Business support, Continuous improvement, Smart Christchurch project management.

Unit list is correct at the time of this report. Key functions and activities may move between units, however they are unlikely to change significantly.

Excluded emissions sources

Emissions from activities on land leased from Council, including grazing on Council land are currently excluded from scope. We do not currently collect information on staff working from home, or staff commuting, so they are both excluded from scope for this year's inventory. Steps are underway to enable the inclusion of staff commuting and working from home in the next inventory.

For this inventory, stationary lubricant data has only been collected for two of our largest facilities, the Christchurch Wastewater Treatment Plant, and the Civic building. We have not counted any chemicals or fertilisers used in our parks in this inventory but are considering ways to collect this information in the future.

This inventory excludes water supply consumption and the usage of wastewater services under Category 4. This is to avoid double counting of the emissions that are produced by Council, and therefore included in Category 1 and 2. This categorisation may also need to change in future depending on decisions around a potential new water entity and future ownership and operation of the networks.

The only freight transportation included in this inventory is the supply of water (via water tankers) in the case of supply disruption. All other sources of freight are excluded as we do not have sufficient information currently available, and as it is undertaken by third parties it falls outside the organisational boundary. Emissions from this source are also likely to be small compared to Council's total emissions.

The emissions associated with chemical production are also excluded from this inventory. Chemicals, such as chlorine, are produced by third parties, and fall outside of the Council's organisational boundary. There also may be limited emissions data available from suppliers.

Gross emissions

This report focuses on the Council's gross emissions only, however net emissions will be reported in future years. A policy to account for direct removals from Council owned and controlled trees has been developed and is currently being implemented. This will enable us to measure progress against our organisational goal of being net carbon neutral for our operations by 2030.

Table 3. Summary of excluded emission sources

Excluded emissions	GHG emissions ISO category	Rationale
Emissions from agricultural leases on Council land	Category 4	We do not have enough data to estimate emissions, and this is unlikely to be a significant source compared to Council's total inventory.
Staff working from home	Category 4	Insufficient data, highly flexible workforce would make it difficult to even do estimates for the current period. We are investigating ways to gather data in future years to be able to include these emissions.
Staff commute	Category 3	Insufficient data. We are investigating opportunities to capture data through surveys or other means to include in future inventories.
Freight transport	Category 3	We currently do not hold comprehensive data outside of water tankers for water supply. Data could potentially be collected in $ spent, but tkm was not readily available. Given the likely small impact on the total emissions, we have chosen to exclude other freight on a de minimis basis.
Water supply and wastewater services (category 4)	Category 4	We have excluded this source from Category 4 as the Council directly supplies these services for the community and already accounts for those emissions in Category 1 and 2.
Emissions from chemical production	Category 4	Chemicals such as chlorine are produced by third parties, and fall outside of the Council's organisational boundary. We do not hold comprehensive data for this emissions source.
Emissions from fertiliser application	Category 1	Insufficient data. This is being investigated for inclusion in future inventories.

Reporting Boundaries

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

To identify emissions sources from Council activities, Council staff used the previous list of sources collected for its Resource Efficiency Greenhouse Gas Emissions (REGGE) data and prior emissions inventories as a starting point, and reviewed asset data to ensure all Council facilities and sites were included. Finance staff assisted with identifying invoices from relevant suppliers, which could be used to identify emissions sources.

Staff also held discussions with teams across Council to sense check the existing data sources, consider any new Council activities which may have any potential new sources, and then determine which additional sources should be included in this inventory. For the previous inventory, Council staff also received guidance from BraveGen ESP staff (who have expertise in carbon inventories and are supplying our emissions inventory software), to ensure the Council was collecting sufficient sources of emissions data to comply with the ISO 14064-1:2018 standard.

As Three Waters is such a large component of the Council's overall emissions, a greater focus has been applied to that area. The Three Waters Unit has a position focused on climate resilience, and was able to provide advice on the wastewater treatment processes and emissions and additional related sources such as overflow estimates, allowing for a comprehensive view of Three Waters data.

The emissions sources deemed significant for inclusion in this inventory were classified into the following categories, as defined under ISO14064-1:2018:

- Direct GHG emissions (Category 1): GHG emissions from sources that are owned or controlled by the company.
- Indirect GHG emissions (Category 2): GHG emissions from the generation of purchased electricity, heat and steam consumed by the company.
- Limited sources of indirect GHG emissions (Categories 3-4): GHG emissions that occur as a consequence of the activities of the company, but occur from sources not owned or controlled by the company.

