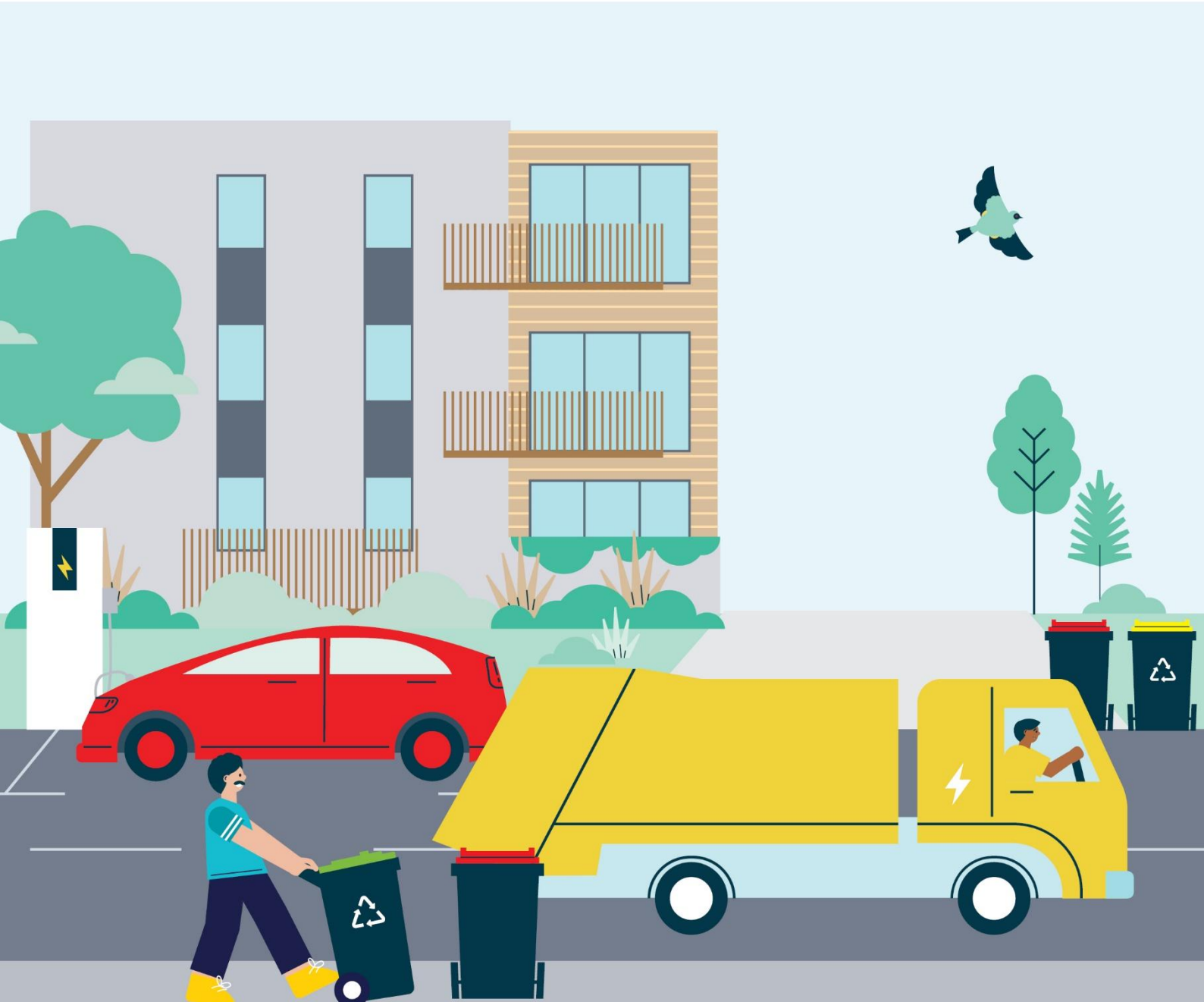
HUTT CITY
TE AWA KAIRANGI

Greenhouse Gas Inventory Report

2024/2025



Hutt City Council

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Date completed:	11th December 2025 (corrected 10 March 2026)
For the period:	1st July 2024 to 30th June 2025
Base year:	1st July 2016 to 30th June 2017

Peer Review: This report was peer reviewed by Tonkin & Taylor Limited in accordance with ISO 14046_1:2018 and the Greenhouse Gas Protocol. Emissions are discussed in scopes, for consistency with other reports. This document is unverified and is not assured to auditing practices.

CONTENTS

LIST OF FIGURES

EXECUTIVE SUMMARY

Hutt City Council (HCC) has in place its Carbon Reduction and Climate Resilience Plan 2021-31, with an organisational target to reduce emissions to net zero by 2050.

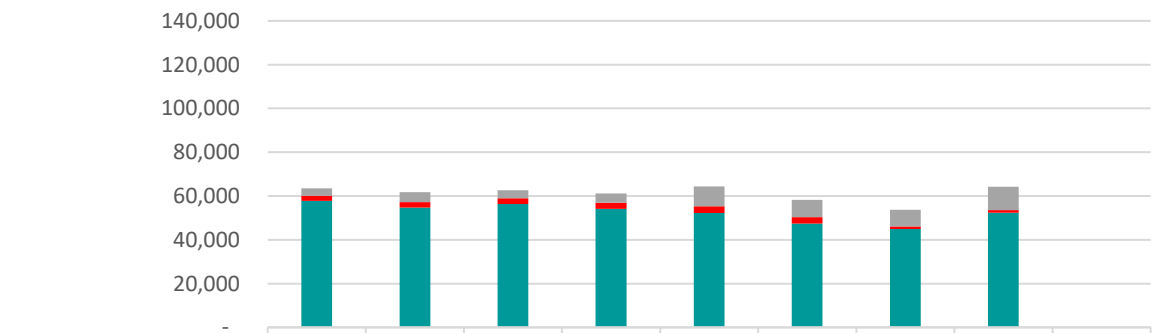
Council produces an annual greenhouse gas inventory report, in order to assess progress against its carbon targets and actions.

Hutt City Council's total carbon footprint for 2024/25 has been estimated at 113,583 tCO_{2-e}.

Unfortunately, a comparison of the 2024/25 data to the 2016/17 base year is not possible, due to significant changes to the reporting scope and methodology regarding Scope 3 emissions.

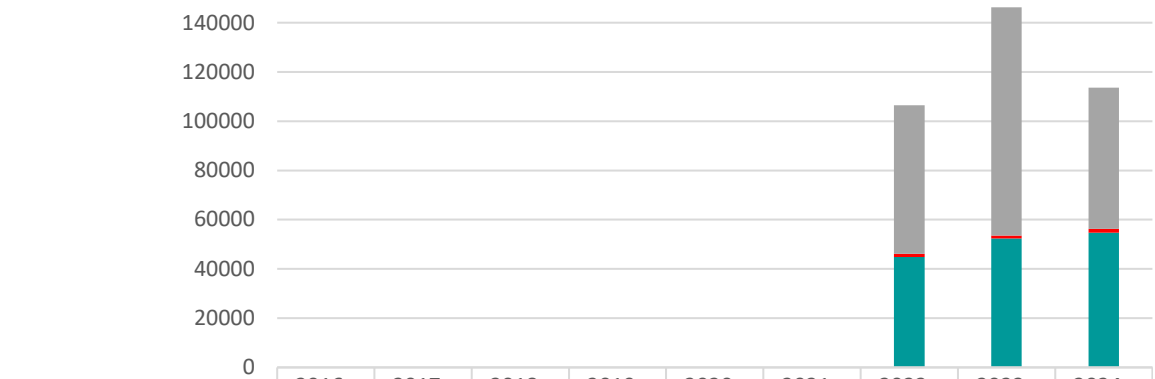
Figure 1 shows the emissions under the old methodology and scope up to 2023/24, whereas Figure 2 shows the new methodology and scope, albeit also applied to the last two financial years to enable some progress evaluation.

Figure 1. HCC emissions profile - old method (in tCO_{2-e})



	2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	2021 - 2022	2022 - 2023	2023 - 2024	2024 - 2025
Scope 3 emissions (old)	3,256	4,514	3,736	4,231	9,035	7,905	7,538	10,671	
Scope 2 total	2,383	2,501	2,590	2,744	3,046	2,921	1,252	1,111	
Scope 1 total	57,805	54,695	56,375	54,143	52,285	47,486	44,870	52,442	

Figure 2. HCC emissions profile - new method (COGO) (in tCO_{2-e})



	2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	2021 - 2022	2022 - 2023	2023 - 2024	2024 - 2025
Scope 3 emissions (new)							60,382	92,705	57,317
Scope 2 total							1,252	1,111	1,539
Scope 1 total							44,870	52,442	54,727

Changes to the reporting scope and methodology were made in the following way:

- Various Scope 3 emissions are now estimated utilising a dollar spend approach based on detailed general ledger and project cost codes. Thus, the following emission categories are now accurately estimated: Category 1 - Purchased goods and services, Category 2 - Capital goods, and Category 4 - Upstream transportation. Emissions for these categories were estimated by applying updated Thinkstep emission factors for New Zealand industries and commodities.

Category 1 - Purchased goods and services

- In the past, only suppliers with an annual cost of more than $250,000 per year were included under this category. For 2024/25, emissions associated with all operational and capital expenditure has been included down to the last dollar, based on COGO's analysis.

Category 2 - Capital goods

- Emissions reporting now captures all Capital goods under HCC and are now estimated via the dollar spend based approach. Capital goods previously only accounted for purchased vehicles emissions.

Category 4 - Upstream transportation

- This category previously accounted for postage and couriers and was represented as “Courier “emissions. Emissions associated under this category now account for postage & courier, and freight & cartage emissions. Emissions are estimated via the dollar spend based approach

Wellington Water categorisation change

- Emissions associated with the assets operated by Wellington Water were previously reported under various scopes. This included the use of gas for the biosolids dryer, and emissions associated with the operation of the treatment plant. For 2024/25, emissions associated with Wellington Water’s operation and capital projects are now estimated based on the analysis by COGO. However, note that the assets managed by Wellington Water will, from 1 July 2026, transition into a new Metro Water agency. For Council’s carbon footprint this will likely mean that the emissions associated with those assets and services will be excluded from Council’s organisational footprint for the time after 1 July 2026.

IT emissions

- IT emissions were previously limited to measuring Microsoft cloud storage emissions via Microsoft Azure. A full cost code analysis by COGO revealed other IT related services that were not accounted for. IT emissions are now estimated via the dollar spend based approach that captures cloud-based subscriptions, software licenses & support and internet charges.

Changes to reported emissions as a result of actions and other factors, are as follows:

Landfill

- Fugitive emissions at Silverstream landfill (Stage 2) are lower compared to the previous year, which may be due to couple of factors. There has been an overall reduction in the amount of waste received at the landfill during 2024/25 compared to the previous year. The reduction in waste volumes appears to be associated with a reduction in economic activity, such as construction and development activities. Further to this, gas destruction was calculated separately for flare and gas engines, accounting for higher efficiency of the flare.
- Emissions at the closed Silverstream landfill (Stage 1) have increased despite this being a closed landfill, and gas generation is expected to decline over time. Although the existing gas extraction system continues to operate, there are challenges with gas extraction. This is due to wells failing to produce gas (e.g. due to collapse or blockage). Note that the open Stage 2 Silverstream landfill is slowly moving over the top of the closed Stage 1/1A landfill, which may affect gas production potential, and/or inhibit the ability to extract any remaining gas. In addition, actual gas production cannot currently be measured and is modelled based on accepted landfill gas production models. Only the amount of gas actually extracted and combusted can be measured, hence, the

residual emissions estimate is modelled only. An increase in emissions does not indicate that landfill systems are not working as intended.

- Emissions at the closed Wainuiomata landfills are declining, as expected for a closed landfill, which is reflected in the emissions. Note that his landfill does not have a gas collection and destruction system.

Urban Plus

- The increase in emissions regarding Urban Plus is due to the completion of new homes that were still under construction last year.

Electrification

- Increases in electricity emissions are related to two factors: Phasing out natural gas heating, and switching to electricity, increases electricity consumption. For example, the new Te Ngaengae pool is fully electric. However, further to this. emissions associated with electricity are subject to the changes in the carbon intensity of New Zealand's electricity production.

Figure 3 below shows the changes in the respective emission categories for this financial year. Scope 3 COGO emissions for 2023/2024 were compared against 2024/2025 emissions to measure changes for Purchased goods and services (Contracts), Capital goods, Freight and cartage and IT.

Figure 3: Hutt City Council emissions profile for 2024/25 compared to 2023/24.

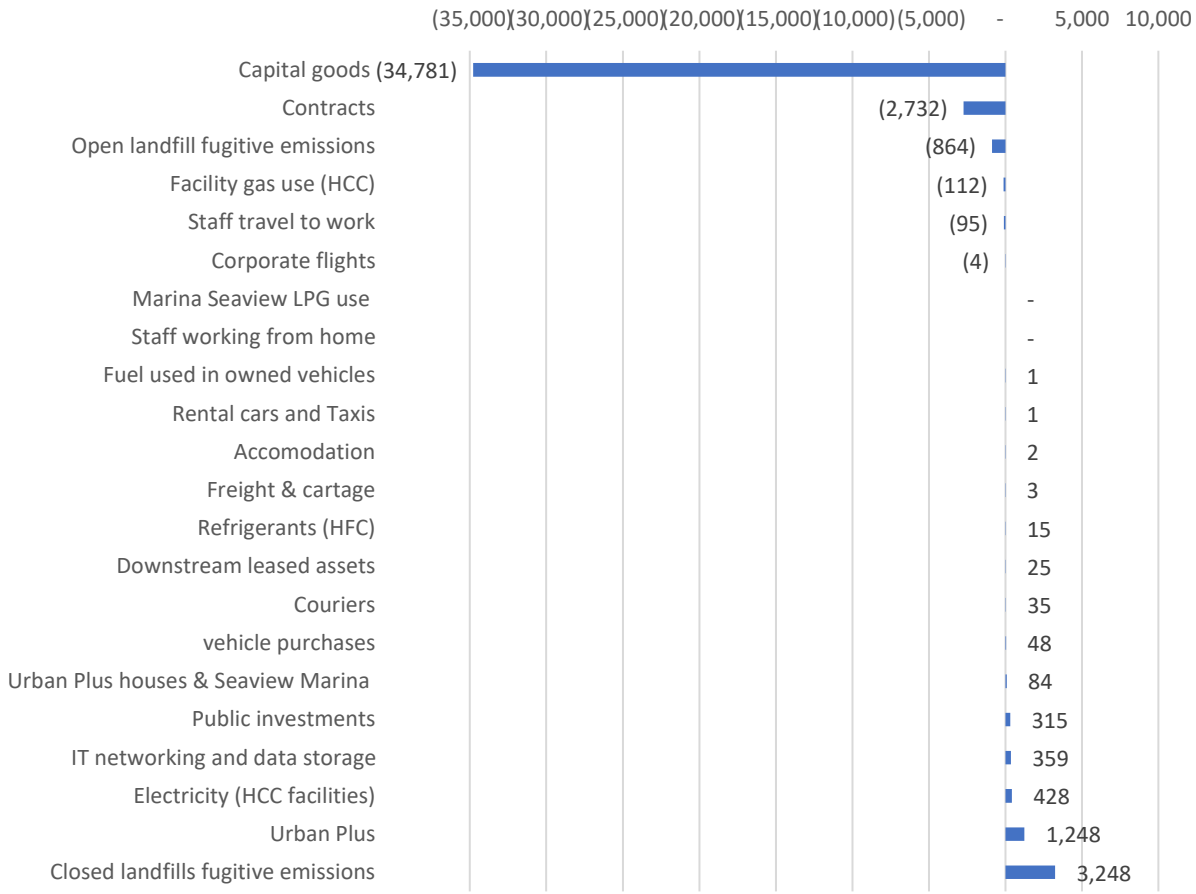
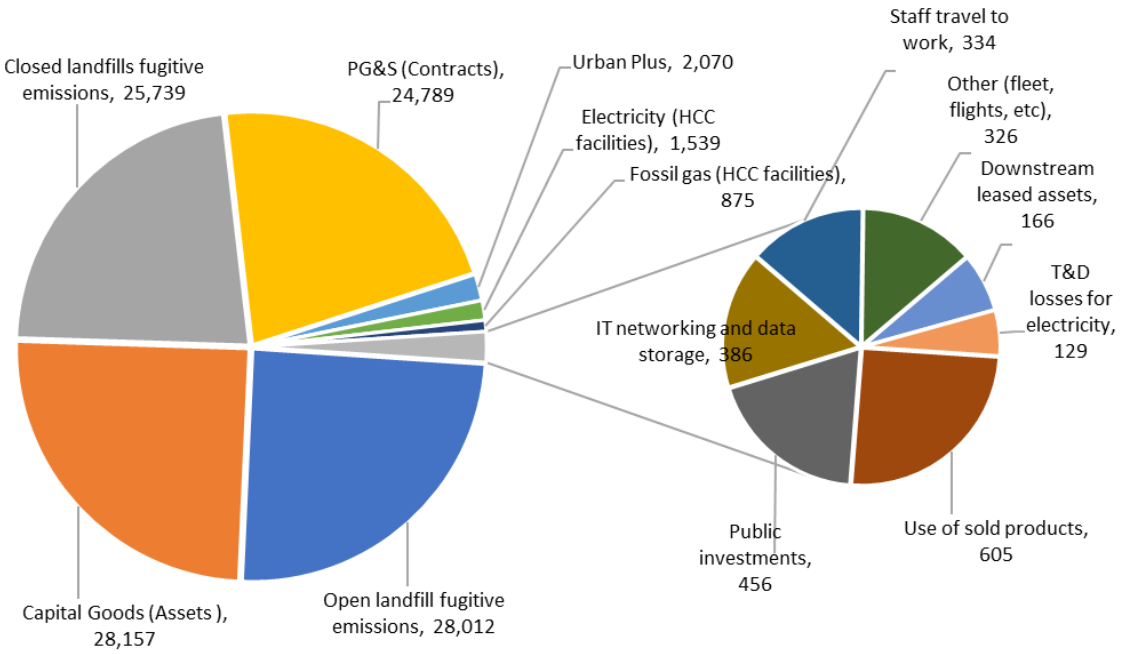


Figure 4 below shows a detailed breakdown of Hutt City Council's emissions for 2024/25. Note that individual emission sources with less than 100 tonnes have been grouped as "others" just for reporting purposes. The category of "others" include:

- Scope 1 – Fuel used in owned vehicles, Seaview Marina LPG use & refrigerants.
- Scope 3 – Vehicle purchases (Category 2), Fuel and energy related services (Category 3), Upstream transportation (Category 4) and Business travel (Category 6).

