Carterton District Council (CDC) Emissions Inventory 2022

Publication version 1.0

(Does not include refrigerant information)

Greenhouse Gas Emissions Report

Emissions summary

This inventory covers a period from January 2022 to December 2022.

Activity in the region began to pick up after the Covid 19 disruptions of the previous two years. We can see a marked increase in our emissions, primarily from our highest emitter: wastewater treatment[1]. We remain negative in our emissions due to the offset by our forest growth.

We've made a change in this report from previous reports which presented emissions by the organisation's business unit. As our electricity and fuel data was not gathered or stored by business unit or location, we've produced a combined organisation report, which still meets the ISO standard requirements. We are seeking to rectify this, so we can separate the business units from the 2026 calendar year and inventory onwards.

Note that this inventory does not contain information on our refrigerant use. In previous inventories the level of refrigerant use was so low that it rounded to 0% as a percentage of Carterton District Council's emissions. We will update and re-publish our 2022 report once we have the refrigerant material.

TABLE 1: ORGANISATION EMISSIONS OVER LAST FIVE YEARS BY SOURCE AND SCOPE

		2018	2019	2020	2021	2022
		t Co2e	t Co2e	t Co2e	t Co2e	t Co2e
Electricity	Scope 2	182.24	201.37	76.41	88.97	87.01
Transmission gains and losses	Scope 3	13.80	17.27	6.55	8.08	10.08
Transport - Diesel	Scope 1	127.25	130.47	113.02	119.19	131.01
Transport - Petrol	Scope 1	21.87	27.27	23.86	21.75	133.28
Transport - Flights	Scope 3	0.60	0.75	0.83	0.87	1.59
Office Waste	Scope 3	0.48	0.61	0.78	0.95	1.07
Refrigerant	Scope 1	0.00	0.00	0.00	0.00	0
Water supply	Scope 1	21.64	24.97	25.55	25.71	18.28
Wastewater treatment	Scope 1	1,092.83	1,117.08	1,134.95	1,140.91	2002.42
Green waste - Landfill	Scope 3	1.55	1.99	0.00	0.00	0
Green waste - Compost	Scope 3	0.00	0.00	0.86	0.86	0.88
Gross Emissions		**1,462.27**	**1,521.78**	**1,382.82**	**1,407.29**	**2385.62**
Sequestration (forest)		-7,249.14	-7,237.39	-7,237.39	-8,039.83	-7,729.08
Net Emissions		**-5,786.88**	**-5,715.61**	**-5,854.57**	**-6,632.54**	**-5,343.46**

[1] Reviewing wastewater records, it appears that volumes have been under-represented in earlier inventories

Chapter 1: General description of the organisation goals and inventory objectives

Description of the reporting organization

Carterton District Council (CDC) is the territorial authority for the Carterton District located in the heart of the Wairarapa. As at the 30th of June 2022, CDC employed 69.4 FTEs[2] (Full Time-Equivalent) and is responsible for water and wastewater, waste, local roads (excluding State Highway), streetlighting, parks and reserves, community facilities and performing statutory duties such as regulatory compliance.

The council is organised by operational units:

- Corporate services,
- Community services, including Parks and reserves,
- Operations, including Water,
- Regulatory.

Person or entity responsible for the report

This is the annual greenhouse gas (GHG) emissions[1] inventory report for Carterton District Council (CDC). This report has been prepared by CDC staff.

The inventory is a quantification of the amount of GHG emissions that can be directly attributed to the organisation's operations within the declared boundary and scope for the specified reporting period.

The inventory has been prepared in accordance with the requirements of the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004)* and *ISO 14064-1:2006 Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals.*

Reporting period covered

This GHG emissions inventory report covers the 2022 calendar year (1 Jan to 31 Dec inclusive).

[2] From 2021/22 Annual Report: 59 + 10.4 FTE equivalents

Chapter 2 Organisational boundaries.

Documentation of the organisational boundaries

Organisational boundaries were set with reference to the methodology described in the GHG Protocol and ISO 14064-1:2006 standards. The GHG Protocol allows two distinct approaches to consolidate GHG emissions: the equity share and control (financial or operational) approaches. We used an operational control approach to account for emissions, as we have done in previous inventories.

This GHG inventory includes the council's business units as shown in Figure 1: Organisational Structure below.

FIGURE 1: ORGANISATIONAL STRUCTURE

Organisational business units excluded from inventory

TABLE 2: GHG SOURCES EXCLUDED FROM THIS INVENTORY

Business unit	GHG emission source	Scope	Reason for exclusion
Community services - Properties	Electricity	Scope 2	Tenants pay their own power accounts
Operations - Waste management	Waste from the community	Scope 3	Outside of CDC operational control Contractor: Earth Care
Operations - Roading	Emissions from road maintenance	Scope 3	Outside of CDC operational control Contractor: Fulton Hogan

Chapter 3: Reporting boundaries.