No emissions sources were identified in Category 5 (indirect emissions associated with the use of products from the organisation), or Category 6 (indirect emissions (other sources)) as these fall outside the organisational boundary.

Methodology

Quantification approaches

A calculation methodology has been used for quantifying the emissions inventory based on the following calculation approach, unless otherwise stated below:

- Emissions = activity data x emissions factor

All emissions were calculated using externally verified emissions factor sources such as those provided by the Ministry for the Environment or based on Intergovernmental Panel on Climate Change (IPCC) guidance. The intent has been to use the most specific and relevant factor for the activity type being quantified.

Global Warming Potential (GWP) values used for the inventory

When compiling this inventory, the Council primarily used the emissions factors built into the BraveGen platform (based on the IPCC's 'AR5 no climate-carbon feedback', unless otherwise stated). This system multiplied the tonnes of various GHG emissions entered with the corresponding emissions factors for the relevant Global Warming Potential - to provide total emissions in a carbon dioxide equivalent (CO2-e), unless otherwise specified. The emissions factors used for each type of emission is listed in the Council's BraveGen ESP platform. The emissions factors used are from the Ministry for the Environment's Te ine tukunga: He tohutohu pakihi Measuring emissions: A guide for organisations: 2024 detailed guide,[2] and are based on the IPCC guidance unless otherwise stated. For various categories of Recycled Waste, BraveGen ESP use the United Kingdom government's emissions factors[3]. See Appendix A for a full list of emissions factors used in this inventory.

One notable exception is the calculation of emissions from the wastewater treatment plants (Christchurch Wastewater Treatment Plant (CWTP) and the Banks Peninsula Wastewater Treatment Plants) and Biosolids Disposal from CWTP. Like the previous inventory, the Council based calculations on the Water New Zealand 'Carbon accounting guidelines for wastewater treatment: CH4 and N2O' guidance to calculate those emissions (published August 2021).

The Banks Peninsula Wastewater Treatment Plants include a number of smaller wastewater treatment plants, where emissions have been calculated individually for each plant based on a population basis - Wainui, Duvauchelle, Akaroa, Tikao Bay, and Lyttelton (noting the Lyttelton Wastewater Treatment Plant ceased operations as of 31 January 2023 and therefore does not show as an emissions source for this financial year 2024 reporting period). Calculations for the larger CWTP were based on plant specific data where available, rather than the more simplified population basis. Additionally, emissions associated with wastewater network overflows were estimated using equations adopted from the Water New Zealand guidelines as a basis.

The refrigerant losses data recorded is the total amount of various refrigerants purchased for the Council by our suppliers, with the exception of the Council's Taiora QEII facility, which was captured separately. Refrigerant liability is mapped by facility. There are still limitations to the data for Three Waters refrigerant losses and liabilities. Work is underway to create a register of Three Waters heat pumps. Once updated, this information will be included in future inventories.

The Council's LPG supplier switched from reporting LPG usage in kilograms to reporting LPG usage in litres during the reporting period. For months with only litre figures for LPG usage, we have converted these to kilograms using the UK Government "Greenhouse gas reporting: conversion factors 2024"[4] (published July 2024).

[2] https://environment.govt.nz/publications/measuring-emissions-a-guide-for-organisations-2024-detailed-guide/
[3] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024
[4] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024

Information management procedures

The Council uses the BraveGen ESP platform to hold all its emissions information in one place. The improved level of data management enables the Council and individual units to make more informed emissions reduction decisions. The emissions data is manually entered into the BraveGen ESP system, and the original invoices or spreadsheets are also stored in the system. Some parts of this process may become more automated in the future if suppliers are able to supply the invoices or data in a compatible form to be automatically uploaded.

Changes since previous inventory

There have been some minor changes to the methodology to ensure that the inventory better aligns with the Council's organisational and reporting boundaries.

The previous inventory counted the emissions associated with the production of chlorination chemicals (NaOH and Cl2), and CO2 emissions from the international freight of chlorine. However, there are limited emissions data available from the supplier. Furthermore, the production of the chlorination chemicals and the international freight is undertaken by third party and therefore considered outside the inventory boundary and is consistent with the treatment of other chemicals used. It is understood there are no emissions produced by mixing chlorine at Council facilities other than electricity usage, and any transport by Council is counted under category 1.