Figure 4. Hutt City Council emissions profile for 2024/25 - emissions by category



As a result of the scope and methodology changes, the relative importance of various emissions sources for Hutt City Council has changed compared to previous emission inventory reports. There are now four large emission sources of similar magnitude (open landfill 25%, capital goods 25%, closed landfills 23%, and purchased goods and services 22%) that collectively make up about 94% of Council's footprint. These are followed by UPL, electricity use, gas use and various other minor categories.

1. INTRODUCTION

1.1 ORGANISATION DESCRIPTION

Hutt City Council (HCC) is a territorial authority that governs the city of Lower Hutt, which is the seventh largest city in New Zealand with an estimated population of 115,500 (as of June 2025). Council consists of a mayor, twelve councillors and 574 full time equivalent staff members that collectively deliver services and projects across its diverse communities. These key services include:

- Roads, parking & transport
- Water supply, wastewater treatment, stormwater management, flood protection via its Council-Controlled Organisation Wellington Water
- Landfill & waste management
- Animal control services
- Parks & reserves (including cemeteries)
- Building consents – licenses and permits
- Environmental protection services
- Social – aquatic & fitness facilities, libraries, hubs, museums, sports facilities and city-wide activation programmes
- Emergency management
- Corporate planning, legal and economic activities

HCC has previously set a target to achieve net-zero carbon emissions by 2050 and declared a climate emergency in June 2019. It established a Carbon Reduction and Resilience Plan 2021-31 and put in place various other plans and initiatives with the intent of reducing carbon emissions, including increasing energy efficiency performance across its facilities. Reporting on its emissions both quarterly and annually is important in the context of measuring Council's emissions reduction performance.

1.2 BASE YEAR

The base year for assessing Hutt City Councils emission reduction performance is 2016-2017, this was the year first assessed by HCC (carried out by AECOM). There are several differences in scope, methodology and exclusions between the initial assessment and the present assessment, so these reports cannot be directly compared (e.g. the initial report excluded fugitive emissions from closed landfills, and the 24/25 report utilises a dollar spend approach for a significant share of Scope 3 emissions).

In light of the changes to scope and methodologies, and also the impending transfer of assets managed by Wellington Water to the new Metro Water agency in 2026, HCC is planning to review its carbon target and base year in 2026.

1.3 STATEMENT OF INTENT

This annual report serves as Hutt City Council's commitment to achieving net-zero greenhouse gas emission by 2050. The inventory report and any GHG assertions was peer-reviewed by a third-party organisation in accordance with the requirements of *ISO 14064-1:2018 Specification with guidance at the organisational level for quantification and reporting of greenhouse gas emissions and removals*. Note that the review completed was not a third-party certification audit and does not provide assurance.

The intended use of the Council's carbon footprint report is to monitor its emission management and reduction performance, including reductions achieved through decarbonisation initiatives. Hutt City Council remains committed to reduce its operational emissions in line with its target, and any national targets.

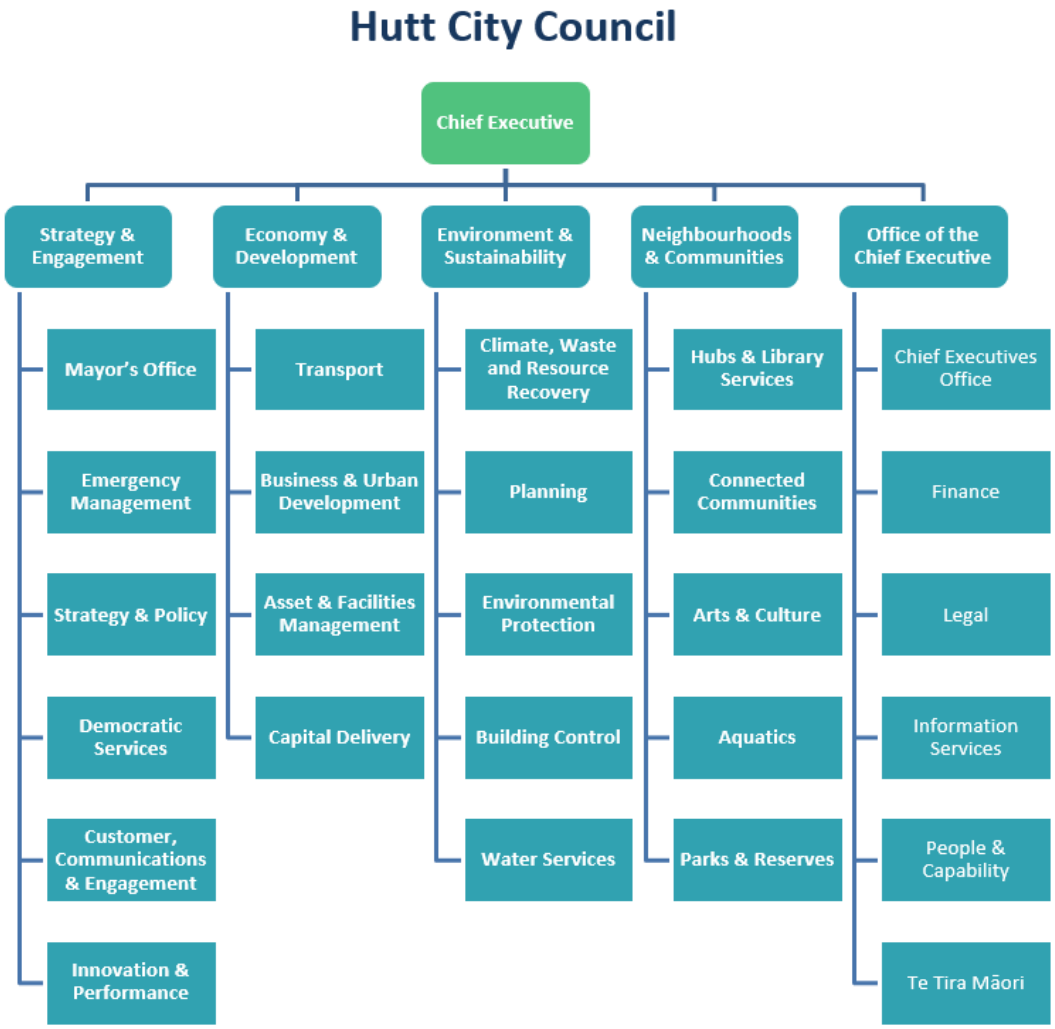
The intended users are Councillors, Council's senior leadership team, business units at HCC, as well as key stakeholders such as the Local Government Funding Agency (LGFA). Internally, this document can be used to inform climate related decisions. External users such as communities, residents, and other councils and interested organisations can review Councils' commitment to reduce its organisational emissions.

1.4 ORGANISATIONAL BOUNDARIES

Organisational boundaries were set in reference to methodology described in the Global Greenhouse Gas Protocol Accounting and Reporting Standard for the Financial industry via the Greenhous Gas Protocol website and the ISO 14064-1:2018 standard. The following methods are widely used in organisational carbon footprint reporting: the control approach (either financial or operational control), and the equity share approach.

For this greenhouse gas inventory, a financial control consolidation approach is used, which means that Council Controlled Organisations (CCOs) are considered an equal component of the footprint, alongside the Council's own operations. This is in order to consider Hutt City Council's overall performance and considering that Hutt City Council either has complete or significant financial interest in its CCOs, which results in significant active influence. The organisational chart provides a summary overview of the primary HCC structures and business units, outlining the assets and activities included within the scope of this report.

Figure 5. Hutt City Council organisational structure



Hutt City Council has three CCOs:

Seaview Marina and Urban Plus Limited are 100% owned by HCC; governance is conducted via the companies' respective boards of directors, with the boards accountable to Hutt City Council.

Hutt City Council is an equal shareholder in Wellington Water Limted, which is jointly owned alongside five other councils. The other sharehilders include Wellington City Council, Porirua City Council, Upper Hutt City Council, South Wairarapa District Council and Greater Wellington Region Council. Each shareholding council is represented on the Wellington Water Committee by one representative, Wellington Water additionally has a board of independent directors. Hutt City has varying stakes in particular assets that are managed by Wellington Water. Although HCC has a 20% share in ownership of WW, inconsistent supply of emissions data from WW has impacted annual reporting of HCC's portion of WW emssions. Re-evaluating the CCO's emissions reporting boundaries from equity share to financial control approach allows Hutt City to more accurately and consistently report its emissions related to Wellington Water. HCC exercises financial control of WW assets and activities within the Lower Hutt boundary and also retains risks associated with WW operations. Thus, employing a financial control approach is consistent with financial control approach guidelines stated in the Greenhouse gas protocol corporate accounting and reporting standard.Note that the assets managed by Wellington Water will, from 1 July 2026, transition into a new Metro Water agency. This may require changes to the scope and approach of Council's carbon footprint for the period after 1 July 2027.

Hutt City has complete ownership and operational control of the Silverstream landfill, which receives waste from Lower Hutt and some other districts in the Greater Wellington region. This results in Hutt City Council having a disproportionately large carbon footprint compared to other comparable organisations.

Hutt City Council's greenhouse gas emissions are reported over a financial year period which commences on 1 July and ends on 30 June the following year. All data collected between the financial year period is then used to calculate Scope 1, 2 and 3 emissions.

1.5 REPORTING BOUNDARIES

Scope 1, 2, and 3 are included. Specific categories are reported as below:

Scope and categories	Subcategories	Included
Scope 1 - Direct emissions and removals		
Stationary combustion	Facility gas use (HCC)	YES
	Marina Seaview LPG use	YES
	Direct flaring from landfills	YES
	Diesel used in generators	NO (Only included if diesel is used for an emergency in the financial year)
	Biomass fuel	NO (biomass is not used)
Mobile combustion	Fuel used in owned vehicles	YES
Direct fugitive emissions	Refrigerants (HFC)	YES
	Open landfill fugitive emissions	YES
	Closed landfills fugitive emissions	YES
Scope 2 – Indirect emissions from imported energy		
Purchased energy	Electricity (HCC Facilities)	YES (includes also electricity emissions for Seaview Marina, UPL, and WW (water, wastewater & stormwater pumps)
	Steam	NO (steam is not used)
	Heating & cooling	NO (additional heating and cooling is not purchased)
Scope 3 - Indirect emissions		
Upstream scope 3 emissions		
Purchased goods and services	Contracts	YES (Emissions covered via COGO spend analysis)
	Urban Plus	YES
	IT networking and data storage	YES (Emissions covered via COGO spend analysis)
Capital goods	Buildings, facilities, equipment's and all other fixed assets for council.	YES (Emissions covered via COGO spend analysis)
	Vehicles (embodied emissions)	YES (Emissions covered via COGO spend analysis)
Fuel- and energy-related activities (not included in Scope 1 or Scope 2)	Transmission & Distribution losses - Electricity	YES

	Transmission & Distribution losses – Natural gas	YES
Upstream transportation and distribution	Three-water management and network	Captured in other categories and via COGO spend analysis
	Couriers & Postage	YES (Emissions covered via COGO spend analysis)
	Freight & Cartage	YES (Emissions covered via COGO spend analysis)
Waste generated in operations	Seaview Wastewater Treatment Plant	Captured in Scope 1, via open landfill fugitive emissions
	Demolition waste	Captured in Scope 1, via open landfill fugitive emissions
	Corporate waste	Captured in Scope 1, via open landfill fugitive emissions
Business travel	Corporate flights	YES
	Accommodation	YES
	Rental cars and Taxis	YES
Employee commuting	Staff travel to work	YES
	Working from home	YES
Upstream leased assets	Building owned and leased	NO (Excluded)

Downstream scope 3 emissions

Downstream transportation and distribution	Product transportation	NO (there are no sold products that require distribution)
	Three-water management and network	YES (captured via COGO spend analysis)
Processing of sold products		NO (there are no processed sold products)
Use of sold products	Urban Plus houses& diesel sale at Seaview Marina	YES
End-of-life treatment of sold products	Urban Plus houses	NO (there are no products that have reached end of life)
Downstream leased assets	Facilities	YES
Franchises		NO (HCC does not have franchises)
Investments	Public investments	YES

OTHERS

Land Use, Land Use Change & Forestry		NO

1.6 EXCLUSIONS

1.6.1 Capital Goods: Seaview Marina

The emissions associated with Scope 3 capital goods for Seaview Marina are excluded as they cannot currently be assessed with accuracy due to limited data records. Hutt City Council is required to maintain financial records for the prior seven years. Thus, there is more work needed to accurately assess emissions associated with the respective CCO.

1.6.2 Upstream leased assets

Cost code mapping by COGO to estimate emissions based on dollar spend reveals emissions associated with upstream leased assets. More work by COGO is needed to dissect the nature of spend to correctly identify emissions relating to this category. Thus, upstream leased emissions are excluded from the reporting year.

1.6.3 Land Use, Land Change and Forestry (LULUCF)

Scope 3 emissions are not captured in their entirety. LULUCF (Land Use, Land Use Change and Forestry) emissions are excluded, as the focus of the report is on gross emissions, and because any credits arising from forests registered under the NZ Emissions Trading Scheme are scheduled to be sold, with revenue to be used to facilitate emission reductions. Therefore, for the purposes of this carbon footprint report, LULUCF has been excluded, to avoid double counting.

2. METHODOLOGY

Generally, emissions are calculated as per the Ministry for Environment guide for measuring emissions. As a resource, the 2025 Emissions Factor Workbook and 2025 Emissions Factors Flat File were published instead of a detailed guide. The Ministry is updating the guide format and encourages the use of *Ministry for the Environment 2024 Measuring Emissions: A Guide for Organisations: 2024 Detailed Guide* as a reference for detail. Where the methodology differs, the differences are discussed in this methodology section.

Accounting for emissions associated with dollar spend, Hutt City Council utilises Thinkstep emissions factors which are inflation adjusted with recent CPI figures. This replaces the use of outdated Motu factors (2014). Thus, emission results associated to dollar spend for financial year 2024/2025 differ significantly to previous reports.

Previously, the capital expenditure emissions reported only captured contracts worth over $250,000 and used 2014 Motu emissions factors. In addition, some suppliers (with an annual expenditure of $1M or more) provided Scope 1 and 2 emissions reporting based on their contract activities.

Now a revised emissions reporting approach calculates all capital expenditure emissions, using cost codes to categorise against spend based emissions factors. This new methodology has streamlined the spend-based emissions calculation allowing the capture and identification of additional Scope 3 emissions that could not be calculated previously.

Emissions relating to transmission and distribution losses are now reported as fuel and energy related activities under Scope 3 emissions. These emissions were included under Scope 1 & 2 emissions in previous reporting but after reviewing GHG protocols they are now categorised as Scope 3 emissions.

Note that HCC has a 20% shared ownership of WW, however data inconsistency from Wellington Water has impacted annual carbon reporting of HCCs portion of WW emissions. Re-evaluating Wellington Water's emissions reporting boundaries from equity share to financial control approach allows Hutt City to more accurately report its emissions related to Wellington Water. HCC exercises majority financial control of WW assets & activites and retains risks associated with WW operations within the Lower Hutt boundary. Thus, employing a financial control approach to Wellington Water emissions is consistent with the financial control approach guidelines stated in the greenhouse gas protocol corporate accounting and reporting standard.

A table of all emission data sources and assumptions used are provided in Appendix 1.

2.1 SCOPE 1 – DIRECT GREENHOUSE GAS EMISSIONS

2.1.1 Stationary combustion

Facility Gas Use

Natural gas use is accounted for across all council owned and operated facilities. Emissions are calculated as per the MFE guide, using invoiced consumption. [Note that facility gas emission figures in HCC's financial annual report differ from the annual carbon inventory figures. Emission factors were rounded and applied to gas consumption data used in HCCs financial report. The precision of emission results is thus lost due to rounding error.]

Direct flaring from landfills

Refer to Appendix 2 – Active and closed landfill assessment.

Seaview Marina LPG use

Calculated as per the MFE guide, using invoiced consumption. Seaview Marina consumes bottled LPG.

2.1.2 Mobile combustion

Fuel use for all council owned vehicles is accounted for. Fuel consumption is tracked through vehicle designated fuel cards. Emissions are calculated as per the MFE guide. Note that this category also accounts for vehicle fuel use by Seaview Marina and Urban Plus Limited.

[Note that HCC's annual report only accounts for mobile combustion of council vehicle fuel use and excludes fuel use by CCOs. Therefore, emissions figures reported here differ slightly to HCC's 2024/2025 annual report.]

2.1.3 Direct fugitive emissions

Refrigerants

Aquaheat reports all refrigerant leakages. Fugitive refrigerant emissions are calculated using the Global Warming Potentials (GWP) provided in the MFE guide.

Open landfill fugitive emissions

Refer to Appendix 2 – Active and closed landfill assessment.

Closed landfill fugitive emissions.

Refer to Appendix 2 – Active and closed landfill assessment.

2.2 SCOPE 2 – INDIRECT EMISSIONS FROM IMPORTED ENERGY

HCC facilities

The most recent available quarterly emission factors from the MFE guide (July 2025) are used. Since MFE has only published quarterly factors up to December 2024, emissions from January to June 2025 were estimated using quarterly averages from the previous two years. Renewable Energy Certificates are not used by Hutt City Council.

[Note that electricity emission figures in HCC's financial annual report differ from the annual carbon inventory figures. Quarterly electricity emission averages were rounded and applied to consumption data used in HCCs financial report. Precision of emission results is thus lost due to rounding errors.]

2.3 SCOPE 3 – UPSTREAM INDIRECT EMISSIONS

2.3.1 Purchased goods and services

HCC services and contracts

Dollar spend data for 2024/2025 was supplied to COGO to summarise all costs associated with purchased goods and services based on HCC general ledger (GL) and project (PJ) cost codes. Replacing MOTU emissions factors, inflation adjusted Thinkstep emission factors were used to determine emissions for all dollar spend on contracts and services.

Note that inflationary adjustments employed by COGO now utilise the Consumer Price Index (CPI).