GHG emission source inclusions

The GHG emissions sources included in this inventory were identified with reference to the methodology in the *GHG Protocol and ISO14064-1:2006 standards*. As adapted from the *GHG Protocol*, these emissions were classified under the following categories:

- **Direct GHG emissions (Scope 1):** emissions from sources that are owned or controlled by the company (emissions from vehicles, refrigerant leaks)
- **Electricity indirect GHG emissions (Scope 2):** emissions from the generation of purchased electricity consumed by the company.
- **Other indirect GHG emissions (Scope 3):** emissions that occur as a consequence of the company's activities but from sources not owned or controlled by the company (waste, energy transport and distribution losses, …).

This inventory considers:

- Electricity
- Transport and distribution losses
- Transport – Diesel
- Transport – Petrol
- Transport – Flights
- Waste
- Refrigerant
- Water supply
- Wastewater treatment
- Electricity – WWTP
- Green waste

GHG emission source exclusions

For more information, refer to Table 2: Business units and GHG emission source excluded from this inventory.

Chapter 4: Quantified GHG inventory of emissions and removals.

Direct GHG emissions, quantified separately for CO2, CH4, N2O, NF3, SF6 and other appropriate GHG groups (HFCs, PFCs, etc) in tonnes of CO2e

The seven GHG included in this inventory are:

- Carbon dioxide: CO_2
- Methane: CH_4
- Nitrous oxide: N_2O
- Hydrofluorocarbons: HFCs

- Perfluorocarbons: PFCs
- Sulfur hexafluoride: SF_6
- Nitrogen trifluoride: NF_3

See our earlier note on refrigerants not being included in this report.

TABLE 3: EMISSIONS FOR ALL SEVEN GHGS

	2018	2019	2020	2021	2022
T CO_2 E	1,462.27	1,521.78	1,382.82	1,407.29	2,385.62
T CO_2	354.29	388.88	238.80	258.26	613.70
T CH_4	859.52	878.83	886.27	890.24	786.98
T N_2O	248.46	254.08	257.76	259.16	977.56
T HFCS	0	0	0	0	0
T PFCS	0	0	0	0	0
T SF_6	0	0	0	0	0
T NF_3	0	0	0	0	0

A description of how biogenic CO2 emissions and removals are treated in the GHG inventory and the relevant biogenic CO2 emissions and removals quantified separately in tonnes of CO2e

The inventory has been prepared in accordance with the requirements of the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004) and ISO 14064-1:2006 Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals.

Emissions factors have been sourced from The Ministry for the Environment's (MfE) 2023 suite of documents for measuring emissions.

If quantified, direct GHG removals, in tonnes of CO2e

Carterton District Council owns a 350-ha forest in the Tararua Range which contains a net stocked area of 261.5 ha. Part of the forest is classified as pre-1990 planting. The forest consists mainly of Radiata Pine, with smaller areas of Manuka and cypress:

Planted forest:

- Radiata Pine – growth: 210.1 ha

- Radiata Pine – old: 24.8 ha
- Cypress – growth: 2.1 ha

Natural forest:

Manuka – Regenerating: 24.5 ha

There was no harvesting in 2022.

TABLE 4: TOTAL CO2 SEQUESTERED AND EMITTED BY FORESTRY IN 2022

		Units	t CO_2e	t CO_2	t CH_4	t N_2O
Carbon sequestration	Native forest	24.5 ha	-195.34	-195.34	n/a	n/a
	Planted forest	212.2 ha	-7,533.74	-7,533.74	n/a	n/a
Harvest emissions	Planted forest	0 ha	0	0	n/a	n/a
	Native forest	0 ha	0	0	n/a	n/a
TOTAL			-7,229.08	-7,229.08	n/a	n/a

Explanation of the exclusion of any significant GHG sources from the Quantification

Only direct sources are included in this inventory. GHG removals are restricted in this inventory only to the Council owned forest. Other removal sources such as recent planting in reserves have not been included.

Quantified indirect GHG emissions separated by category in tonnes of CO2e

We used an operational control approach to account for emissions, so only those within our control are included.

Chapter 5: GHG reduction initiative and internal performance tracking.

The historical base year selected and the base-year GHG inventory

The first greenhouse gas inventory done for Carterton District Council was made in 2018 (January to December). It set up the baseline.