The emissions factor for landfill gas has also been updated in this inventory. The emissions factor is now reported as zero based on the Ministry for the Environment's Te ine tukunga: He tohutohu pakihi Measuring emissions: A guide for organisations: 2024 detailed guide[5] and guidance from Toitū. Landfill gas is recovered and combusted and flared, and as such, CO2 emitted is regarded as part of the natural carbon cycle and not counted as an emission.

The categorisation for landfill gas at the Biosolids Energy Centre (BEC) has also been updated. Previously, landfill gas was reported under Category 4. It is now reported under Category 2, to ensure consistency with energy generated by wood chips. This is to ensure accuracy and consistency of reporting, noting that there will be no emissions as the emissions factor is zero.

Electricity used by third parties who lease space in the following Council facilities has also been excluded from this inventory (after being included last year), as we have now been able to identify and separate their electricity consumption: The Tea Kiosk, Ilex Cafe, Sushi Shop, Brighton Mall tenants, South Library Cafe, and Bus Interchange tenants.

We have also recently begun collecting information to estimate our refrigerant liability across council facilities. As this is in its early stages, the data is being collated into a spreadsheet and has not yet been entered into BraveGen (noting that liabilities data will not impact on actual annual emissions totals). We aim to incorporate available liability data in future reporting. However,

[5] https://environment.govt.nz/publications/measuring-emissions-a-guide-for-organisations-2024-detailed-guide/

emissions from refrigerants used in Council operations have been included in the inventory report where available.

Historical recalculations

No historical recalculations have been undertaken as part of this inventory.

Data Selection and collection used for quantification

Table 4. Data collection methodology and assumptions for included emission sources.

GHG emissions category (ISO 14064-1:2018)	**GHG emissions source subcategory**	**Overview of Activity source data**	**Explanation of uncertainties or assumptions around data and evidence**	**Use of default and average emissions factors**
***Category 1*:** *Direct emissions and removals*	Direct emissions from stationary combustion	-Diesel (stationary) -Stationary LPG -Landfill gas -Lubricants stationary engines	It is assumed the data sources are complete and accurate. All source data is derived from supplier records.	The most accurate emissions factors were selected for all sources.
	Direct emissions from mobile combustion	-Fleet Fuel – Diesel -Fleet Fuel – Petrol -Fleet lubricants	It is assumed the data sources are complete and accurate. All source data is derived from supplier records.	The most accurate emissions factors were selected for all sources.
	Wastewater treatment and network overflows emissions	-Wastewater treatment	Calculations are based on figures and methods in the Water NZ guidelines. Plant specific data was used where available.	Plant specific data was used for the Christchurch Wastewater Treatment Plant where available. Average loadings were used for Banks Peninsula treatment plants based on population.
	Direct fugitive emissions arising from the release of GHGs in anthropogenic Systems	-Refrigerants (heating and cooling)	It is assumed the data sources are complete and accurate. All source data is derived from maintenance records.	The most accurate emissions factors were selected for all sources, as all refrigerant types are directly correlated to the available GWP of the gas type.

	Direct emissions and removals from land use, land use change and forestry	-Fertiliser -Land use change / forestry	We have not collected data on fertiliser use, however this is being investigated for inclusion in future inventories. No significant land use change has occurred.	n/a
Overall assessment of uncertainty for category 1	*Medium. We have high confidence in data from stationary and mobile fuel use, and wastewater treatments, but there is greater uncertainty around refrigerants, lubricants, and potential fertiliser and woodchip use.*			
GHG emissions category	**GHG emissions source or sink subcategory**	**Overview of Activity data and evidence**	**Explanation of uncertainties or assumptions around data and evidence**	**Use of default and average emissions factors**
Category 2: *Indirect GHG emissions from imported energy*	Indirect emissions from imported electricity	-Electricity -Energy generated by woodchips, landfill gas (BEC).	It is assumed the data sources are complete and accurate. All source data is derived from supplier records.	Average emissions factors were used for electricity and energy production (noting difficulty in categorising woodchip usage)
Overall assessment of uncertainty for Category 2 emissions	*Medium. There is high confidence that the volume of imported energy is correct. There is some uncertainty over the categorisation of energy generated from woodchips, as landfill gas (from Council) and electricity purchased by Council were also used in the production of the energy. However, this represents a small portion of overall emissions.*			
GHG emissions category	**GHG emissions source or sink subcategory**	**Overview of Activity data and evidence**	**Explanation of uncertainties or assumptions around data and evidence**	**Use of default and average emissions factors**
Category 3*: Indirect GHG emissions from transportation*	Emissions from Business travel	-Air travel (domestic, long and short haul, business/economy), -Hotels -Rental cars -Private cars -Taxis	It is assumed the data sources are complete and accurate. All source data is derived from supplier customer activity reports.	The most accurate emissions factors were selected from the available data – e.g., air travel split by type of flight and class, hotels by country etc.
	Emissions from upstream transport and distribution for goods	-Freight transport	We currently do not hold comprehensive data outside of water tankers for water supply. Given that other freight is undertaken by third parties, it falls outside	The most accurate emissions factors were selected from the available data.