Hutt City Council still requests emissions data from its larger contractors (typically exceeding expenditure of $1M per annum) to support supplier engagement. Contractors are required to report their Scope 1 and Scope 2 emissions data associated with HCC contracts. However, the data provided by contractors is not used for reporting purposes in this inventory report.

Urban Plus

Urban Plus Limited provided capital expenditure data associated with construction and demolition, equipment, operational expenses, and cleaning. Emissions have been estimated by using inflation-adjusted Thinkstep emission factors provided by COGO. Note that all capital expenditure data from Urban Plus was for financial year 2024/2025 and was gathered and supplied by HCC's finance team.

Wellington Water (WW)

HCC now use COGO to map all cost codes relating to Wellington Water capital expenditure for the financial year. Thinkstep emission factors are applied to calculate all Wellington Water emissions. Note that this also accounts for emissions relating to the Seaview Waste Treatment Plant (SWTP). Scope 2 electricity emissions from water pumps, storm water pumps, and wastewater pumps are accounted for under HCC's electricity emissions total, as this falls outside WW's capital expenditure budget.

IT networking and data storage

HCC now uses COGO to map all cost codes relating to software licenses and support, online data base subscriptions and other internet charges. Thinkstep emission factors are applied to calculate IT emissions.

2.3.2 Capital Goods

Buildings, facilities, equipment and other fixed assets

Recently included, HCC can now account for upstream emissions associated with capital expenditure for HCC buildings, facilities, equipment and other fixed assets. HCC now uses COGO to map all cost codes for capital goods. Thinkstep emission factors are applied to calculate for capital goods, albeit excluding vehicles.

Vehicle purchases (Cars, utes, vans)

HCC now uses COGO to map all cost codes for vehicle purchases. Thinkstep emission factors are applied to calculate for embodied vehicle emissions. Upstream emissions are reported separately for consistency with previously reported data.

2.3.3 Fuel and energy-related activities

Emissions related to electricity and natural gas transmission and distribution losses are calculated using the Ministry for Environment emissions workbook for 2025. In line with the GHG protocols, these emissions are now reported separately from electricity and natural gas emissions.

2.3.4 Upstream transportation

Postage and Couriers

HCC now uses COGO to map all cost codes for postage and couriers. Thinkstep emission factors are applied to calculate for postage and courier emissions. Dollar spend emissions under this category also account for Urban Plus and Seaview Marina postage and courier emissions.

Freight and Cartage

HCC now uses COGO to map all cost codes for freight and cartage. Thinkstep emission factors are applied to calculate for freight and cartage emissions. Dollar spend emissions under this category also account for Urban Plus and Seaview Marina freight and cartage emissions.

2.3.5 Waste generated in operations

Emission sources for waste generated in operations include Seaview Wastewater Treatment Plant (SWWTP), demolition waste and corporate waste. However, Hutt City Council owns and operates the Silverstream landfill, where all operational waste is disposed. Thus, all relevant operational waste emissions are already captured in the emissions reported for Silverstream landfill, refer Appendix 2.

2.3.6 Business travel

Corporate flights

HCC uses Orbit Travel as a travel agent. As part of this service, they produce a report based on distance travelled, in kilometres, associated with air travel. This information is submitted to CarbonEES, who organise and present the data on their software platform eBench. Emissions are calculated using the appropriate emission factors from the MFE emissions guide 2025.

Accommodation

HCC now uses COGO to map all cost codes for accommodation by staff on business travel. Thinkstep emission factors are applied to calculate emissions.

Rental cars and taxis

HCC now uses COGO to map all cost codes for transportation by staff on business travel. Thinkstep emission factors are applied to calculate emissions.

2.3.7 Employee commuting

Staff travel to work

A staff survey was completed in October 2025, and the associated emissions of each respondent was calculated as per the 2025 MFE guide. These emissions were averaged and extrapolated to account for FTE council staff with the assumption that each staff member worked 48 weeks per annum. Note that this approach likely overestimates emissions, as it does not account for public holidays and sick leave. However, this has been done for consistency with previous reports.

Working from home

A staff survey was completed in October 2025, and the associated emissions of each respondent was calculated as per the 2025 MFE guide. These emissions were averaged and extrapolated to account for FTE count with the assumption that each staff member worked 48 weeks per annum.

2.3.8 Downstream transportation and distribution

The only significant downstream transportation and distribution that Hutt City Council carries out is associated with the Three Waters network. These emissions are therefore captured elsewhere (Scope 3 – Purchased goods and service, and Scope 3 – Capital goods).

Houses sold by Urban Plus are built on site and not transported.

2.3.9 Use of sold products

These are emissions related to resold diesel by Seaview Marina and public housing constructed by Urban Plus.

Emissions associated with houses sold by Urban Plus have been estimated based on the cumulative number of houses sold by UPL and 2024 StatsNZ data on regional household emissions. Note that UPL houses have to achieve a minimum HomeStar 6 rating and cannot include the use of fossil gas for cooking and heating. It is likely that the use of these houses may result in lower emissions than StatsNZ data suggests.

2.3.10 Downstream leased assets

The majority of HCC's leased assets are captured within Scope 1 and 2. Although HCC is invoiced for the energy consumption at these sites, it passes this on to the lessee to settle. Council leases property under operating leases. A majority of these leases have a non-cancellable term of 36 months, with the exception of housing leases that have a non-cancellable term of 22 working days.

For the remaining sites, especially tenanted houses, the emissions are estimated based on the average Wellington household emissions from StatsNZ, as well as StatsNZ data on the average number of occupants in a household.

2.3.11 Public investments

HCC now uses COGO to map all cost codes for public investments. Thinkstep emission factors are applied to calculate emissions associated with public investments.

3. RESULTS

3.1 2024/2025 EMISSIONS

Scope and categories	Subcategories	Included
Scope 1 - Direct GHG emissions and removals		
Stationary combustion	Facility gas use (HCC)	875
	Marina Seaview LPG use	5
Mobile combustion	Fuel used in owned vehicles	77
Direct fugitive emissions	Refrigerants (HFC)	20
	Open landfill fugitive emissions	28,012
	Closed landfills fugitive emissions	25,739
Scope 2 - Indirect emissions from imported energy		
Purchased energy	Electricity (HCC facilities)	1,539
Scope 3 - Indirect emissions		
Upstream scope 3 emissions		
Purchased goods and services	Contracts	24,789
	Urban Plus	2,070
	IT networking and data storage	386
Capital goods	Buildings, facilities, equipment and all fixed assets for council	28,157
	Vehicle purchases	67
Fuel and energy-related activities (Not included in scope 1 or scope 2)	T&D losses for electricity	129
	T&D losses for natural gas	28
Upstream transportation and distribution	Courier & Postage	51
	Freight & Cartage	37
Business travel	Corporate flights	33
	Accommodation	2
	Rental cars and Taxis	4
Employee commuting	Staff travel to work	334
	Staff working from home	2
Downstream scope 3 emissions		
Use of sold products	Urban Plus houses & Seaview Marina	605
Downstream leased assets	Facilities	166
Investments	Public investments	456

3.2 SCOPE 1 – DIRECT GREENHOUSE GAS EMISSIONS

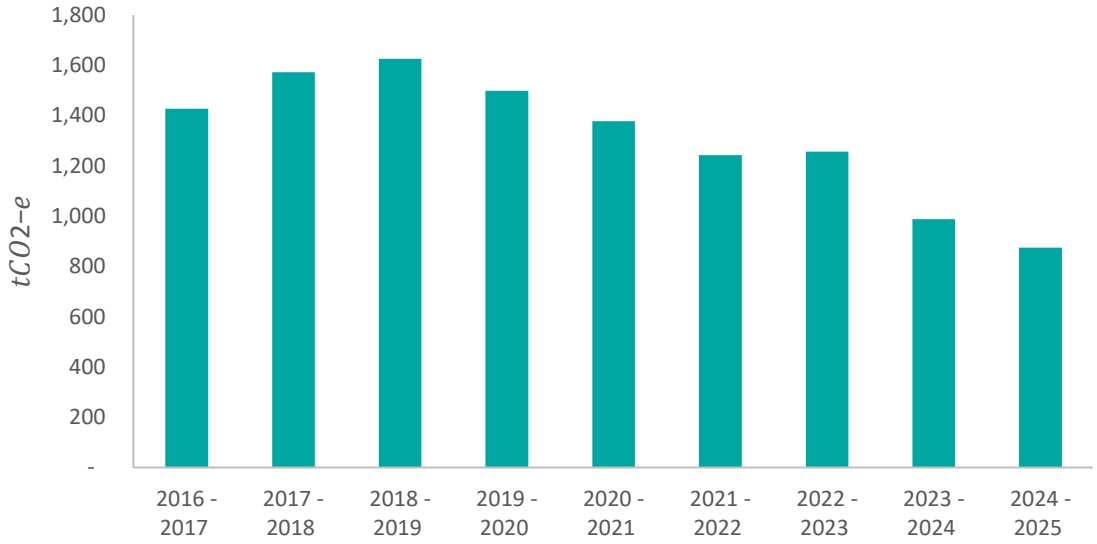
3.2.1 Stationary combustion

Fossil gas used in facilities

Emissions from fossil gas consumption have been steadily reducing since the 2019 calendar year, largely as a result of Council's programme to improve energy efficiency and to phase out the use of fossil gas.

Hutt City Council is committed to removing fossil gas from all its facilities by 2030, which consequentially means that HCC is not expected to directly consume any fossil fuels from the next decade.

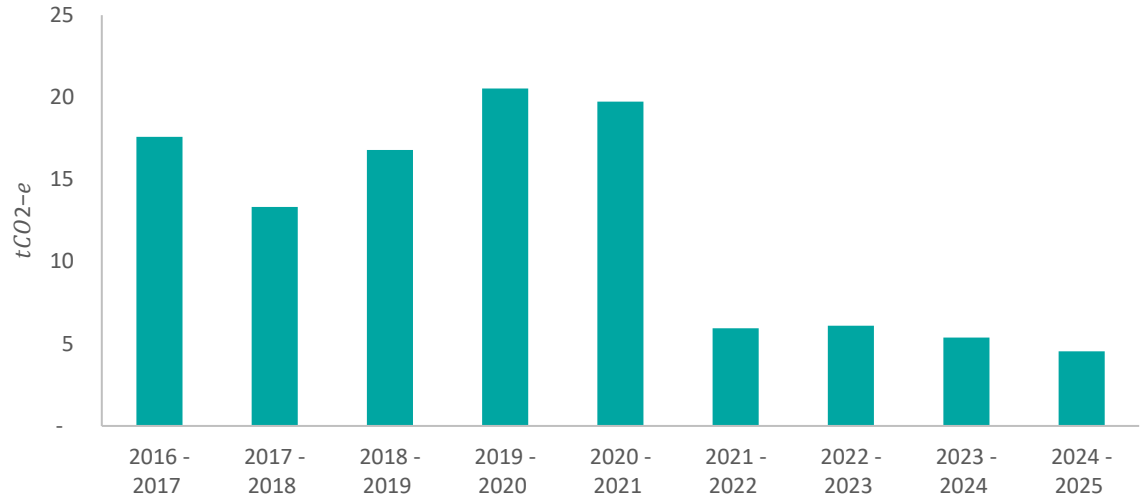
Figure 6. Invoiced fossil gas consumption for HCC facilities



Seaview Marina

Seaview Marina uses LPG to heat water in its showers and ablution blocks. There has been a reduction on LPG gas use since the 2020/2021 financial year. The reduction is related to a decline in tenants (those living in their boats at the marina) and visitor habits around shower use post Covid.

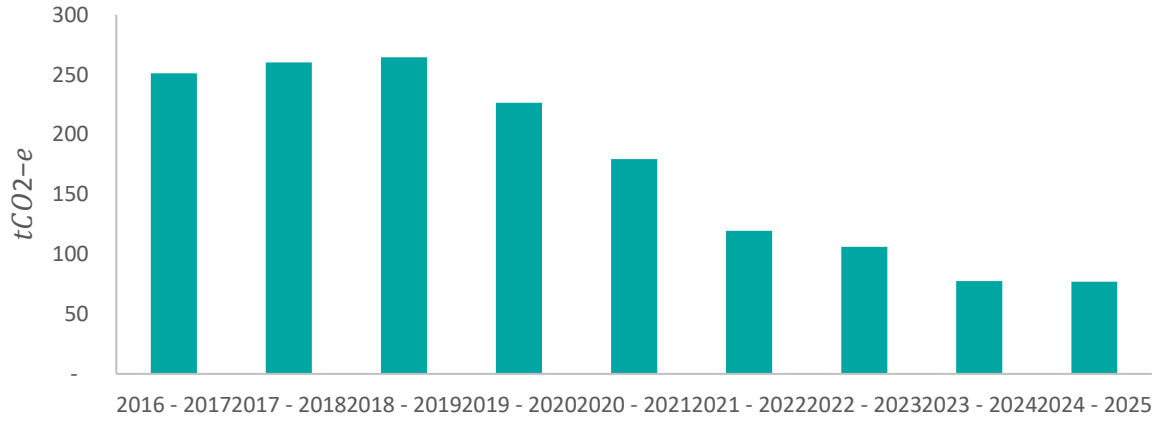
Figure 7. LPG emissions, Seaview Marina



3.2.2 Mobile combustion

Emissions from transport fuels (the operation of Council's vehicle fleet) have steadily declined since 2019, in line with Council's electrification of its fleet. By the end of the 2024/25 financial year, Council's fleet was 80% electric, albeit a small number of diesel vehicles remain, with associated diesel consumption. This is expected to decline further over the coming years.

Figure 8. Mobile combustion, HCC transport fuel use

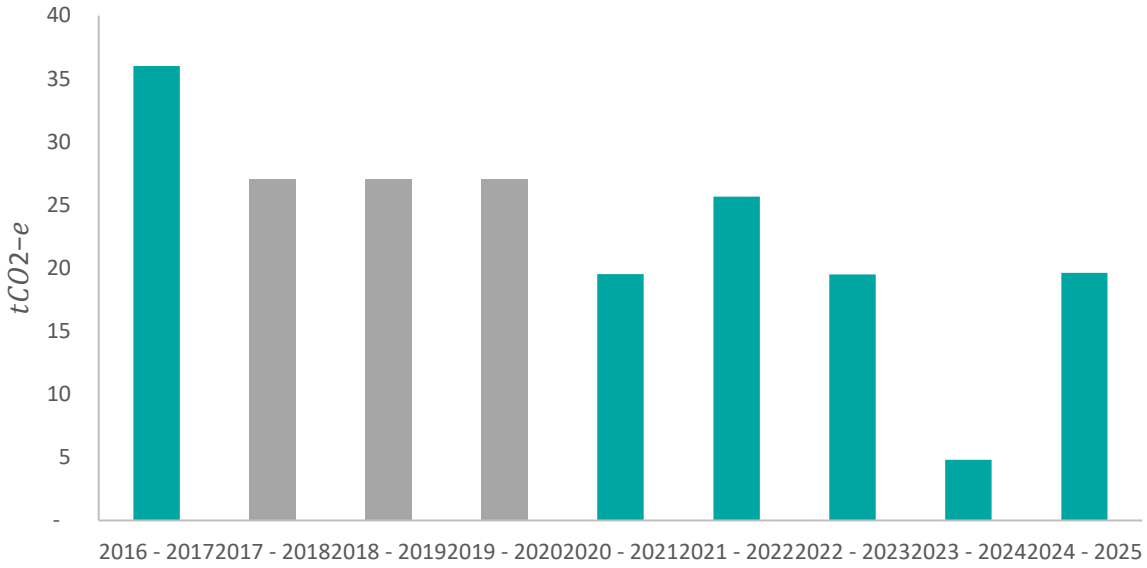


3.2.3 Direct fugitive emissions

Refrigerants

Emissions associated with refrigerant use is calculated to have increased compared to the previous year. There was a reported leakage of R134a and R404a at the Events Centre as well as R410a refrigerant from air conditioning at the Wainuiomata Community Centre. The refrigerant itself has a high emission factor because of its global warming potential (GWP 1,924). Overall emissions were significantly higher compared to the previous financial year's results. Note that for the period 2017/18 to 2019/20, highlighted in grey, actual emissions data is not available, and data has been estimated using averages.

Figure 9. Refrigerant emissions



Direct flaring from landfills

Directly flared emissions are those associated with the engines of the power plant (and a supplementary flare) at Silverstream landfill, which destroys methane, producing carbon dioxide and electricity. These are noted separately as some landfill emissions are fugitive, whilst these are direct emissions.

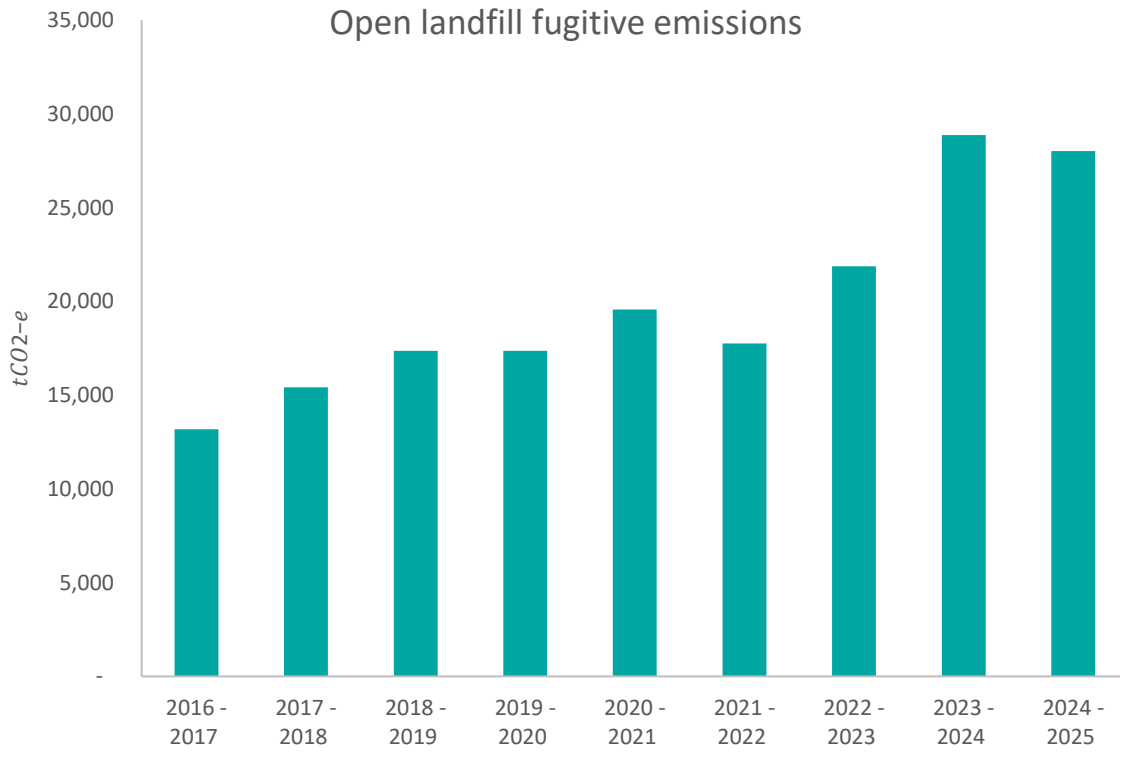
In all totals and time series these emissions are included with 'open landfill emissions', due to this breakdown only being available for three years (please refer to Appendix 2 for more detail on landfill emissions.