Explanation of any change to the base year of the historical GHG data or categorization and any recalculation of the base year or other historical GHG inventory and documentation of any limitation to comparability resulting from such recalculation

No adjustments have been made to the base year, or any historical reported GHG emissions data. However, in sourcing data for this report it was found that wastewater figures in earlier years may have been under-represented in inventory reports (for example in 2021 wastewater tCO_2e emissions may have been under-represented by nearly 6,500 tonnes). We are not adjusting the historic figures, but will be consistent in our wastewater figures going forward.

Reference to, or description of, quantification approaches, including reasons for their selection

See p.7. Quantification is in line with the standards and guidance used previously and the method used in previous inventories.

Explanation of any change to quantification approaches previously used

A change in this report from previous reports is us moving away from presenting emissions by the organisation's business unit, as our electricity and fuel data was not gathered or stored by business unit or location. We are seeking to rectify this, so we can separate the business units from the 2026 calendar year and inventory.

Description of the impact of uncertainties on the accuracy of the GHG emissions and removals data per category

Uncertainties are all assessed as low to moderate and is consistent with previous inventories.

Uncertainty assessment description and results

Quantification approaches are consistent with earlier inventories.

TABLE 5: GHG EMISSION SOURCES, DATA COLLECTION AND UNCERTAINTY

GHG emission source	Scope	Data source	Data collection unit	Uncertainty (description)
Electricity	Scope 2		kWh	Low

Transport and distribution losses	Scope 3	Electricity company		It is assumed that the meter readings were done correctly. Allocation to Council unit was unable to be done using the data collected.
Transport - Diesel	Scope 1	Fuel company	L	Low It is assumed that the supplier reports are complete and accurate. Allocation to Council unit was unable to be done using the data collected.
Transport - Petrol	Scope 1			
Transport - Flights	Scope 3	Finance team	Km	Low/Moderate It is assumed that the employees' reports are complete and accurate
Waste	Scope 3	Council officer	Kg	Moderate Estimation made by the staff in charge of the waste collection. Consistent with earlier reports.
Refrigerant	Scope 1	A/C company	Kg	See note on refrigerants not included in this report at the moment
Water supply	Scope 1	Council officer	m3	Low System data cross checked. It is assumed that the data source is an appropriate representation of activities
Wastewater treatment	Scope 1	Council officer	DBO Nitrogen	Low System data cross checked. It is assumed that the data source is an appropriate representation of activities
Green waste	Scope 3	Council officer	Kg	Moderate Estimation made by the staff in charge of the green waste. Consistent with earlier reports.

The GWP values used in the calculation, as well as their source. If the GWP values are not taken from the latest IPCC report, include emissions factors or the database reference used in the calculation

Reference to, or description of the impact of, GHG emission or removal factors used

Emissions and removal factors have been sourced from The Ministry for the Environment's (MfE) 2023 suite of documents for measuring emissions. Factors have been adjusted from previous years in MfE guidance based on updated findings in the 6th IPCCC report released in 2022. These have tended to increase the attributable emissions over previous factors and reports.

A statement that the GHG report has been prepared in accordance with the ISO 14064-1:2018(E) standard.

The inventory has been prepared in accordance with the requirements of the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004) and ISO 14064-1:2006 Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals.

A disclosure describing whether the GHG inventory, report or statement has been verified, including the type of verification and level of assurance achieved

This report has not been verified. There is no requirement for CDC to do so.

Evolution of the GHG emissions and significant emissions changes [3]

As in previous inventories, the wastewater emissions accounted for by far the highest proportion of CDC emissions. The wastewater flows for 2022 were much higher than previous year reported flows, and going back through the previous emissions inventories, it appears that previous reported levels may have been under-represented. This shows up in our scope 1 figures. Rather than redoing the figures from previous inventories, we will use the source flow information from CDC's water outlook system going forward. Our wastewater network is also susceptible to water ingress during periods of heavy rain. 2022 had the highest recorded annual rainfall since available records started in 1960[4].

There have also been changes to the emissions factors from MfE leading to markedly higher gross and net emissions figures.