			of our organisational boundary. It also likely has a small impact on total emissions, and is not included in this inventory.	
	Emissions from staff commute	Out of scope – we currently do not collect suitable data but are looking to provide this data in future inventories.		
Overall assessment of uncertainty for Category 3 emissions	*Medium. Some uncertainty around staff business travel (e.g. size of rental cars, hotel averages etc.) and freight. Further work is needed to monitor additional sources of freight use in the future.*			
GHG emissions category	**GHG emissions source or sink subcategory**	**Overview of Activity data and evidence**	**Explanation of uncertainties or assumptions around data and evidence**	**Use of default and average emissions factors**
Category 4: *Indirect GHG emissions from products used by an organisation*	Transmission and distribution losses	-Electricity -Transmission and Distribution Losses	It is assumed the data sources are complete and accurate. All source data is derived from supplier customer activity reports.	Average T&D factors used
	Staff working from home	Out of scope – we currently do not collect suitable data, but are considering ways to include data when available in future inventories.		
	Materials and Waste	-Waste to landfill -Recycled waste	Local MfE factors used for landfill waste, some uncertainty around using UK based recycling factors.	DEFRA factors used for various categories of recycling
Overall assessment of uncertainty for Category 4 emissions	*Medium. Good information on Transmission and Distribution Losses. There is confidence in the accuracy of the volumes of various types of recycling, but some uncertainty around accuracy of recycling factors.*			
Category 5: *Indirect emissions associated with the use of products*	Out of scope			

from the organisation	
***Category 6**: indirect emissions (other sources)*	Out of scope

EMISSIONS INVENTORY RESULTS

Inventory Summary

Table 5. GHG emissions summary for period 01 July 2023 to 30 June 2024

Category	**Total emissions (tCO2-e)**
Category 1: Direct emissions	23,654.85
Category 2: Indirect emissions (*imported energy*)	6,448.36
Category 3: Indirect GHG emissions (*transportation*)	321.86
Category 4: Indirect emissions (*products used by organisation*)	2,429.07
Category 5: Indirect emissions (*use of products from the organisation*)	n/a
Category 6: Indirect GHG emissions (*other sources*)	n/a
Total direct emissions	23,654.85
Total indirect emissions	9,199.30
Total gross emissions	**32,854.15**

Table 6. GHG emissions summary by source: 01 July 2023 to 30 June 2024

Category (ISO 14064-1:2018)	**Scope** (prior ISO 14064-1:2006)	**Emission Source**	**Emissions** (tCO2-e)
Category 1: Direct emissions	1	Diesel (stationary)	1,244.96
		LPG (stationary)	54.62
		Landfill Gas	0
		Lubricants	32.02
		Fleet Fuel - Diesel	655.94
		Fleet Fuel - Petrol	203.21
		Wastewater Treatment (and network overflows)	21,311.21
		Refrigerants	152.89
		Fertiliser	0
		Land use change / forestry	0
		Total Emissions CATEGORY 1	**23,654.85**
Category 2: Indirect emissions (*imported energy*)	2	Electricity	6,305.49
		Energy generated by wood chips	134.52
		Energy generated by wood pellets	8.35
		Landfill Gas (BEC)	0
		Total Emissions CATEGORY 2	**6,448.36**
Category 3: Indirect GHG emissions (*transportation*)	3	Air Travel (combined)	182.83
		Hotels	11.63
		Rental Cars	6.19
		Private Cars	97.47
		Taxis	0.77
		Freight transport distribution	22.98
		Staff Commute (out of scope)	n/a
		Total Emissions CATEGORY 3	**321.86**
Category 4: Indirect emissions (*products used by organisation)*	3	Electricity -T&D losses	461.24
		Waste to landfill	337.08
		Recycled waste	1.79
		Biosolid disposal to land application	1,628.96
		Staff working from home (out of scope)	n/a
		Total Emissions CATEGORY 4	**2,429.07**
Category 5: Indirect emissions associated with the use of products from the organisation	3	Out of scope	n/a
Category 6: Indirect emissions from other sources	3	Out of scope	n/a
		TOTAL EMISSIONS	**32,854.15**