Financial year	Silverstream fugitive emissions separated by pathway (tCO_2e)			
	Stage 1 & 1a		Stage 2	
	Through cap	From engines	Through cap	From engines
2022/23	5,384	1,461	9,445	11,266
2023/24	8,525	768	19,962	8,914
2024/25	12,761	441	19,926	8,086

Open landfill emissions

The emissions associated with Silverstream landfill (Stage 2) have increased, largely due to the overall amount of waste contained in the landfill increasing, (and hence emissions continue to increase). Please refer to Appendix 2 for additional information.

Figure 10. Open landfill fugitive emissions



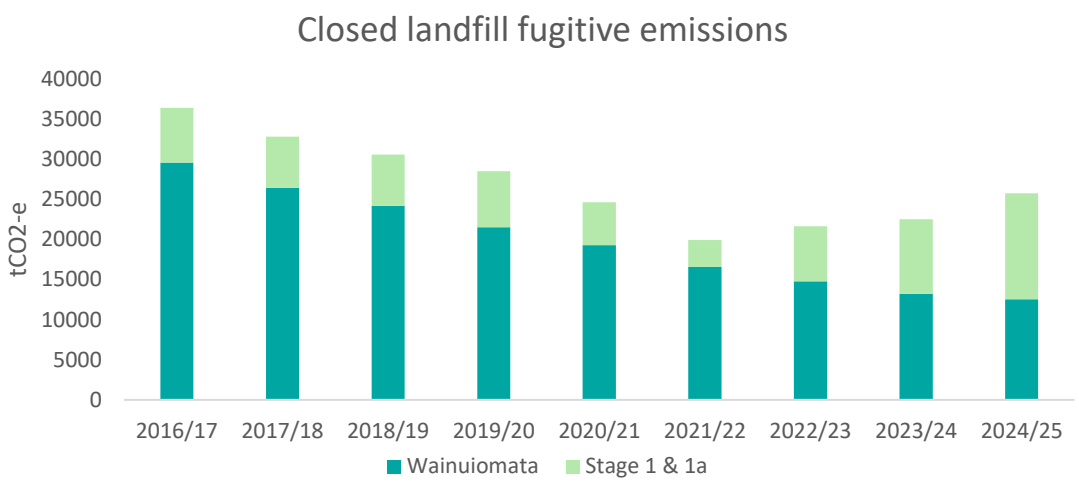
Closed landfill fugitive emissions

Emissions at the closed Silverstream landfill (Stage 1/1A) have increased despite this being a closed landfill, and gas generation is expected to decline over time. Although the existing gas extraction system continues to reduce emissions, there are challenges with gas extraction. This is due to wells failing to produce gas (e.g. due to collapse or blockage). Note that the open Stage 2 Silverstream landfill is slowly moving over the top of the closed Stage 1/1A landfill, which may affect gas production potential, and/or inhibit the ability to extract any remaining gas. In addition, actual gas production cannot currently be measured and is modelled based on accepted landfill gas production models. Only the amount of gas actually extracted and combusted can be measured, hence, the residual emissions estimate is modelled only. An increase in emissions does not indicate that landfill systems are not working as intended.

Please refer to Appendix 2 for additional information.

Financial year	Fugitive emissions estimate in tCO_2e (emissions destroyed by combustion in brackets)		
	Silverstream		Wainuiomata
	Stage 1 & 1a	Stage 2	
2016/17	6,814 (24,713)	13,182 (42,583)	29,545 (0)
2017/18	6,375 (23,137)	15,416 (53,106)	26,412 (0)
2018/19	6,375 (23,137)	17,362 (58,805)	24,173 (0)
2019/20	6,995 (25,390)	17,356 (67,228)	21,487 (0)
2020/21	5,350 (19,416)	19,559 (58,766)	19,249 (0)
2021/22	3,328 (20,231)	17,757 (87,024)	16,563 (0)
2022/23	6,845 (14,611)	21,865 (101,394)	14,772 (0)
2023/24	9,293 (11,115)	28,876 (108,266)	13,198 (0)
2024/25	**13,205 (4557)**	**28,012 (99.856)**	**12,534 (0)**

Figure 11. Closed landfill fugitive emissions

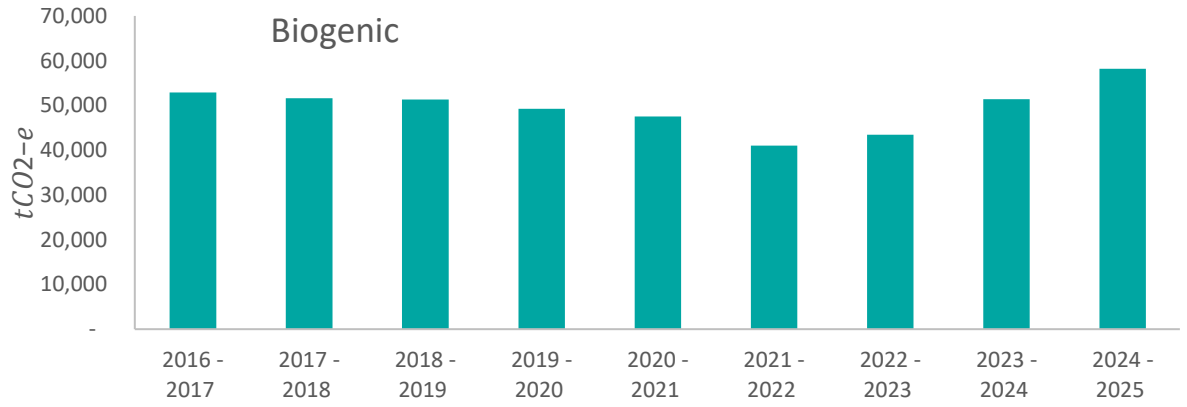


3.2.4 Biogenic emissions

As below, biogenic methane emissions increased compared to the previous year but note that biogenic emissions are not additional to those noted elsewhere. Please refer to Appendix 2 for more detail on biogenic emissions.

There is significant work under way to continuously improve methane capture and destruction at Silverstream landfill (e.g. new wells are being added as required).

Figure 12. Total fugitive emissions: biogenic

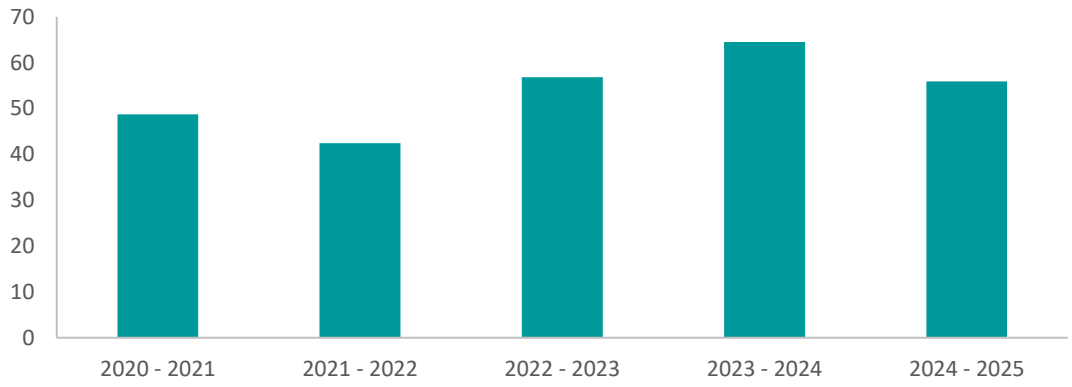


3.2.5 Waste from facilities

Emissions associated with HCC's facility waste has broadly remained stable. The waste-type-specific method, which involves using 2025 MFE emissions factors for specific waste types was applied to determine waste emissions for facilities.

This emission source is provided as an information item only, as emissions are captured under Scope 1 (Silverstream landfill fugitive emissions).

Figure 13. Facility Waste

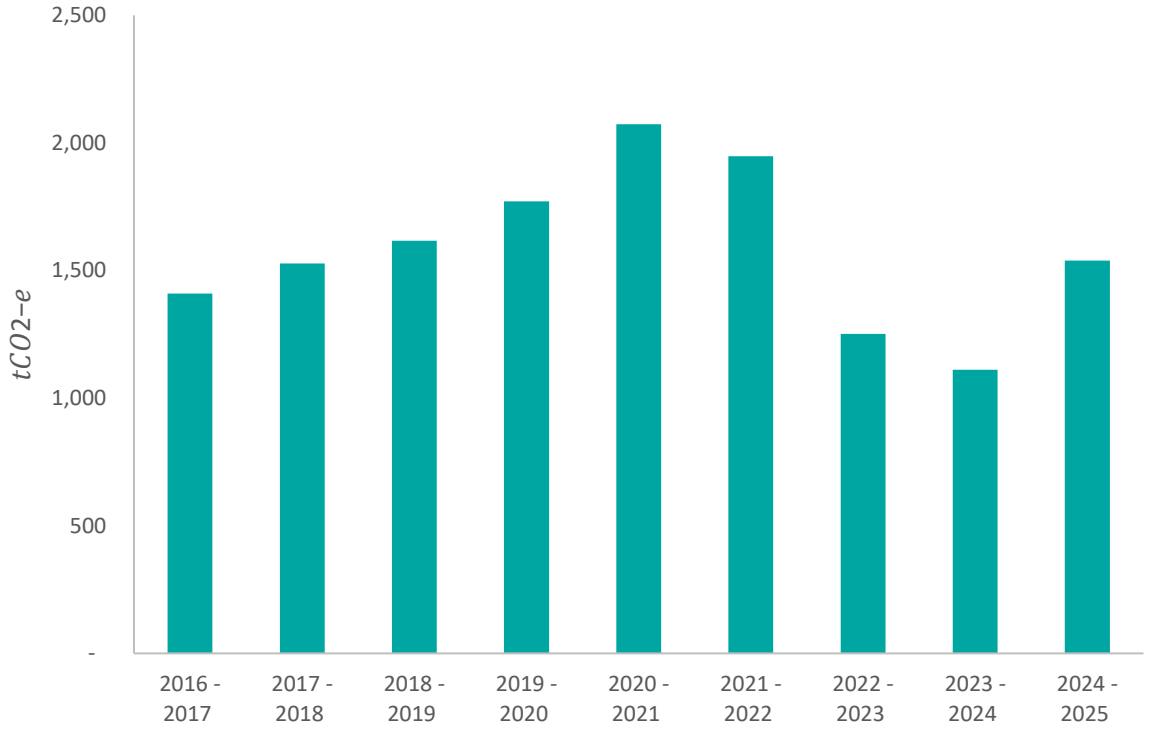


3.3 SCOPE 2 – INDIRECT EMISSIONS FROM IMPORTED ENERGY

Electricity (HCC facilities)

The below figure shows emissions associated with invoiced electricity consumption.

Figure 14. Electricity use at HCC facilities



Electricity consumption increased slightly, due to the opening of the new Te Ngaengae Pool. However, note that emissions associated with electricity consumption can fluctuate from year to year, depending on the carbon intensity of New Zealand's electricity generation.

Where applicable, emissions for the previous year have been re-calculated, as updated emission factors have been released by the Ministry for the Environment in 2025.

3.4 SCOPE 3 – UPSTREAM INDIRECT EMISSIONS

3.4.1 Purchased goods and services

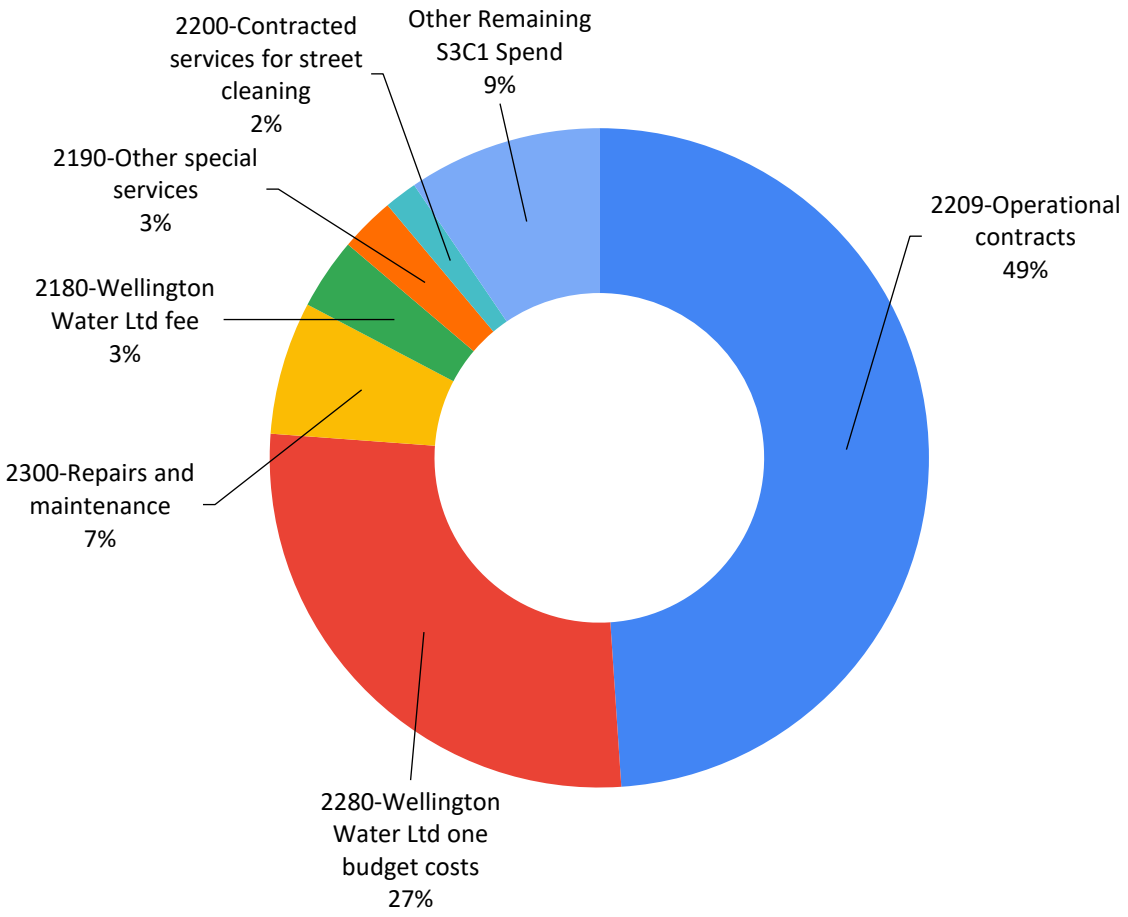
Contracts

Hutt City Council utilises COGO to map all general ledger and project cost codes relating to purchased goods and services for this financial year. All contracts and purchased service emissions are then estimated based on dollar spend using 'Thinkstep' emission factors that are developed for New Zealand industries and commodities. Emissions for all contract sizes are therefore accounted for and are categorised as Scope 3 category 1 - purchased goods and services emissions.

Note that reported emissions data by COGO excludes contracts for certain services, such as gas and electricity, to name a couple, as these are addressed elsewhere.

This year, total emissions for this category have been estimated at 24,789 tCO_{2-e}.

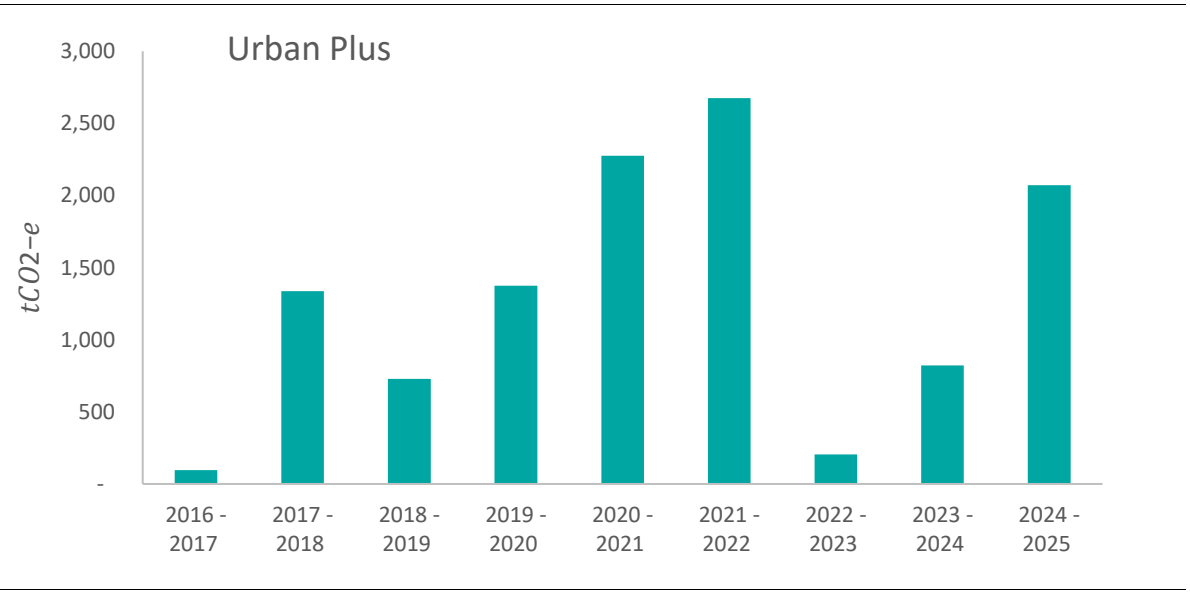
Figure 15. HCC Spend-Based "Category 1 - Purchased Goods & Services"



3.4.2 Urban Plus

These emissions are primarily derived from the construction activity that Urban Plus Limited undertakes (via suppliers that undertake services and activities for Urban Plus). Due to only having financial figures that combines the demolition and construction costs, this is likely an overestimation of emissions. Urban Plus also accounts for the costs of a project upon completion, which accounts for some of the annual variation in these emissions. Work is being undertaken to reduce operational emissions of the properties (new homes have to achieve a minimum rating of Homestar 6), but it is not apparent if the embodied emissions will be reduced. Urban Plus emissions have risen since the last financial year as there has been an increase in housing projects this financial year.