TABLE 6: ORGANISATION EMISSIONS OVER LAST FIVE YEARS BY SOURCE AND SCOPE

		2018	2019	2020	2021	2022
		t Co2e	t Co2e	t Co2e	t Co2e	t Co2e
Electricity	Scope 2	182.24	201.37	76.41	88.97	87.01
Transmission gains and losses	Scope 3	13.80	17.27	6.55	8.08	10.08
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Transport - Petrol	Scope 1	21.87	27.27	23.86	21.75	133.28
Transport - Flights	Scope 3	0.60	0.75	0.83	0.87	1.59
Office Waste	Scope 3	0.48	0.61	0.78	0.95	1.07
Refrigerant	Scope 1	0.00	0.00	0.00	0.00	0
Water supply	Scope 1	21.64	24.97	25.55	25.71	18.28
Wastewater treatment	Scope 1	1,092.83	1,117.08	1,134.95	1,140.91	2002.42
Green waste - Landfill	Scope 3	1.55	1.99	0.00	0.00	0
Green waste - Compost	Scope 3	0.00	0.00	0.86	0.86	0.88
Gross Emissions		**1,462.27**	**1,521.78**	**1,382.82**	**1,407.29**	**2385.62**

[3] Emission factors (EF) released by MfE are used in the greenhouse gas inventory.

[4] recorded at Masterton

Sequestration (forest)		-7,249.14	-7,237.39	-7,237.39	-8,039.83	-7,729.08
Net Emissions		**-5,786.88**	**-5,715.61**	**-5,854.57**	**-6,632.54**	**-5,343.46**

TABLE 7: CHANGES TO THE ORGANISATION'S EMISSIONS SINCE 2018 BY SCOPE

	T CO_2E - 2018	T CO_2E - 2019	T CO_2E - 2020	T CO_2E - 2021	T CO_2E - 2022
SCOPE 1	1,263.60	1,299.79	1,297.39	1,307.56	2284.99
SCOPE 2	182.24	201.37	76.41	88.97	87.01
SCOPE 3	16.43	20.62	9.02	10.76	13.62
GROSS EMISSIONS	1,426.27	1,521.78	1,382.82	1,407.29	2385.62

On a more positive note our electricity, office waste, and green waste are at consistent levels to previous years, and are affected more by changes to emission factors than volumes.

There has been an increase in Full Time Equivalent employees (FTE) over the year, and along with more activity post-Covid may account for the increase in diesel and petrol consumption.

The estimated population of Carterton also rose over this period (Stats NZ data), but not enough to offset the wastewater increases. The gross emissions are the highest since CDC began its inventories in 2018.

TABLE 8: CHANGES FOR THE EMISSIONS PER FTE AND PER CAPITA SINCE 2018 (GROSS AND NET)

	2018	2019	2020	2021	2022
GROSS EMISSIONS PER FTE (T CO_2E) 2018: 59.8 FTE 2019: 61.2 FTE 2020: 66.3 FTE 2021: 65.6 FTE 2022: 69.4 FTE	24.45	24.87	20.36	21.45	34.37
GROSS EMISSIONS PER CAPITA (KG CO_2E) 2018: 9,440 2019: 9,690 2020: 9,888 2021: 9,987 2022: 10,200 (STATS NZ ESTIMATE)	154.90	157.05	139.85	140.91	233.88

Carbon sequestration from council's forest continues to be the reason for net emissions to be negative. Gross emissions will need to reduce before 2032 when the current tree crop is due to begin being felled.

Statement of intent

This inventory forms part of Carterton District Council's commitment to measure and manage our emissions.

CDC is expected to contribute to the goal of net-zero New Zealand greenhouse gas emissions (other than biogenic methane) by 2050, and have regard to the New Zealand Emissions Reduction Plan, and the Regional Emissions Reduction Plan. Under the Local Government Leaders Climate Change Declaration, Council committed to 'Develop and implement plans to reduce emissions'.

Liabilities

GHG stocks held

HFCs, PFCs and SF_6 represent GHGs with high global warming potentials. Their accidental release could result in a large increase in emissions for the reporting period. Therefore, any GHG stocks are included in the greenhouse gas emissions inventory to identify significant liabilities and implement procedures for minimising the risk of their accidental release.

HFCs, PFCs and SF6 represent GHGs with high global warming potentials. Their accidental release could result in a large increase in emissions for that year, and therefore the stock holdings are reported in this inventory (Table 9: HFCs, PFCs and SF6 held by CDC).

This is the table from 2021, see earlier note on refrigerant information.

TABLE 9: HFCS, PFCS AND SF6 HELD BY CDC

Source	Amount held – January 2021	Amount held – December 2021	Potential liability
R410-A	39.1 kg	39.1 kg	81.6 tCO_2e
R32	1.27 kg	1.27 kg	0.9 tCO_2e
TOTAL			82.5 tCO_2e

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. If a sequestration is claimed, this also represents a liability in future years should fire, flood or other management activities release the stored carbon.

Land-use change has been included in this inventory. CDC owns 212.2 ha of growing planted forest (mainly Radiata Pine), 28.8 ha of old planted forest (Radiata Pine) and 24.5ha of natural forest (Manuka), The potential liability of land-use change is 221,570.6 tCO_2e.