Table 7. Direct Category 1 emissions by gas.

Category 1 Emission source	Emissions by gas (converted to CO2-e)							
	CO2	CH4	N2O	HFCs	PFCs	SF6	other	Total (CO2-e)
Wastewater (treatment plant process & effluent, and network overflows)[6]	-	7,304.8	14,006.4	-	-	-	-	21,311.2
Refrigerants	-	-	-	152.9	-	-	-	152.9
fuel[7],[8]	2,164.5	8.4	17.9	-	-	-	-	2,190.8
Total Category 1	2,164.5	7,313.2	14,024.3	152.9	-	-	-	**23,654.9**

Performance Monitoring

The Council will monitor its greenhouse gas emissions in an ongoing basis through its BraveGen ESP platform. The Council will report on its results annually, after verification has occurred.

Staff in key units across the Council will be responsible for identifying emissions reduction opportunities within their units, relevant to their activities.

Organisational emissions reduction planning is currently underway, with key reduction opportunities being identified for the organisation. Work has also begun to quantify removals so they can be included in future inventories, with the annual results compared against the Council's emissions targets.

Significance Criteria

Council's intention is to include all available sources of emissions under Category 1 and 2.

[6] Excludes biogenic CO2.
[7] Includes stationary lubricants burnt as fuel.
[8] Includes fleet lubricants.

When considering additional sources for inclusion in Category 3 and 4, key considerations were available data sources (e.g., what we could collect for the eligible period), the estimated magnitude of emissions (size of the source compared to organisational total), and the degree of influence the Council has on the emissions. As a public sector organisation, staff also reviewed guidance in the Carbon Neutral Government Programme (CNGP) on what should be considered a significant source for inclusion (noting this was to inform thinking only, and that Councils are not required to comply with that programme). In general, where information was readily available, we included it within scope if it aligned with our reporting boundary.

For example, staff business travel was included in Category 3 as the decision for that travel was made within the organisation, and we hold receipts for the different emissions sources involved, such as airfares, taxis, and hotels etc., and could reasonably influence those emissions by varying business travel policy. We also hold good information on waste and recycling across council sites, so included that data under Category 4. Likewise, data on Transmission and Distribution Losses was readily available and included in scope.

However, two sources recommended under the Carbon Neutral Government Programme, staff commuting, and working from home were excluded from our scope as we do not currently collect suitable data on them (but have plans to collect data and include in future inventories). Insufficient data also meant we excluded emissions from livestock on land leased from Council, and limited the reporting on freight.

See Table 8 below for a summary of the significance criteria used.

Table 8. Significance criteria

Emissions source	Likely magnitude of emissions (compared to overall inventory)	Data availability	Public sector guidance	Level of influence	Include in inventory?	Key determinant for decision
Staff commute	unknown	no	If practicable	moderate	no	No data
Staff working from home	unknown	no	If practicable	moderate	no	No data
Staff business travel	low	yes	yes	high	yes	Good data, high influence
T&D losses	moderate	yes	yes	low	yes	Good data, moderate magnitude
Freight	low	limited	If practicable	moderate	Yes, noting limited data	Limited data, but sufficient to include.
Agricultural Leases	moderate	no	If practicable	high	no	No data.
Waste and Recycling	moderate	yes	yes	high	yes	Available data, high influence.
Water Supply and Wastewater	low	yes	yes	moderate	no	Double counting - if included - as

services (Category 4)						Council supplies those services it already counts these in Category 1 & 2
Chemicals	unknown	Limited / outside boundary	If practicable	low	no	Limited data availability, low influence, largely outside boundary

References

International Organization for Standardization, 2018. 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. ISO: Geneva, Switzerland.