Figure 16. Urban Plus emissions from purchased goods and services



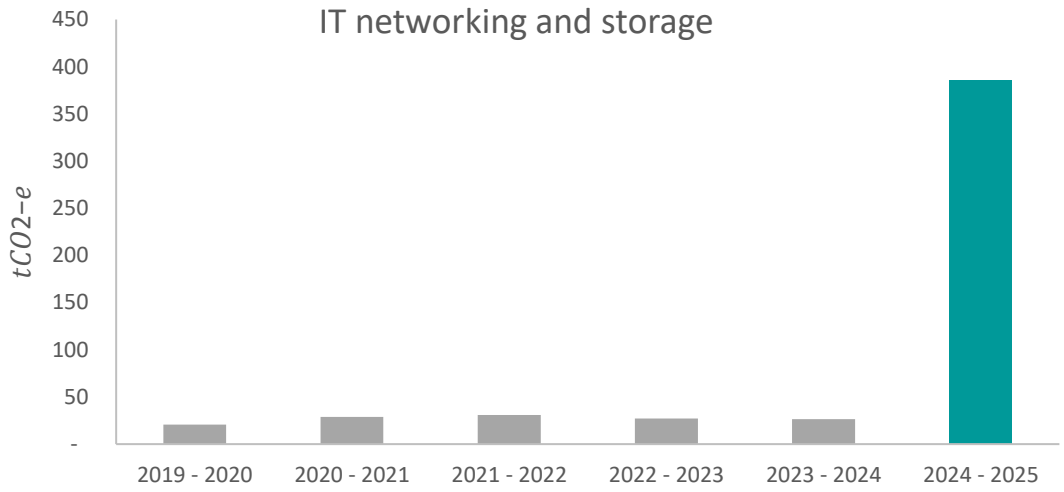
3.4.3 IT networking and data storage

Emissions relating to IT networking and data storage are now estimated based on dollar spend and “Thinkstep” emission factors by COGO.

Historically the scope of IT emissions reported was limited to Microsoft (MS) Azure, which only accounted for cloud-based information and storage used by Council. While emissions data represented HCC’s portion of emissions, the use of COGO identified unreported aspects of IT. Through cost code mapping with COGO, estimated IT emissions now also capture software licenses & support, online data subscriptions (cloud storage) and internet charges. This as a result represents an increase in emissions estimate based on dollar spend.

The graph below shows a comparison of emissions reporting between COGO dollar spend based emissions (in green), and the data by MS Azure used in previous reports.

Figure 17. IT Network and storage emissions



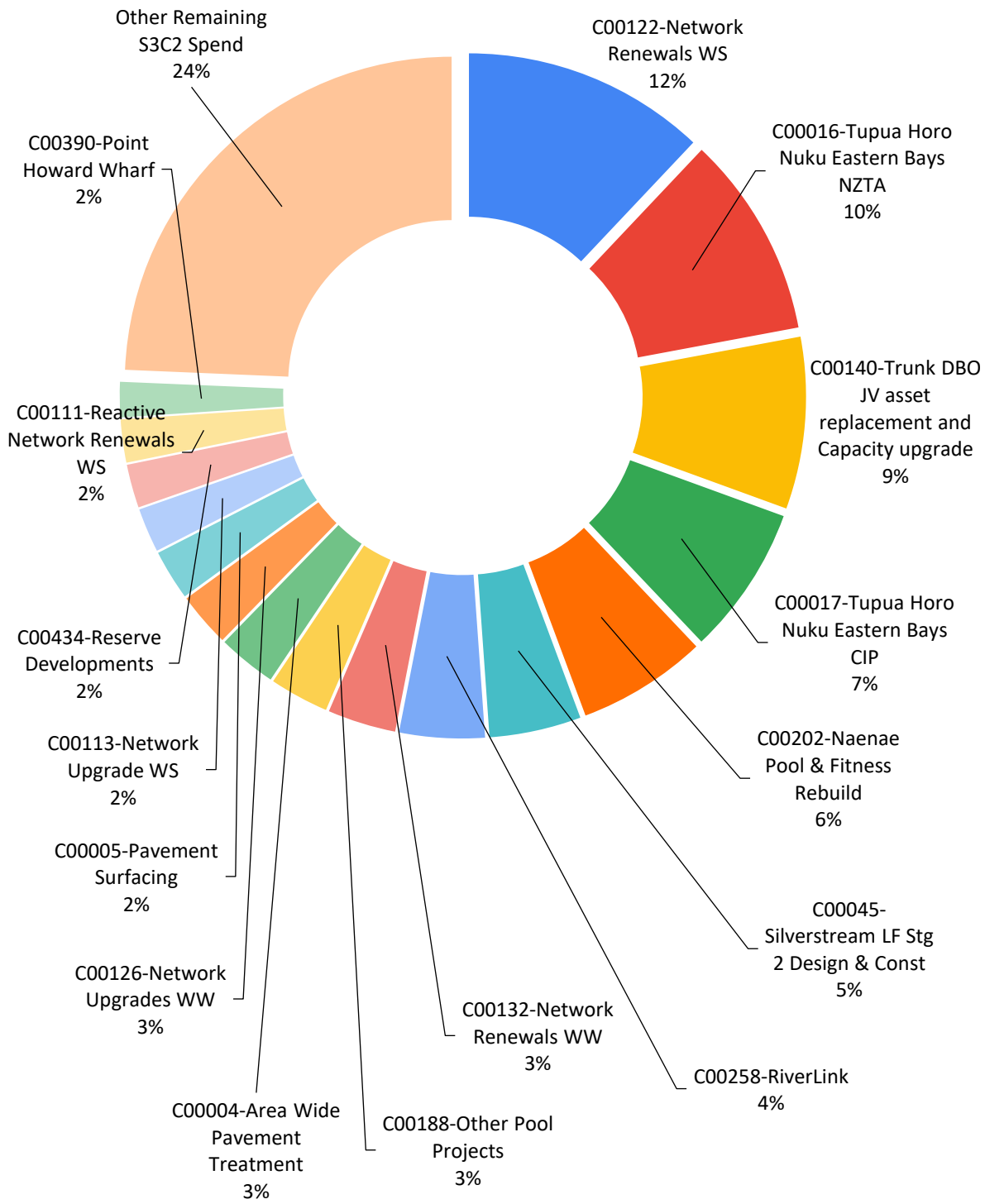
3.4.4 Capital goods

Facilities, equipment and other fixed assets

Classified as Scope 3 category 2 – capital goods, these emissions are estimated via dollar spend and Thinkstep inflation adjusted emission factors by COGO. The dollar spend based component is associated with capital spent on all council owned facilities, assets and equipment that have an extended life and are used by Council. Capital goods emissions are estimated to be 28,157 tCO_{2-e}. Note that this excludes vehicle purchases reported in the following subsection.

Previously emissions reporting for the Capital Goods category was limited to HCC vehicle purchases as all other assets could not be accurately assessed. The application of spend based emissions reporting by COGO now adequately estimates emissions.

Figure 18. HCC Spend-Based 'Category 2 - Capital Goods' Footprint

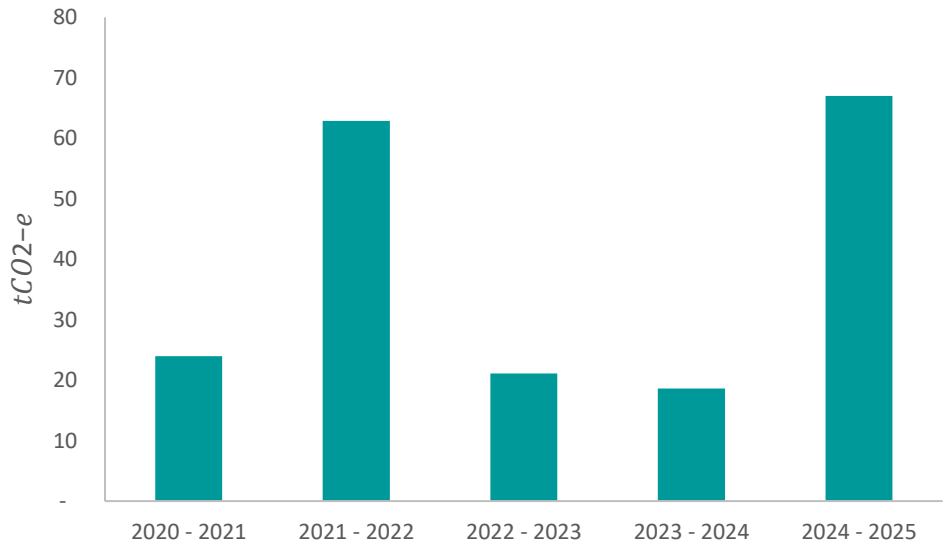


Vehicle purchases

Note that HCC's overall fleet has not grown but has reduced since 2019. Emissions reported here are associated with vehicle purchases per financial year, to replace vehicles, in line with Council's vehicle fleet policy and replacement guidance. Thus, the emissions increase for 2024/2025 are related to the purchase of vehicles in that particular year. All vehicles purchased were either fully electric, or plug-in hybrid models.

In addition, this financial year's emissions reporting employs updated Thinkstep emissions factors that are adjusted for inflation compared to previously emission results. This is also likely to have affected the emissions result for 2024/25.

Figure 19. Embodied emissions - Vehicles



3.4.5 Fuel and energy-related activities.

These emissions relate to transmission and distribution losses for electricity and natural gas for HCC facilities. 2025 MFE emissions factors were applied respectively to kWh consumption data (reported in an earlier part of this report) for electricity and natural gas to compute for emissions.

Note that T&D losses were previously included in electricity and natural gas emission calculations, but these are now appropriately categorised and separately reported.

3.4.6 Upstream Transportation and distribution

Courier and Postage

Reported by COGO as Scope 3 - Category 4 upstream emissions based on dollar spend components relating to postal and courier services. This also captures all courier charges linked to Urban Plus Ltd and Seaview Marina.

Freight and Cartage

Reported by COGO as Scope 3 - Category 4 upstream emissions. These are based on dollar spend components relating to road transport services, freight, and transport services via pipeline. This also captures all freight and cartage charges linked to Urban Plus Ltd and Seaview Marina

Note that this sub-category of upstream transportation and distribution emission was not previously captured in reporting until now accurately identified by COGO via cost code emissions mapping.

3.4.7 Business travel

Corporate flights

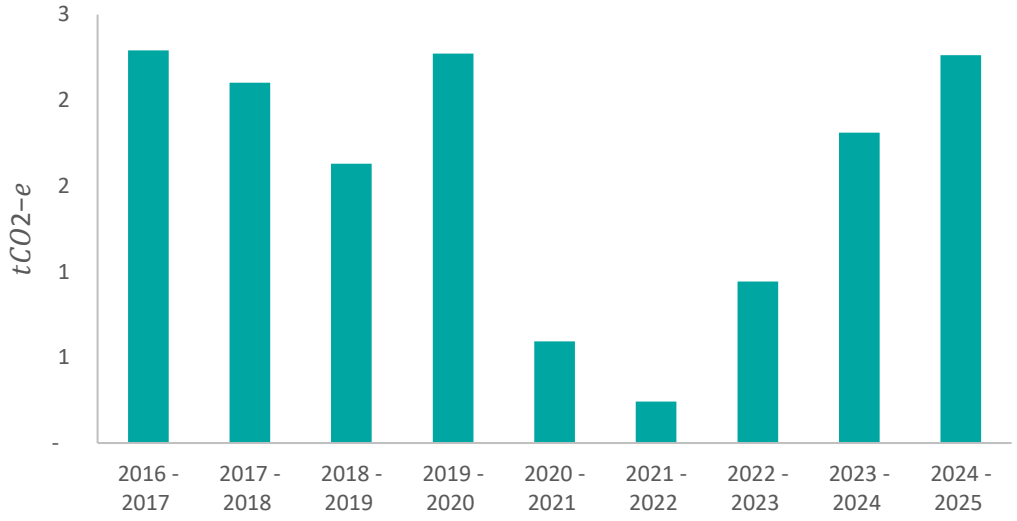
Compared to the period of time prior to the COVID-19 pandemic, emissions from corporate flights have remained relatively low, due to the general acceptance of online and remote working technologies (e.g. MS Teams).

Figure 20. Corporate flight emissions

Accommodation

HCC now uses COGO to map all cost codes for accommodation by staff on business travel. Thinkstep emission factors are applied to calculate emissions. However, overall emissions are very low compared to other sources.

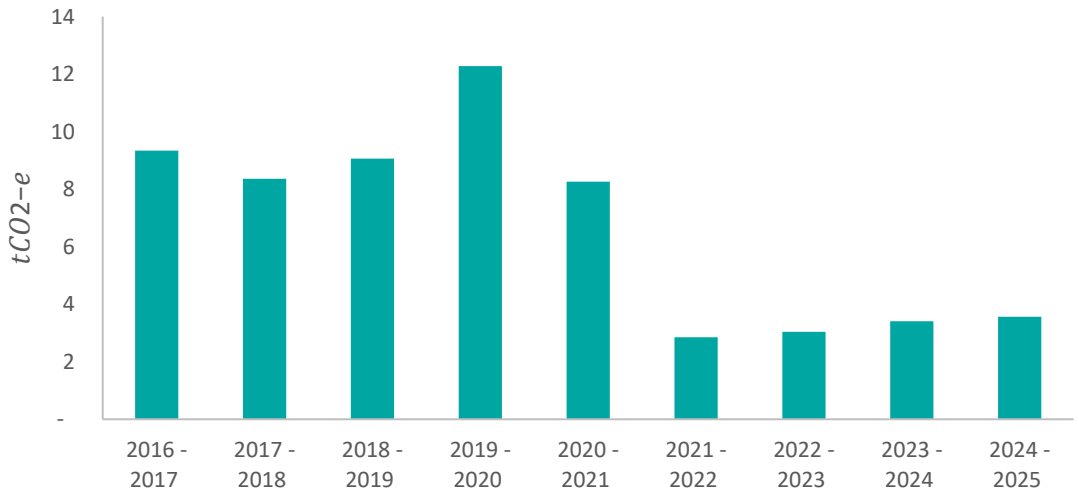
Figure 21. Accommodation for business travel



Rental cars and taxis

Compared to the period of time prior to the COVID-19 pandemic, emissions associated with rental car and taxi use have remained low.

Figure 22. Rental car and taxi emissions



3.4.8 Employee commuting

Staff commuting

The emissions associated with HCC's employee commuting is estimated to be 334 tCO_{2-e}. For this inventory a staff survey was undertaken (total tonnage is extrapolated out to represent all employees, based on the survey results).[1]

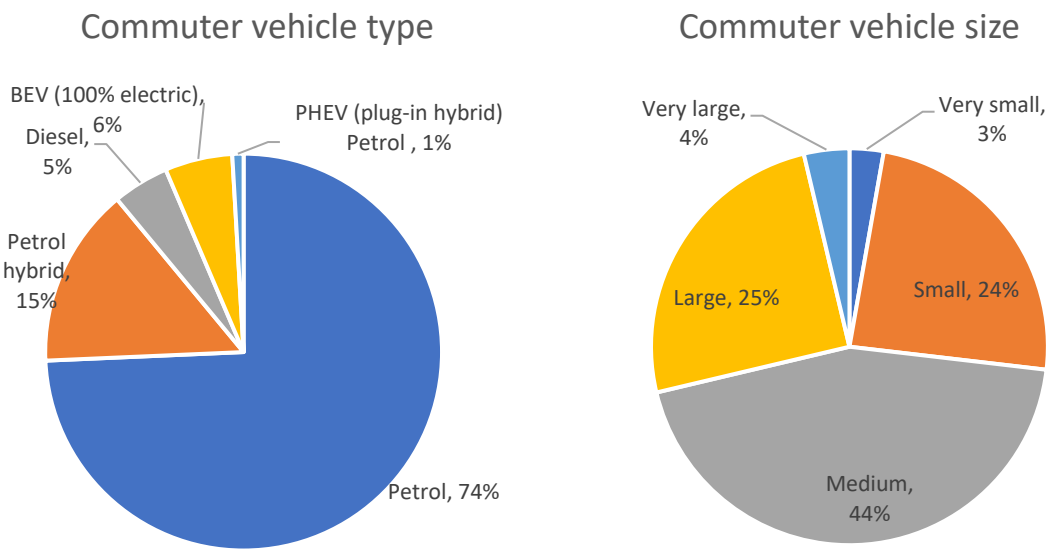
Notable insights include:

- 11% of reported commutes are on public transport.
- 14% reported commutes are through active transport.
- 75% of respondents drive a personal car to work daily.

The mean commute distance is 21.3 km.

With regard to staff using motor vehicles to travel to and from work, the majority of vehicles are petrol and diesel vehicles. The use of EVs is still low.