TABLE 10: POTENTIAL LIABILITY OF THE LAND-USE CHANGE

	t CO_2e	t CO_2	t CH_4	t N_2O
Carbon emission (deforestation) – Planted forest	212,107.5	212,107.5	n/a	n/a
Carbon emission (deforestation) – Native forest	3,463.075	3,463.075	n/a	n/a
TOTAL	221,570.6	221,570.6	n/a	n/a

Appendix A: Methodology and references

Methodology

The greenhouse gas inventory method used by Carterton District Council is based on the following guides:

- National guidance:
    - Measuring Emissions: A guide for Organisations – MfE (2019, 2020, 2022)
    - Carbon accounting guidelines for wastewater treatment: CH_4 and N_2O – Water New Zealand
- International guidance:
    - The Greenhouse Gas Protocol
    - ISO14064-1:2018

More information here (MfE guidance) and here.(Water NZ guidance).

References

Measuring Emissions: A guide for Organisations – MfE, 2019, 2020, 2022

Carbon accounting guidelines for wastewater treatment: CH_4 and N_2O – Water New Zealand

The Greenhouse Gas Protocol: A corporate accounting and reporting standard – World Business Council for Sustainable Development and World resources Institute, 2004 (revised)

ISO14064-1:2018. Greenhouse gases – Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals – International Organization for Standardization, 2018 (revised)

Disclaimer:

The information in this greenhouse gas inventory is true and complete to the best of our knowledge. The calculation method used (MfE workbook and MfE factors), the inclusions and exclusions of this inventory may be different from other inventories and can explain the differences. The author and publisher disclaim any liability in connection with the use of this information.

Do minimum requirements

ISO 14064-1:2018(E) – Annex F p.35

Annex F (informative – recommended)

To encourage completeness, consistency and readability, the organization should consider organizing the GHG report according to the following chapters:

a) Chapter 1: General description of the organization goals and inventory objectives

This chapter includes the description of the reporting organization, persons responsible, purpose of the report, intended users, dissemination policy, reporting period and frequency of reporting, data and information included in the report (list of GHGs taken into account and explained), and statements by the organisation about verification.

b) Chapter 2 Organizational boundaries.

This chapter includes the description and explanation of boundaries and consolidation methodologies

c) Chapter 3: Reporting boundaries.

This chapter includes the description and explanation of emissions categories that are consolidated

d) Chapter 4: Quantified GHG inventory of emissions and removals.

This chapter includes the quantified data results by emission or removal category, description of methodologies and activity data used, references and/or documentation of emission and removal factors, uncertainties and accuracy impacts on results (disaggregated by category), and description of planned actions for reducing uncertainty for the future inventory.

e) Chapter 5:
GHG reduction initiative and internal performance tracking.

The organization may report its GHG reduction initiatives and the results of its internal performance tracking.

ISO 14064-1:2018(E) – GHG reporting p.14

GHG reporting shall include the following:

f) Description of the reporting organization
g) Person or entity responsible for the report

h) Reporting period covered
i) Documentation of the organizational boundaries
j) Documentation of reporting boundaries, including criteria determined by the organization to define significant emissions
k) Direct GHG emissions, quantified separately for CO2, CH4, N2O, NF3, SF6 and other appropriate GHG groups (HFCs, PFCs, etc) in tonnes of CO2e
l) A description of how biogenic CO2 emissions and removals are treated in the GHG inventory and the relevant biogenic CO2 emissions and removals quantified separately in tonnes of CO2e
m) If quantified, direct GHG removals, in tonnes of CO2e
n) Explanation of the exclusion of any significant GHG sources from the Quantification
o) Quantified indirect GHG emissions separated by category in tonnes of CO2e
p) The historical base year selected and the base-year GHG inventory
q) Explanation of any change to the base year of the historical GHG data or categorization and any recalculation of the base year or other historical GHG inventory and documentation of any limitation to comparability resulting from such recalculation
r) Reference to, or description of, quantification approaches, including reasons for their selection
s) Explanation of any change to quantification approaches previously used
t) Description of the impact of uncertainties on the accuracy of the GHG emissions and removals data per category
u) Uncertainty assessment description and results
v) A statement that the GHG report has been prepared in accordance with this document.
w) A disclosure describing whether the GHG inventory, report or statement has been verified, including the type of verification and level of assurance achieved
x) The GWP values used in the calculation, as well as their source. If the GWP values are not taken from the latest IPCC report, include emissions factors or the database reference used in the calculation