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APPENDIX A: Emissions Factors Used for Inventory

	Category (EFG	UoM (E	Region (E	Emission Factor Descrip	Effectiv	Factor tCO2(	Factor Source
3	Business Travel	km	New Zealand	Air Travel - Domestic Business (K	2023-07-01	0.000194047742	MfE Measuring Emissions Guidance. May 2024. Table 19. DOMESTIC AIR TRAVEL Passenger w/ Radiative
5	Business Travel	km	New Zealand	Air Travel - Domestic Economy (I	2023-07-01	0.000194047742	MfE Measuring Emissions Guidance. May 2024. Table 19. DOMESTIC AIR TRAVEL Passenger w/ Radiative
7	Business Travel	km	New Zealand	Air Travel - Domestic Premium E	2023-07-01	0.000194047742	MfE Measuring Emissions Guidance. May 2024. Table 19. DOMESTIC AIR TRAVEL Passenger w/ Radiative
9	Business Travel	km	New Zealand	Air Travel - International Long Hau	2023-07-01	0.000428587635	MfE Measuring Emissions Guidance. May 2024. Table 20. INTERNATIONAL AIR TRAVEL Passenger w/ Radiative
11	Business Travel	km	New Zealand	Air Travel - International Long Hau	2023-07-01	0.000147790361	MfE Measuring Emissions Guidance. May 2024. Table 20. INTERNATIONAL AIR TRAVEL Passenger w/ Radiative
13	Business Travel	km	New Zealand	Air Travel - International Long Hau	2023-07-01	0.000236461636	MfE Measuring Emissions Guidance. May 2024. Table 20. INTERNATIONAL AIR TRAVEL Passenger w/ Radiative
15	Business Travel	km	New Zealand	Air Travel - International Short Ha	2023-07-01	0.000226397173	MfE Measuring Emissions Guidance. May 2024. Table 20. INTERNATIONAL AIR TRAVEL Passenger w/ Radiative
17	Business Travel	km	New Zealand	Air Travel - International Short Ha	2023-07-01	0.000150938146	MfE Measuring Emissions Guidance. May 2024. Table 20. INTERNATIONAL AIR TRAVEL Passenger w/ Radiative
19	Business Travel	km	New Zealand	Air Travel - International Short Ha	2023-07-01	0.000079758150	MfE Measuring Emissions Guidance. May 2024. Table 20. INTERNATIONAL AIR TRAVEL Passenger without Radiative
21	Chemical production	kg	New Zealand	Chlorine production - Chlorine Ga	2023-07-01	0.000800000000	2022 EuroChlor Data – LCIA Results in 2022 Report (page 4 of PDF).
23	Chemical production	kg	New Zealand	Chlorine production - Sodium Hyp	2023-07-01	0.000740000000	2022 EuroChlor Data – LCIA Results in 2022 Report (page 4 of PDF)
25	Fuel	L	New Zealand	Diesel (L)	2023-07-01	0.002677543305	MfE Measuring Emissions Guidance. May 2024. Table 4.Transport fuels
27	Fuel	L	New Zealand	Diesel stationary (L)	2023-07-01	0.002678493439	MfE Measuring Emissions Guidance. May 2024. Table 2. Stationary combusion fuel. Commercial use
29	Electricity	kWh	New Zealand	Electricity (kWh)	2023-07-01	0.000072891744	MfE Measuring Emissions Guidance. May 2024. Table 9. Purchased energy - Annual Average
31	Electricity	kWh	New Zealand	Electricity T&D Losses (kWh)	2023-07-01	0.000005332048	MfE Measuring Emissions Guidance. May 2024. Table 6. Electricity Transmission and distribution losses
33	Business Travel	room night	New Zealand	Hotel Stay - AU (room night)	2023-07-01	0.043225500486	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
34	Business Travel	room night	New Zealand	Hotel Stay - GB (room night)	2023-07-01	0.010533171134	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
36	Business Travel	room night	New Zealand	Hotel Stay - JP (room night)	2023-07-01	0.050087980754	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
38	Business Travel	room night	New Zealand	Hotel Stay - NZ (room night)	2023-07-01	0.011599900131	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
40	Business Travel	room night	New Zealand	Hotel Stay - SG (room night)	2023-07-01	0.024084702625	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
42	Business Travel	room night	New Zealand	Hotel Stay - SK (room night)	2023-07-01	0.059138824705	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