Figure 23. Vehicles technologies and vehicles size



Employees working from home

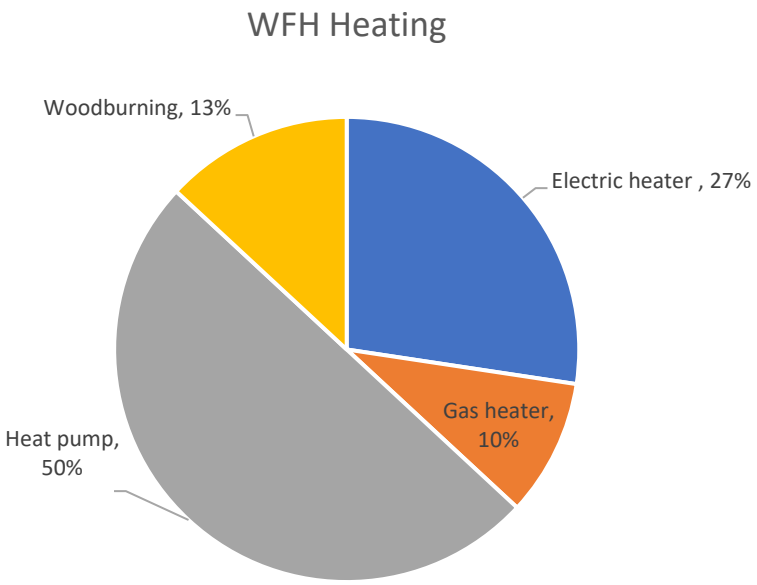
Emissions associated with staff working from home have been estimated at 2.28 tCO_{2-e}, which is significantly less than the emissions associated with commuting (334 tCO_{2-e}). Emissions are primarily associated with space heating. According to survey data, 50% of staff working from home typically use heat pumps and about 10% still utilise gas heaters. Emissions could

[1] The number of respondents was lower than last year's survey results. While results are extrapolated so that we derive emissions totals across all staff, results are not fully comparable and are an estimate only for this emission category.

be reduced by staff switching away from gas to alternative technologies for heating, such as electric heaters.

Based on these findings, there appear to be emission saving benefits associated with working from home and hybrid/flexible working arrangements, including by reducing transport emissions through reduced commuting. However, those benefits also need to be viewed in light of other benefits associated with staff working in the office (e.g. relationship building, face to face interactions).

Figure 24. Heating technologies used by staff at home



3.5 SCOPE 3 – DOWNSTREAM INDIRECT EMISSIONS

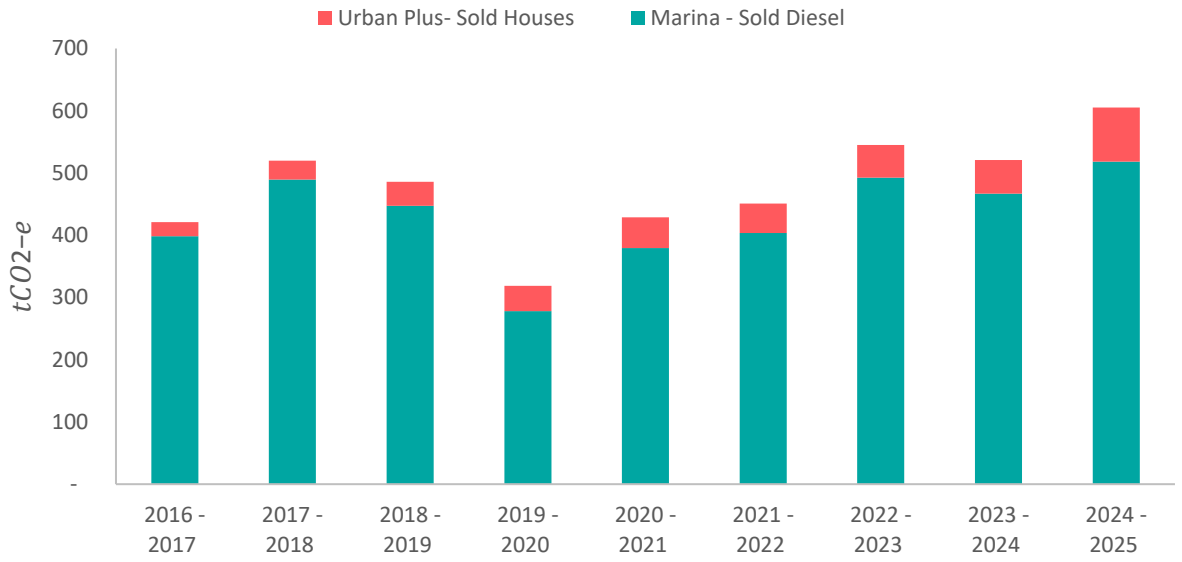
3.5.1 Use of sold products

Hutt City Council only has two sold products, including diesel from the Marina to boat users, and UPL selling houses. The latter are a small emission source through the occupant's usage of energy for heating and cooking.

Emissions associated with sold houses could be lower than is estimated here. This is because UPL builds homes to Homestar 6 as a minimum and no longer installs fossil gas for any home and water heating, and cooking. Average Toitu figures do not reflect actual occupant emissions per household.

The amount of diesel sold to boat users is subject to demand. The emergence of electrified boat options is yet to have an impact as fossil-fuelled boats remain popular. Emissions associated with sold diesel may reduce through the adoption of electric boats in the medium to long term, which the Seaview Marina may choose to incentivise/promote in the future.

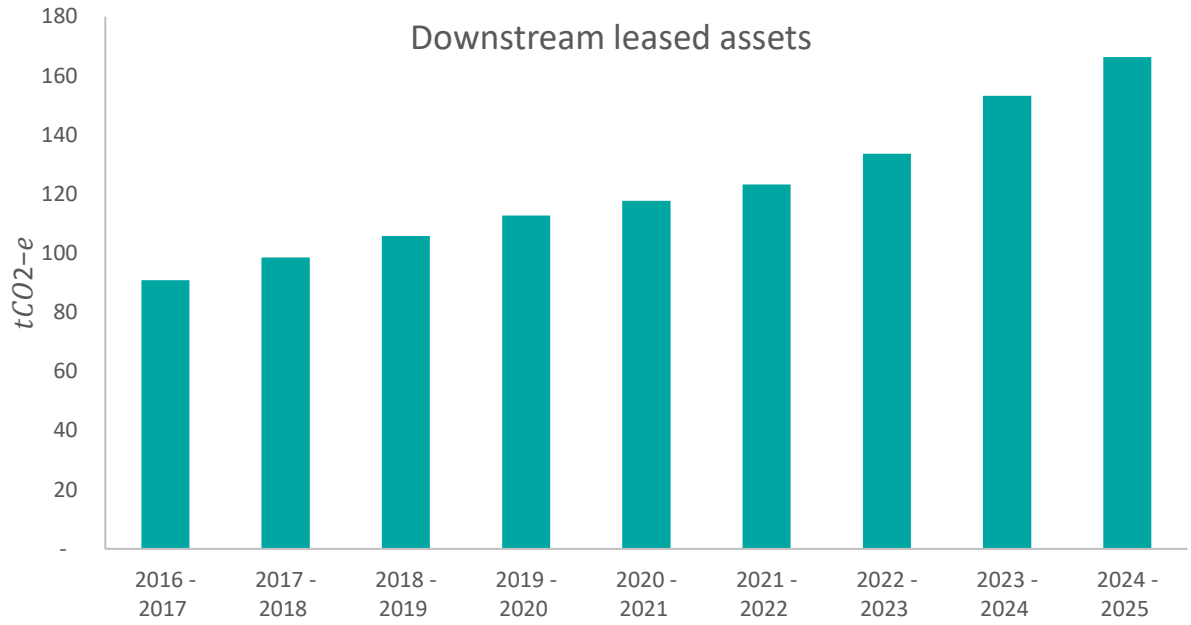
Figure 25. Indirect emissions - sold houses & sold diesel



3.5.2 Downstream leased assets

These emissions are related to occupants living in houses owned by Urban Plus, these are estimated to have increased this financial year due to the increasing number of rentals owned by UPL. However, they may be an overestimate, as UPL has a requirement to only utilise electric heating and cooking technologies in its rental properties.

Figure 26. Downstream leased assets



3.5.3 Public investments

Hutt City Council does not currently have a green investment policy, in contrast Auckland, Dunedin, Palmerston North, Waikato Regional, and Christchurch City Council have already adopted binding policies to divest from fossil fuels.

3.6 COUNCIL CONTROLLED ORGANISATION EMISSIONS

Note that the following sections and associated emissions are represented within their appropriate category above and provided as an information item only.

3.6.1 Wellington Water

HCC now uses COGO to map all cost codes relating to Wellington Water capital expenditure for the financial year. Thinkstep emission factors are applied to calculate for Wellington Water emissions. Based on COGO results, WWL emissions amount to 6,856 tCO_{2-e}. Note that this total is nested within the total contracts' emissions total.

3.6.1 Seaview Marina

The majority of Seaview Marina's carbon footprint is associated with diesel sold to marina customers (Scope 3). Scope 1 for the Seaview Marina includes diesel used for the ute, travel lift for lifting and moving vessels for repair, and LPG bottles for the showers.

Note that the Seaview Marina's Scope 2 emissions (electricity) are invoiced directly to Hutt City Council and included in Hutt City Council's Scope 2 emissions (refer section 2.2) and are therefore not included below.

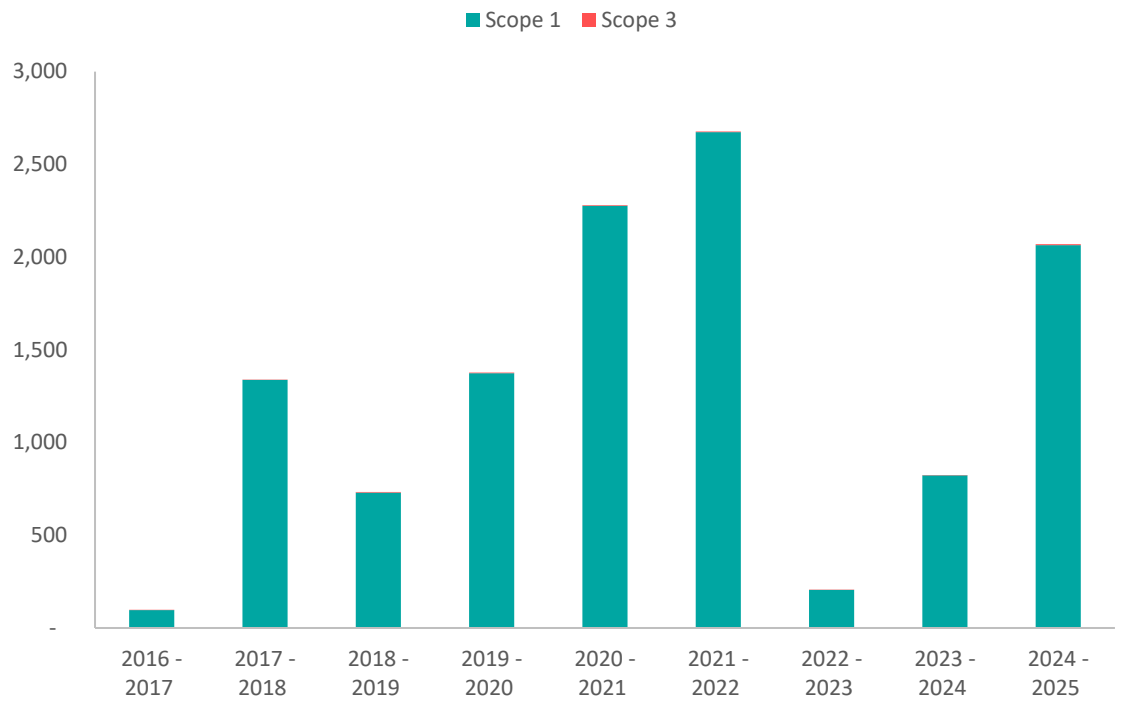
Figure 27. Seaview Marina emissions

3.6.2 Urban Plus Limited

As below, almost the entirety of Urban Plus's emission profile is estimated to originate from its emissions associated with the buildings it constructs (refer sections 3.4.1 and 3.5.1). Therefore, the timing of the completion of builds will heavily influence the emissions profile. Emissions have increased due to the completion of new housing projects in Lower Hutt.

Note that Urban Plus's Scope 2 emissions (electricity) are invoiced directly to Hutt City Council and included in Hutt City Council's Scope 2 emissions (refer section 2.2) and are therefore not included below.

Figure 28. Scope 1 & Scope 3 Urban Plus emissions



4. PERFORMANCE ASSESSMENT

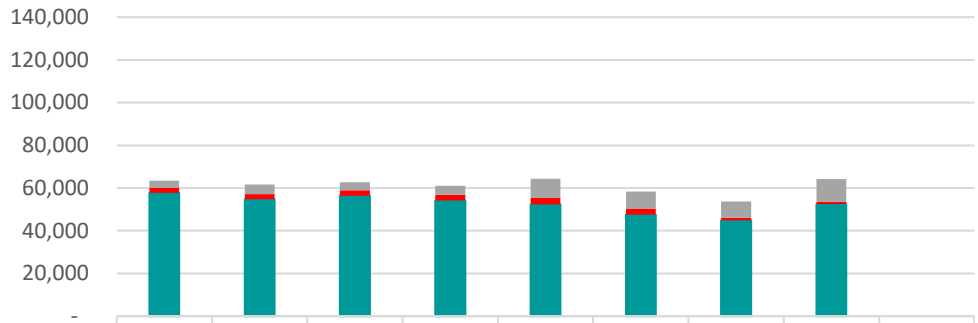
4.1 PERFORMANCE COMPARED TO THE BASE YEAR

Hutt City Council's total carbon footprint for 2024/25 has been estimated at 113,583 tCO_{2-e}.

In light of changes to emissions reporting methodologies, and changes in scope, a comparison of 2024/25 emissions to the base year is not possible.

The below figure shows HCC's emissions for the years 2016/17 to 2023/24, based on the previous methodology and scope.

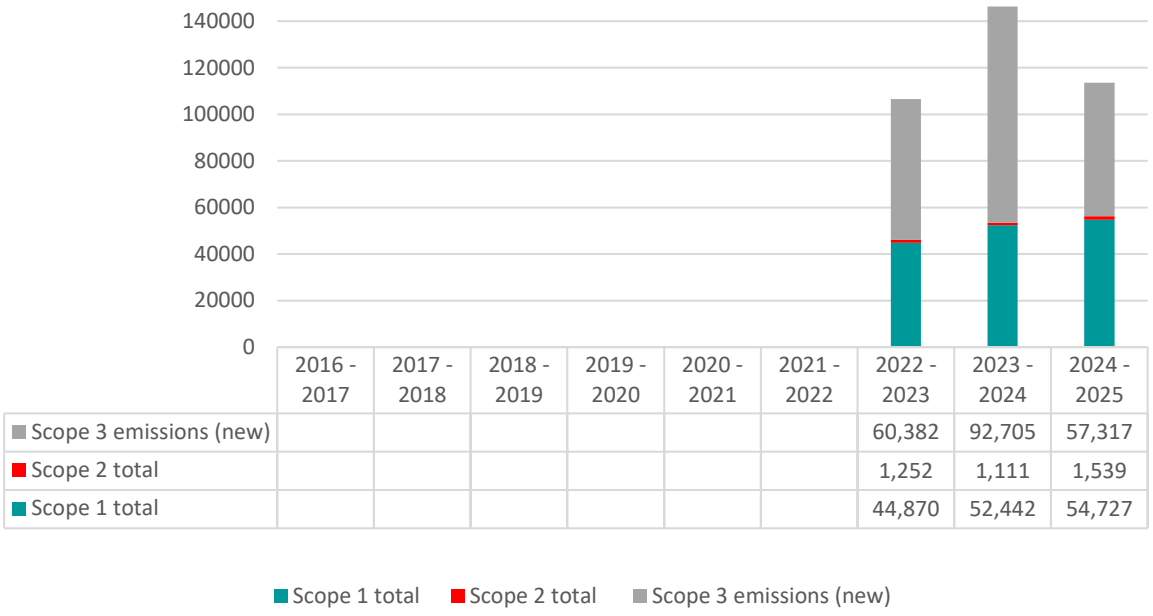
Figure 29. HCC emissions profile - old method



	2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	2021 - 2022	2022 - 2023	2023 - 2024	2024 - 2025
Scope 3 emissions (old)	3,256	4,514	3,736	4,231	9,035	7,905	7,538	10,671	
Scope 2 total	2,383	2,501	2,590	2,744	3,046	2,921	1,252	1,111	
Scope 1 total	57,805	54,695	56,375	54,143	52,285	47,486	44,870	52,442	

Considering that it is not possible to compare the results for 2024/25 to the original base year, the Scope 3 emissions for the two previous years 2022/23 and 2023/24 have been recalculated. This enables a comparison of our emissions performance to at least the two previous financial years. As it is not be possible to apply the new methodology and scope to the original base year, HCC will need to undertake work on a new base year in the coming year.

Figure 30. Emissions Profile – new method for Scope 3 (COGO)



4.2 PERFORMANCE COMPARED TO PRIOR YEARS

A reduction in emissions for Silverstream landfill (Stage 2) was recorded. For Stage 2 this is due to:

- An overall waste volume reduction, likely related to lower economic activity, such as construction and development activities, and
- Gas destruction now calculated separately for flare and gas engines, which reveals a higher destruction efficiency of the flare.

Increases in emissions have been recorded for the closed Silverstream landfill (Stage 1/1A). Note that Stage 2 is slowly moving over the top of the closed landfill, and it is becoming more difficult to extract gas, in particular vis-à-vis the modelled theoretical gas generation.

With regard to Scope 3 emissions, in particular Category 1 - Purchased goods and services and Category 2 - Capital goods, emissions have reduced compared to the recalculated emissions for 2023/24. However, noting that all emissions are based on dollar spend, the reduction mirrors changes in dollar spend rather than changes to emissions as a result of reduction actions such as electrification.

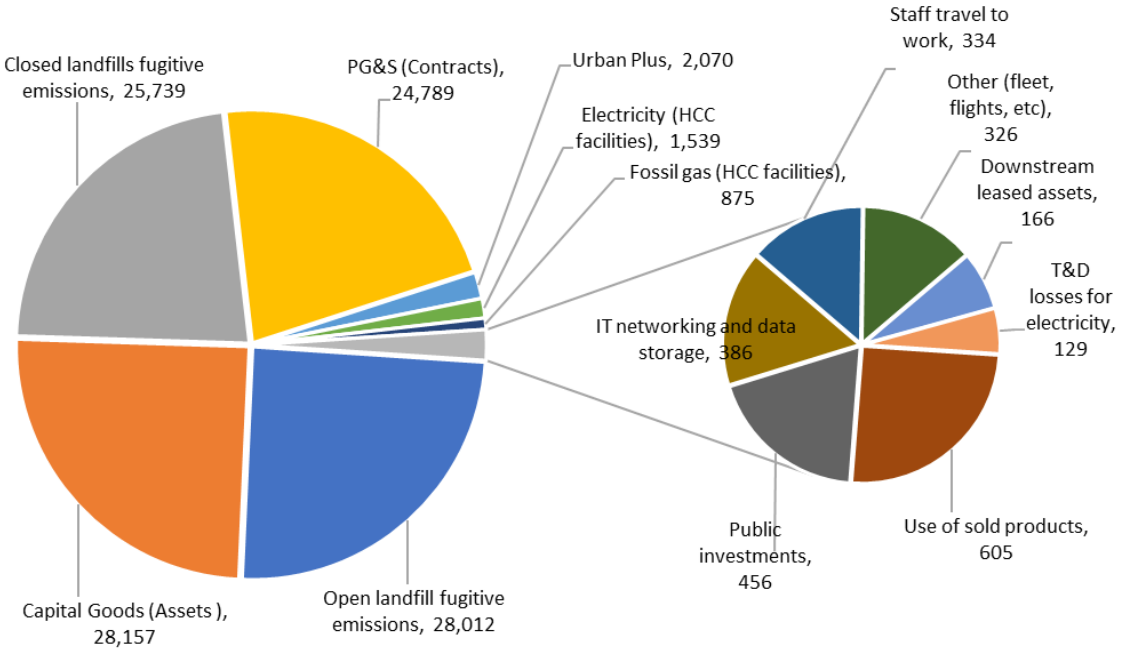
Aside from the significant changes to landfill emissions, and the changes to Scope 3, there were some smaller changes. This includes an increase in emissions regarding Urban Plus, due to the completion of new homes that were still under construction last year, reductions in emissions associated with the use of gas to heat our facilities an increase in emissions

associated with the use of electricity to power our facilities, and changes to various minor categories.

The figure below shows a detailed breakdown of emissions for 2024/25, albeit note that some individual emission sources with less than 100 tonnes have been grouped as “others” for reporting purposes only. The category of “others” include:

- Scope 1 – Fuel used in owned vehicles, Seaview Marina LPG use & refrigerants.
- Scope 3 – Vehicle purchases (Category 2), Fuel and energy related services (Category 3), Upstream transportation (Category 4) and Business travel (Category 6).

Figure 31. Hutt City Council emissions profile for 2024/25



Hutt City Council’s largest emission sources include capital goods (assets and equipment), Silverstream landfill (Stage 2), closed landfills (the closed Wainuiomata landfill and Silverstream landfill Stage 1/1A), and contracted services (purchased goods and services) The remainder is made up of a variety of smaller emission sources.

4.3 PERFORMANCE COMPARED TO CARBON REDUCTION AND CLIMATE RESILIENCE PLAN 2021-2031

Hutt City Council (HCC) has in place its Carbon Reduction and Climate Resilience Plan 2021-31, with an organisational target to reduce emissions to net zero by 2050, and various actions to give effect to this target. Hutt City Council provides annual updates to its Climate Change and Sustainability Committee on progress regarding the implementation of this plan.

The latest report with a full overview on the status of each action is available online (refer report number: CCASC2025/4/246.

APPENDIX 1 – DATA SOURCE AND ASSUMPTIONS

Scope /Category	Data source and Assumptions
General	
Emission Factors	Emission factors calculated for respective emission categories were taken from the Ministry for Environment "Te ine tukungga, measuring emissions guide 2025 and Measuring emissions: A guide for organisations (2024 detailed guide). https://environment.govt.nz/assets/publications/Measuring-Emissions-Guide-2025/EmissionFactors_Workbook_2025_2.xlsx https://environment.govt.nz/publications/measuring-emissions-a-guide-for-organisations-2024-detailed-guide/
Thinkstep Emission Factors	Thinkstep emission factors were used against dollar spend to calculate Category 1- Purchased goods and services, Category 2-Capital goods, and Category 4–Upstream transportation. Note that these factors were inflation adjusted.
Global Warming Potential used	Extracted from the Ministry for Environment "Te ine tukungga, Measuring emissions: A guide for organisations (2024 detailed guide). The Guide uses the 1000-year GWPs from IPCC's AR5 to ensure consistency with New Zealand's Greenhouse Inventory 1990-2022.
Population	Population figures are provided for by StatsNZ. Recent figures are obtained from the "Greenhouse gas emissions report for Wellington region 2022" on StatsNZ. https://www.stats.govt.nz/assets/Uploads/Greenhouse-gas-emissions-by-region-industry-and-household/Greenhouse-gas-emissions-by-region-industry-and-household-Year-ended-2024/Download-data/greenhouse-gas-emissions-by-region-industry-and-household-year-ended-2024.xlsx

SCOPE 1 - DIRECT GREENHOUSE GAS EMISSIONS: STATIONARY COMBUSTION

Facility Gas Use	Emissions data is supplied via eBench through monthly invoicing from the contracted gas supplier. Hutt City Council utilizes "eBench", an energy management software, to monitor energy use across its facilities. Ebench uses invoiced gas consumption data and applies current emission factors published by MEF to calculate natural gas emissions.
Direct Flaring from landfill	Carbon emissions data is provided by Tokin & Taylor in its 2024/2025 financial year Landfill Emissions Report. Refer to Appendix 2 to view report, assumptions, and results.
Seaview Marina	LPG and Diesel data are supplied by Hutt City Council's finance team. Seaview Marina is a Council Controlled Organisation (CCO); hence Hutt City Council has oversight of its operational expenditure.

Mobile Combustion	Emissions data supplied by eBench. Data associated with fuel use for Hutt City Council (HCC) owned vehicles is provided by BP and is then consolidated and supplied via "eBench", an energy management software utilized by HCC.

Direct Fugitive Emissions

Refrigerants (HFC)	Refrigerant losses in kilograms are supplied by Aquaheat for financial year 2024/2025.
Open Landfill Fugitive Emissions	
Closed Landfill Fugitive Emissions	The Open landfill and Closed landfill fugitive emissions are provided by Tonkin & Taylor in its 2024/2025 financial year Landfill Emissions Report. See Appendix 2- Active and Closed Landfill Assessment.

SCOPE 2 - INDIRECT EMISSIONS FROM IMPORTED ENERGY

Purchased Energy

Electricity (HCC Facilities)	Emissions data is supplied via eBench through monthly invoicing from contracted electricity suppliers. Hutt City Council Utilizes "eBench", an energy management software, to monitor energy use across its facilities. Ebench uses invoiced electricity consumption data and applies current emission factors published by MEF to calculate natural gas emissions.

SCOPE 3 - INDIRECT EMISSIONS: UPSTREAM SCOPE 3 EMISSIONS

Purchased Goods and Services

Contracts	Emissions related to contracts are estimated by the dollar spend method applied with Thinkstep emissions factor that are adjusted to inflation. Cost code mapping by COGO identifies all purchased goods and services item relating to contracts.
Urban Plus	Urban plus is a Council Controlled Organisation, and all dollar spend information for its operational expenditures is provided by council's finance team. Urban Plus operational expenditure includes capital goods, purchase goods and services, fuel costs and air travel. Electricity costs are excluded as these are invoiced directly to Hutt City Council and included in scope 2 emissions.
Wellington Water	HCC now use COGO to map all cost codes relating to Wellington Water capital expenditures for the financial year. Thinkstep emission factors

	are applied to calculate for Wellington Water emissions. Note that this also accounts for emissions relating to the Seaview waste treatment plant (SWTP). Scope 2 electricity emissions from water pumps, storm water pumps, and water pumps are accounted for under HCCs electricity emissions total, as this falls outside WWs capital expenditure budget.
IT Networking Data	Estimated emissions based on dollar spend relating to software licenses and support, online database subscriptions and internet charges. Thinkstep emissions were applied taking into account inflation adjustments.

Capital Goods

Buildings, facilities, equipment and all other fixed assets for council	These emissions are estimated via dollar spend and Thinkstep inflation adjusted emission factors by COGO. The dollar spend based component is associated with capital spent on all council owned facilities, assets and equipment that have an extended life and are used by council.
Cars (Embodied Emissions)	Vehicle emissions are estimated using dollar spend against Thinkstep industry emissions factors. Emissions calculated are treated as embodied emissions.
Fuel and energy-related activities	Emissions for transmission and distribution (T&D) losses for electricity and natural gas is measured using MFE factors and kWh consumption data from all HCC facilities.

Upstream transportation and distribution

Couriers & Postage	Emissions associated with postage and courier services are calculated using cost code data supplied to COGO. Dollar spend sum of services are applied to Thinkstep emissions factors that are adjusted to inflation rates. Dollar spend emissions under this category also account for Urban Plus and Seaview Marina postage and courier emissions.
Freight & Cartage	Reported by COGO as scope 3 category 4 upstream emissions based on dollar spend components relating to road transport services freight and transport services via pipeline. This also captures all freight and cartage charges linked to Urban Plus Ltd and Seaview Marina

Business Travel

Corporate flights	Total Corporate flight travelled distance is supplied by Orbit Travel via ebench. Orbit Travel acts as councils flight booking agent and all flight

	details are consolidated and supplied to eBench for reporting. Emissions are calculated using domestic aviation emission factors with a radiative forcing multiplier. Emission factors employed are taken from the MFE 2025 emissions guide.
Accommodation & Rental cars and Taxis	Emissions for both categories were calculated using dollar spend data and Thinkstep emission factors supplied by COGO. Note that this also accounts for accommodation and rental cars & taxi emissions associated with Seaview Marina and Urban Plus.
Employee commuting & Employee Work from Home	Employee commuting and work from home information was gathered from a Hutt City Council staff survey conducted for the 2024/2025 financial year. Emissions for each respondent was calculated as per the 2024 Ministry for Environment emissions guide. These emissions were averaged and extrapolated to account for every council staff member.

SCOPE 3 - INDIRECT EMISSIONS: DOWNSTREAM SCOPE 3 EMISSIONS

Use of Sold Products	Use of sold products accounts for emissions belonging to Seaview Marina and Urban Plus. Seaview Marina emissions are associated with sold diesel. Urban Plus emissions relate to estimated emissions from houses sold. Dollar Spend information is provided by council's finance team and is applied against Thinkstep emission factors, with inflationary adjustments.
Downstream Leased Assets	Dollar spend information supplied by council's finance team is used to calculate leased asset emissions. Note that Thinkstep emissions factors are applied with inflationary adjustments.
Investments	Emissions were calculated using Thinkstep emission factors against investment dollar spend inflation adjustments accounted for in calculations. All dollar spend information is provided by council's finance team.

APPENDIX 2 – ACTIVE AND CLOSED LANDFILL ASSESSMENT

Tonkin+Taylor

27 February 2026
Job No: 82948.017

Hutt City Council
By email: joern.scherzer@huttcity.govt.nz

Attention: Jörn Scherzer

Dear Jörn

Hutt City Carbon Footprint - Active and Closed Landfill Assessment
FY 2024/2025

Tonkin &Taylor Ltd (T+T) are pleased to provide an estimate of the carbon emissions from selected waste disposal sites within the Hutt City area. This work was requested by Hutt City Council (HCC) for inclusion in HCC's 2024/25 carbon footprint inventory.

> This report is an update of our report of 6 December 2025, to amend errors in Table 1.1 (amended numbers are in orange font)

1 Estimated carbon emissions

Carbon emissions have been estimated for Silverstream (Stages 1, 1a and 2), along with Wainuiomata closed landfill. The emissions are summarised in Table 1.1 below.

Table 1.1: Estimated emissions

Financial year	Total Emissions (Emissions destroyed by combustion/ Fugitive emissions) in t CO_2e		
	Silverstream		Wainuiomata
	Stage 1 & 1a	Stage 2	
2016/17	31,527 (24,713/6,814)	55,765 (42,583/13,182)	29,545 (0/29,545)
2017/18	29,512 (23,137/6,375)	68,522 (53,106/15,416)	26,412 (0/26,412)
2018/19	29,512 (23,137/6,375)	76,167 (58,805/17,362)	24,173 (0/24,173)
2019/20	32,385 (25,390/6,995)	84,584 (67,228/17,356)	21,487 (0/21,487)
2020/21	24,766 (19,416/5,350)	78,325 (58,766/19,559)	19,249 (0/19,249)
2021/22	23,559 (20,231/3,328)	104,781 (87,024/17,757)	16,563 (0/16,563)
2022/23	21,456 (14,611/6,845)	123,259 (101,394/21,865)	14,773 (0/14,773)
2023/24	20,408 (11,115/9,293)	137,142 (108,266/28,876)	13,198 (0/13,198)
2024/25	17,762 (4,557/13,205)	127,868 (99,856/28,012)	12,534 (0/12,534)

Note: The Silverstream emissions are after extraction and destruction is taken into account. No rounding undertaken to above figures at request of HCC, so that rounding can be applied elsewhere in inventory.

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Commentary on the changes in emissions since last year is as follows:

Stage 1/1A (closed Silverstream landfill):

- This is a closed landfill, and gas generation is expected to decline over time.
- A gas extraction system is in place, which has reduced emissions that otherwise would have occurred in the last few years. However, gas extraction has continued to be increasingly challenging for this area of the Silverstream landfill, with wells failing to produce gas (e.g. due to collapse or blockage), new wells placed in the most promising areas of Stage 1/1a failed to produce significant gas and the encroachment of Stage 2 partially over the top of Stage 1a.
- Note that the open Stage 2 Silverstream landfill is slowly moving over the top of the closed Stage 1/1A landfill, which may affect gas production potential, and/or inhibit the ability to extract any remaining gas.
- The below graph shows expected gas production based on the landfill characteristics and the time it closed in 2011. The graph also shows the amount of gas extracted.
- Actual gas production cannot currently be measured and is modelled based on the Scholl Canyon first order decay landfill gas production model. Only the amount of gas actually extracted and combusted can be measured, hence, the residual emissions estimate is modelled only. An increase in emissions does not indicate that landfill systems are not working as intended.

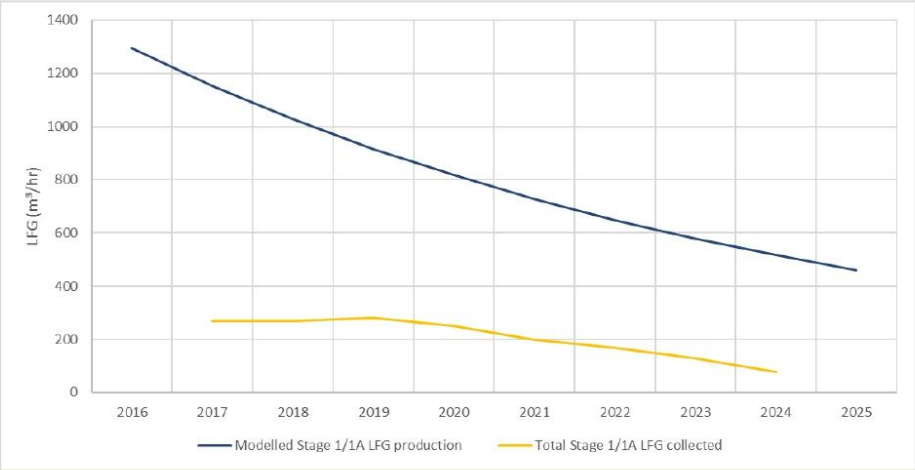


Figure 1.1: Stage 1/1A modelled and real LFG emission, collection and destruction data.

Stage 2 (open and active Silverstream landfill):

- Each year, gas is produced by the new waste deposited, plus all the previously deposited waste.
- Fugitive emissions at Stage 2 are lower compared to the previous year, which may be due to a couple of factors:
  - There has been an overall reduction in the amount of waste received at Silverstream landfill during 2024/25, compared to the previous year. The reduction in waste volumes appears to be associated with a reduction in economic activity, such as construction and development activities.

– Gas destruction was calculated separately for the flare and gas engines, accounting for the higher destruction efficiency of the flare.

Wainuiomata closed landfill (closed 2012):

- Wainuiomata – generation is declining at this closed landfill, which is reflected in the emissions. This landfill does not have a gas collection and destruction system.

Silverstream Emissions breakdown:

The fugitive emissions through the landfill caps and from the gas engines/flare (where applicable) are separated in Table 1.3 below. UEF calculations for 2024/25 are enclosed in Appendix A. Records of tonnages submitted to MfE are included in Appendix C.

Consistent with the Environmental Protection Authority's interpretation set out in the regulations in the 2015 amendment and updated in February 2023, the default waste composition parameters have been used for all waste. The waste emissions factors for Stages 1/1a and Stage 2 are outlined in Table 1.2 below.

Table 1.2: Waste emissions factor with and without landfill gas recovery (LFGR)

Waste stream component	Waste emissions factor L_0				
	Without LFGR			With LFGR	
				Stages 1/1a	Stage 2
	m^3 CH_4/tonne	kg CO_2-e/kg		kg CO_2-e/kg	
Garden	100	0.13	1.38	0.97	0.30
Nappies and sanitary	120	0.07			
Putrescibles other than garden waste	75	0.15			
Paper	200	0.27			
Sewage sludge	25	0.01			
Timber	215	0.62			
Textile	120	0.14			
Inert	0	0.00			

Table 1.3: Proportion of fugitive emissions through cap and from engines and flare

Financial year	Silverstream fugitive emissions separated by pathway (t CO_2e)			
	Stage 1 & 1a		Stage 2	
	Through cap	From engines and flare	Through cap	From engines and flare
2021/22	1,472	1,856	7,833	9,923
2022/23	5,384	1,461	9,445	11,266
2023/24	8,525	768	19,962	8,914
2024/25	12,761	444	19,926	8,086

2 Location of diffuse emissions

Since 2010, surface monitoring of methane emissions has been undertaken regularly across Silverstream Stages 1/1a and 2. The frequency of monitoring has varied between weekly and monthly over the years and is currently undertaken fortnightly. This monitoring only allows concentrations of methane emitted to be measured, not volumes.

From the body of information gathered, the emissions pathways for landfill gas to escape to atmosphere are typically through:

- Cracks between extraction wells and the clay cap: As the landfill moves, so cracks regularly develop, generally hairline in size, through which gas can escape.
- Exposed leachate gravels in Stage 2: these gravels line the base and sides of the landfill, ensuring downward migration of leachate. They also collect landfill gas. A temporary inhibitor is installed where the gravels daylight, which comprises a polyethylene membrane and compacted clay. On occasions this inhibitor is damaged or disturbed, causing emissions.