44	Business Travel	room night	New Zealand	Hotel Stay - UAE (room night)	2023-07-01	0.062074693756	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
46	Business Travel	room night	New Zealand	Hotel Stay - US (room night)	2023-07-01	0.015115132498	MfE Measuring Emissions Guidance. May 2024. Table 22. Hotel Stays
48	Landfill Gas	m3	UK	Landfill Gas (m3) (UKBEIS)	2023-07-01	0.000323728350	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Bioenergy. Biogas. Landfill gas: 0.465t per 1m3 of landfill gas
50	Waste	t	New Zealand	Landfill Waste - Bio Sludge (t) - W	2023-07-01	0.153216000000	MfE Measuring Emissions Guidance. May 2024. Table 33. Waste to landfill with gas recovery
52	Waste	t	UK	Landfill Waste - Contaminated Re	2023-07-01	0.520334200000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Refuse. Commercial and industrial waste. Landfill
54	Waste	t	New Zealand	Landfill Waste - General Mixed Co	2023-07-01	0.231771555100	MfE Measuring Emissions Guidance. May 2024. Table 33. Waste to landfill with gas recovery
55	Fuel		NZ		2023-07-01	0.000000000000	
57	Fuel	kg	New Zealand	Stationary Fuel Industrial Use - LF	2023-07-01	0.002966315097	MfE Measuring Emissions Guidance. May 2024. Table 3. Stationary combusion fuel. Industrial Use
59	Fuel	t	New Zealand	Stationary Fuel Industrial Use - LF	2023-07-01	2.966315097000	MfE Measuring Emissions Guidance. May 2024. Table 3. Stationary combusion fuel. Industrial Use
62	Fuel	L	New Zealand	Petrol Premium (L)	2023-07-01	0.002406650628	MfE Measuring Emissions Guidance. May 2024. Table 4.Transport fuels
64	Fuel	L	New Zealand	Petrol Unleaded (L)	2023-07-01	0.002372606596	MfE Measuring Emissions Guidance. May 2024. Table 4.Transport fuels (regular)
66	Business Travel	km	New Zealand	Private car mileage (km) MFE (Pr	2023-07-01	0.000243289683	MfE Measuring Emissions Guidance. May 2024. Table 14. Defaul Private Car
68	Waste	t	UK	Recycled Waste - Cardboard (t) P	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Paper. Paper and board: board. Closed-loop
70	Waste	t	UK	Recycled Waste - Comingle Mate	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat File V1.0. Waste Disposal. Open-loop and Closed-loop
72	Waste	t	UK	Recycled Waste - Food Waste (t)	2023-07-01	0.008883860000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Refuse. Organic: food and drink waste. Composting
74	Waste	t	UK	Recycled Waste - Glass Mixed (t)	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Other. Glass. Open-loop
76	Waste	t	UK	Recycled Waste - Green Waste (t)	2023-07-01	0.008883860000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Refuse. Organic: mixed food and garden waste. Composting
78	Waste	t	UK	Recycled Waste - Paper & Cardbo	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Paper. Paper and board: mixed. Closed-loop
80	Waste	t	UK	Recycled Waste - Paper (t) Paper	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Paper. Paper and board: paper. Closed-loop
82	Waste	t	UK	Recycled Waste - Plastic (t) Plast	2023-07-01	1.566386380000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Material use. Plastic. Plastics: average plastics. Closed-loop source
84	Waste	t	UK	Recycled Waste - Polystyrene (t) I	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Plastic. Plastics: PS (incl. forming). Open-loop
86	Waste	t	UK	Recycled Waste - Recycle Mixed (	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting.2024 Flat file V1.0. Waste Disposal. Open-loop and Closed-loop
88	Waste	t	UK	Recycled Waste - Tyres (UK BEIS	2023-07-01	0.006410610000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Waste disposal. Construction. Tyres. Closed-loop
90	Fugutive Emissions	kg	New Zealand	Refrigerant 134a (kg) - MFE	2023-07-01	1.300000000000	MfE Measuring Emissions Guidance. May 2024. Table 7. Refrigerants and other gases
92	Fugutive Emissions	kg	New Zealand	Refrigerant R22 (kg) - MFE	2023-07-01	1.760000000000	MfE Measuring Emissions Guidance. May 2024. Table 7. Refrigerants and other gases
94	Fugutive Emissions	kg	New Zealand	Refrigerant R32 (kg)	2023-07-01	0.677000000000	MfE Measuring Emissions Guidance. May 2024. Table 7. Refrigerants and other gases
96	Fugutive Emissions	kg	New Zealand	Refrigerant R407c (kg) (MFE)	2023-07-01	1.624210000000	MfE Measuring Emissions Guidance. May 2024. Table 7. Refrigerants and other gases
98	Fugutive Emissions	kg	New Zealand	Refrigerant R410a (kg) - MFE	2023-07-01	1.923500000000	MfE Measuring Emissions Guidance. May 2024. Table 7. Refrigerants and other gases
100	Fugutive Emissions	Kg	New Zealand	Refrigerant R417c (kg) (MFE)	2023-07-01	2.127322000000	MfE Measuring Emissions Guidance. May 2024. Table 7. Refrigerants and other gases
102	Business Travel	days	New Zealand	Rental Car - Compact (days) MFE	2023-07-01	0.007855125335	MfE Measuring Emissions Guidance. May 2024. Table 13. Light Passenger Vehicle. 2015-2020 fleet
104	Business Travel	days	New Zealand	Rental Car - Economy (days) MFI	2023-07-01	0.008129632400	MfE Measuring Emissions Guidance. May 2024. Table 13. Light Passenger Vehicle. 2015-2020 fleet
106	Business Travel	km	New Zealand	Rental Car - Electric (km) MFE	2023-07-01	0.000016274295	MfE Measuring Emissions Guidance. May 2024. Table 15. Defaul Rental car
108	Business Travel	days	New Zealand	Rental Car - Full Size (days) MFE	2023-07-01	0.012162774710	MfE Measuring Emissions Guidance. May 2024. Table 13. Light Passenger Vehicle. 2015-2020 fleet
110	Business Travel	days	New Zealand	Rental Car - Intermediate (days) M	2023-07-01	0.009153754925	MfE Measuring Emissions Guidance. May 2024. Table 13. Light Passenger Vehicle. 2015-2020 fleet
112	Business Travel	days	New Zealand	Rental Car - Standard (days) MFE	2023-07-01	0.011168612150	MfE Measuring Emissions Guidance. May 2024. Table 13. Light Passenger Vehicle. 2015-2020 fleet
114	Road Freight	km	New Zealand	Road Freight - HGV Diesel >=300	2023-07-01	0.001492194884	MfE Measuring Emissions Guidance. May 2024. Table 25. ROAD freight for Heavy goods vehicles. 2015-2020
116	Freight	tKm	New Zealand	Container Ship Average	2023-07-01	0.000016118570	MfE Measuring Emissions Guidance. May 2024. Table 30. International sea travel freight
118	Fuel	L	New Zealand	Stationary Lubricants (L) MFE (Li	2023-07-01	0.002963348406	MfE Measuring Emissions Guidance. May 2024. Table 3. Stationary combusion fuel. Industrial Use
120	Business Travel	km	New Zealand	Taxi usage (km) Taxi Travel Regu	2023-07-01	0.000159919305	MfE Measuring Emissions Guidance. May 2024. Table 16. Default Taxi Travel
121	Test	Kg	New Zealand	dfklsjdfds	2023-08-30	0.002345430000	MFE 2023 table 5
127	Fuel	L	New Zealand	Vehicle Lubricants (L) MFE (Light	2023-07-01	0.002981910743	MfE Measuring Emissions Guidance. May 2024. Table 4.Transport fuels
129	Wood chip	GJ	UK	Wood Chip - Biogenic CO2 (GJ) (	2023-07-01	0.097222300000	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0- outside Scopes: Conversion factor GJ to kWh multiply by 277.778
131	Wood chip	GJ	UK	Wood Chip (GJ) (UKBEIS)	2023-07-01	0.003144446960	UK Government GHG Conversion Factors for Company Reporting. 2024 Flat file V1.0 Bioenergy. Biomass. Wood chips. Conversion factor GJ to kWh multiply by 277.778
133	Fuel	t	New Zealand	Wood Pellets (t) Wood - Industria	2023-07-01	1.698793066700	MfE Measuring Emissions Guidance. May 2024. Table 5. Biofuel & Biomass
135	Fuel	t	New Zealand	Wood Pellets (t) Wood - Industria	2023-07-01	0.028861760000	MfE Measuring Emissions Guidance. May 2024. Table 5. Biofuel & Biomass - Factor amended to match sum of gases