An ongoing regime of maintenance is in place to remediate the above pathways.

3 Destruction efficiency

The efficiency with which landfill gas is destroyed from Stages 1/1a and Stage 2 are detailed in Table 3.1 below.

Table 3.1: Destruction efficiency

Financial Year	Silverstream landfill gas collection efficiency	
	Stages 1/1a	Stage 2
2021/22	83 %	83 %
2022/23	66 %	82 %
2023/24	54 %	79 %
2024/25	30 %	78 %

4 Flare vs gas engines destruction

The volumes of gas destroyed by the flare vs the gas engines from Stages 1/1a and Stage 2 is detailed on Table 4.1 below (obtained from LMS records). The destruction efficiency of the engines is understood to be 90 % and we understand that the destruction efficiency of the flare is 98 %.

Table 4.1: Volumes of gas (Stages 1/1a and 2) through the flare vs gas engines (July 2024 to June 2025)

Month	Volume (m^3) of gas through		% of gas volume through the flare
	Gas engines	Flare	
July	944,508	37,774	4 %
August	987,176	7,338	1 %
September	920,182	10,329	1 %
October	909,590	33,389	4 %
November	720,712	196,230	21 %

Month	Volume (m^3) of gas through		% of gas volume through the flare
	Gas engines	Flare	
December	894,070	27,404	3 %
January	982,350	9,503	1 %
February	893,556	10,615	1 %
March	979,588	13,774	1 %
April	881,468	19,194	2 %
May	917,610	1,709	0 %
June	884,300	4,170	0 %

Note: % gas volume through flare = volume of gas through flare divided by sum of gas volume through flare and gas engines.

5 Landfill gas composition

Spot checks throughout the year have been made for Silverstream Stages 1/1a and 2. No monitoring wells are installed at Wainuiomata Closed Landfill. Gas composition data from Silverstream Stage 1/1a and 2 are enclosed as Appendix B.

6 Data sources

Silverstream, Stage 1 and 1a:

- Silverstream Stage 1/1a landfill gas is extracted to create electricity that is fed into the national grid. A flow logger was installed on 18th October 2019 and has recorded an average flow of 44 m^3/hr for the 2024/25 financial year.

Silverstream Stage 2:

- Carbon emissions have been estimated using the data from the UEF assessments for calendar years 2016 to 2024. For 2025, an interim UEF assessment has been used to estimate the gas generation and flow.

Wainuiomata:

- Landfill gas generated (at 50 % methane) has been estimated from Figure 3.1 of the Landfill Emissions Report[1], using the T+T Model (Red) line.
- Wainuiomata has no gas extraction system, however, 10 % oxidation of methane when passing though the cap has been assumed.
- A flare trial was undertaken at the end of 2022, which extracted landfill gas from about 10 % of the landfill. Only one well consistently extracted gas over the course of a week (approximately 90 m^3/hr), the other wells did not produce sufficient gas to flare. The results of the trial indicate that the estimate in Figure 3.1 of the Emissions Report is likely to represent a worst case for gas generation.

[1] T+T (March 2021) Wainuiomata closed landfill emissions investigation: Task 2 – Gas generation modelling, draft letter report, prepared on behalf of Hutt City Council.

7 Applicability

This report has been prepared for the exclusive use of our client Hutt City Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

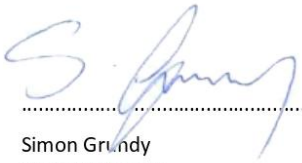
Tonkin & Taylor Ltd

Report prepared by:

.....

Chris Hillman
Principal Environmental Engineer

Authorised for Tonkin & Taylor Ltd by:



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Simon Grundy
Project Director

27-Feb-26
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Appendix A UEF calculations

Project: Silverstream Landfill **Project number: 8664102.2526** **22/10/2025**
Description: Carbon footprint
Computed: DERA **Checked MEKL**

Landfill gas generation and UEF calculation

The generation of landfill gas is estimated by the Scholl Canyon model, which is a first order decay model. The calculation procedures permits the modelling of:

- multiple waste/time input profiles
- changes in the decay parameters to account for the effects of capping a landfill
- capping is presumed to occur at the completion of all waste placement.

Reference

USACE (1995) CEMP-RT Washington, DC 20314-1000 ETL 1110-1-160 Technical Letter No. 1110-1-160 17 April 1995 "Engineering and Design Landfill Off-gas Collection and treatment systems"

Waste parameters

Lo, Potential CH4 generation capacity of the waste	Values are variable as stated in Schedule 3 of the UEF Regulations
k, CH4 generation rate decay constant during operations	Values are variable as stated in Schedule 3 of the UEF Regulations
Time to reach anaerobic conditions, yrs.	$Anaerobic_{lag} := 0.5 \cdot yr$
Oxidation factor (%)	$Ox := 10\%$

Destruction efficiencies

Flare destruction efficiency, based on certified efficiency	$D_{flare} := 98\%$
Engine destruction efficiency, based UEF Regulations default	$D_{engine} := 90\%$

Collected methane

Total volume of methane collected to the flare during the calendar year, based on site-specific data	$Q\_collected\_flare := 83250 \frac{m^3}{yr}$
Total volume of methane collected to the engine during the calendar year, based on site-specific data	$Q\_collected\_engine := 9414843 \frac{m^3}{yr}$

Destroyed methane

Function defining the total volume of methane destroyed during the calendar year

$$Q\_methanedestroyed := (D_{flare} \cdot Q\_collected\_flare) + (D_{engine} \cdot Q\_collected\_engine)$$

Total volume of methane destroyed during the calendar year	$Q\_methanedestroyed = 8554943.7 \frac{m^3}{yr}$

Project: Silverstream Landfill **Project number: 8664102.2526** **22/10/2025**
Description: Carbon footprint
Computed: DERA **Checked MEKL**

Landfill waste input

Year	Tonnage (tonnes)	Lo (m^3/tonne)	k (1/year)
2009	0	90.91	0.041
2010	10479	90.91	0.041
2011	76678	90.91	0.041
2012	83025	90.91	0.041
2013	110565	90.91	0.041
2014	118481	90.91	0.041
2015	111319	90.91	0.041
2016	117370	79.18	0.063
2017	117481	79.18	0.063
2018	122419	79.18	0.063
2019	135604	79.18	0.063
2020	140066	79.18	0.063
2021	142393	79.18	0.063
2022	167696	79.18	0.063
2023	174822	60.82	0.039
2024	145154	60.82	0.039
2025	143726	60.82	0.039
2026	0	60.82	0.039

$Date := (Waste^{(0)}) \cdot yr$

$Anwaste := Waste^{(1)} \cdot tonne$

$Lo\_vec := Waste^{(2)} \cdot m^3 \ tonne^{-1}$

$k\_vec := Waste^{(3)} \cdot yr^{-1}$

Outp...

$Waste := excel_{"A3:D39"}$

Start date for analysis $Start := Date_0$

$Start = 2009 \ yr$

Final year of waste placement $Final\_yr := \max(Date)$

$Incom := \text{length}(Anwaste)$

$Incom = 37$

Project: Silverstream Landfill **Project number: 8664102.2526** **22/10/2025**
Description: Carbon footprint
Computed: DERA **Checked MEKL**

Final year of waste placement including lag

$Final\_yr\_lag := Final\_yr + Anaerobic_{lag} - 1 \cdot yr$ $Incom\_lag := Incom + \frac{Anaerobic_{lag}}{yr}$

$Final\_yr\_lag = 2025.5\ yr$ $Incom\_lag = 37.5$

Current year

$CurrentYear := 2025 \cdot yr$

Waste placement distribution

The number of increments in a year LandGem uses 10 increments. 12 increments represents an increment for each month in the year.

$inc := 12$

Function defining waste placement across the years of incoming waste

$$WastePlaced(Anwaste, Anaerobic_{lag}) := \left| \begin{array}{l} \text{for } i \in \frac{Anaerobic_{lag}}{yr} .. Incom\_lag - 1 \\ \quad \text{for } j \in 1 .. inc \\ \quad\quad wPlcd_{i \cdot inc + j} \leftarrow \frac{Anwaste_{i - \frac{Anaerobic_{lag}}{yr}}}{inc} \\ wPlcd \end{array} \right.$$

Placed waste is apportioned over the relevant year in accordance with the number of increments in the year. The waste assumed to be placed at the end of each time increment.

Vector containing the waste placement in the relevant increments

$WPl := WastePlaced(Anwaste, Anaerobic_{lag})$

Date of waste placement

Function to determine the date on which the waste is placed

$$DatePlaced(Incom\_lag) := \left| \begin{array}{l} \text{for } i \in 0 .. Incom - 1 \\ \quad \text{for } j \in 0 .. inc \\ \quad\quad dPlcd_{i \cdot inc + j} \leftarrow Date_i + \frac{j}{inc} \cdot yr \\ \text{for } i \in Incom - 1 .. Incom\_lag - 1 \\ \quad \text{for } j \in 0 .. inc \\ \quad\quad dPlcd_{i \cdot inc + j} \leftarrow Date_{i - \text{ceil}\left(\frac{Anaerobic_{lag}}{yr}\right)} + \left(\text{ceil}\left(\frac{Anaerobic_{lag}}{yr}\right)\right) \cdot yr + \frac{j}{inc} \cdot yr \\ dPlcd \end{array} \right.$$

Vector containing the date increments for waste placement

$DPl := DatePlaced(Incom\_lag)$

Project: Silverstream Landfill **Project number: 8664102.2526** **22/10/2025**
Description: Carbon footprint
Computed: DERA **Checked MEKL**

Input variables for waste placement

Lo, Potential CH4 generation capacity of the waste

Function to determine the Lo input value required at each date increment of waste placement

```
Lo_Placed :=
    for i ∈ 0
        for j ∈ 1 .. inc
            Lo_placed[i·inc + j] ← Lo_vec[i]
    for i ∈ 1 .. (Incom − 1)
        for j ∈ 0
            Lo_placed[i·inc + j] ← Lo_vec[i − 1]
        for j ∈ 1 .. inc
            Lo_placed[i·inc + j] ← Lo_vec[i]
    Lo_placed
```

Function to determine Lo input values while taking into account the Anaerobic lag

```
Lo_Placed_lag(Lo_Placed) := if Anaerobic_lag > 0.5 · yr
    for i ∈ (Anaerobic_lag / yr) · inc + 1 .. length(Lo_Placed) − 1 + (Anaerobic_lag / yr) · inc − 1
        for j ∈ 0 .. inc − 1
            Lo_placed_lag[i + j] ← Lo_Placed[i − (Anaerobic_lag / yr) · inc]
        Lo_placed_lag
    else if Anaerobic_lag = 0 · yr
        for i ∈ 1 .. length(Lo_Placed) − 1
            Lo_placed_lag[i] ← Lo_Placed[i]
        Lo_placed_lag
    else
        for i ∈ 2 .. length(Lo_Placed)
            Lo_placed_lag[i] ← Lo_Placed[i − 1]
        Lo_placed_lag
```

Vector containing the Lo values for the increments with anaerobic lag

$Lo\_Placed\_Lag := Lo\_Placed\_lag(Lo\_Placed)$

k, CH4 generation rate decay constant during operations

Function to determine the k input value required at each date increment of waste placement

```
k_Placed :=
    for i ∈ 0
        for j ∈ 0 .. (inc)
            k_placed[i·inc + j] ← k_vec[i]
    for i ∈ 1 .. (Incom − 1)
        for j ∈ 0
            k_placed[i·inc + j] ← k_vec[i − 1]
        for j ∈ 1 .. inc
            k_placed[i·inc + j] ← k_vec[i]
    k_placed
```

Project: Silverstream Landfill **Project number: 8664102.2526** **22/10/2025**
Description: Carbon footprint
Computed: DERA **Checked MEKL**

Function to determine k input values while taking into account the Anaerobic lag

$$k\_Placed\_lag(Lo\_Placed) := \text{if } Anaerobic_{lag} > 0.5 \cdot yr$$
$$\quad \text{for } i \in \text{ceil}\left(\frac{Anaerobic_{lag}}{yr}\right) \cdot inc + 1 \,..\, \text{length}(k\_Placed) - 1 + \left(\frac{Anaerobic_{lag}}{yr}\right) \cdot inc - 1$$
$$\quad\quad \text{for } j \in 0 \,..\, inc - 1$$
$$\quad\quad\quad k\_placed\_lag_{i+j} \leftarrow k\_Placed_{i - \text{ceil}\left(\frac{Anaerobic_{lag}}{yr}\right) \cdot inc}$$
$$\quad\quad k\_placed\_lag$$
$$\text{else if } Anaerobic_{lag} = 0 \cdot yr$$
$$\quad \text{for } i \in 1 \,..\, \text{length}(Lo\_Placed) - 1$$
$$\quad\quad k\_placed\_lag_i \leftarrow k\_Placed_i$$
$$\quad k\_placed\_lag$$
$$\text{else}$$
$$\quad \text{for } i \in 2 \,..\, \text{length}(Lo\_Placed)$$
$$\quad\quad k\_placed\_lag_i \leftarrow k\_Placed_{i-1}$$
$$\quad k\_placed\_lag$$

Vector containing the Lo values for the increments with anaerobic lag $k\_Placed\_Lag := k\_Placed\_lag(k\_Placed)$

Landfill gas generation- Scholl Canyon Model

Estimated total landfill gas flow rate

$$Q(WPlcd, DPl, t, Lo\_Placed, k\_Placed) := q \leftarrow 0 \cdot m^3 \cdot hr^{-1}$$
$$\text{for } i \in 0 \,..\, \text{last}(DPl)$$
$$\quad ti \leftarrow (t + 1 \cdot yr) - DPl_i$$
$$\quad \text{if } ti < -0.0000010 \cdot yr$$
$$\quad\quad q \leftarrow q + 0 \cdot m^3 \cdot hr^{-1}$$
$$\quad \text{else}$$
$$\quad\quad \Delta q \leftarrow 2\, k\_Placed_i \cdot Lo\_Placed_i \cdot WPlcd_i \cdot e^{-k\_Placed_i \cdot ti}$$
$$\quad\quad q \leftarrow q + \Delta q$$
$$q$$

ti = Time from waste placement

Assume 50% of the landfill gas is methane.

Project: Silverstream Landfill **Project number: 8664102.2526** **22/10/2025**
Description: Carbon footprint
Computed: DERA **Checked MEKL**

Results

Estimated gas generation for the current year

$CurrentYear = 2025\ yr$

Methane generation rate (LFG gen at 50% methane)

$$Q(WPI, DPI, CurrentYear, Lo\_Placed\_Lag, k\_Placed\_Lag) = 10459685.5\ \frac{m^3}{yr}$$

$$Q(WPI, DPI, CurrentYear, Lo\_Placed\_Lag, k\_Placed\_Lag) = 1193.2\ \frac{m^3}{hr}$$

Estimated collection efficiency and UEF

Estimated collection efficiency

$$Col(time) := \begin{cases} \text{if } \dfrac{Q\_methanedestroyed}{Q(WPI, DPI, CurrentYear, Lo\_Placed\_Lag, k\_Placed) \cdot (1 - Ox)} > 0.9 \\ \quad 0.9 \\ \text{else} \\ \quad \dfrac{Q\_methanedestroyed}{Q(WPI, DPI, CurrentYear, Lo\_Placed\_Lag, k\_Placed) \cdot (1 - Ox)} \end{cases}$$

Adopted collection efficiency for the year $Col(CurrentYear \cdot yr) = 0.9$

$$UEF(time) := 1.023 \cdot (1 - Col(time))$$

Unique emission factor $UEF(CurrentYear \cdot yr) = 0.1023$

Appendix B Gas composition data

	Portable Meter										Fixed Meters					Comparison		
Date	CH4 (%)	CO2 (%)	O2 (%)	CO (PPM)	H2S (PPM)	Bal (%)	Gas Meter	Time	USER	Stage 1 CH4 (%)	Total Flow Stage 2	FLOW Stage 2 (NM3/H)	FLOW Stage 1 (NM3/H)	CH4 NEW (%)	CH4 OLD (%)	Variation between fixed and portable	Variation between new and old meter	Comments
18/06/2024	45.5	35.5	2.2	4	FILTERED	16.8	GA5000	11:45	LAMC	50	43461663	1193	88.63	44.8				Stage 1 CO2-29.8, O2-0.6, CO 0, H2S-FILTERED, Balance 19.5, total flow 6963094
3/07/2024	46.6	33.3	1.4	5	FILTERED	18.8	GA5000	11:15	LAMC	44	43880775	1211	105.6	44.4				Stage 1 CO2-27.1, O2-2.5, CO 1, H2S-FILTERED, Balance 26.3, total flow 7001878
15/07/2024	46	37	1.2	5	FILTERED	15.8	GA5000	2:20	LAMC	44.5	44238052	1545	120.9	45.18				Stage 1 CO2-27.9, O2-2.3, CO 0, H2S-FILTERED, Balance 25.3, total flow 7032756
31/07/2024	46.9	37.7	0.5	6	FILTERED	14.9	GA5000	1:05	LAMC	45.6	44719997	1230	104.8	46.14				Stage 1 CO2-28.6, O2-0.9, CO 0, H2S-FILTERED, Balance 24.9, total flow 7075171
6/08/2024	46.7	37.2	0.8	6	FILTERED	15.2	GA5000	1:15	LAMC	44.1	44899724	1352	104.3	45.49				Stage 1 CO2-28.2, O2-1.1, CO 0, H2S-FILTERED, Balance 26.5, total flow 7090016
19/08/2024	50.6	40.3	0.5	7	FILTERED	8.6	GA5000	11:40	LAMC	48.3	45293130	1198	76.19	48.54				Stage 1 CO2-29.4, O2-1.1, CO 0, H2S-FILTERED, Balance 21.1, total flow 7119631
30/08/2024	48.5	38.6	0.8	7	FILTERED	12.3	GA5000	12:15	LAMC	45.4	45627576	1247	71.6	47.83				Stage 1 CO2-28.7, O2-1.0, CO 0, H2S-FILTERED, Balance 24.7, total flow 7142732
11/09/2024	46.2	37	0.8	7	FILTERED	16	GA5000	2:00	LAMC		45993198	1333	55.09	45.94				
20/09/2024	49.2	38.9	0.5	10	FILTERED	11.4	GA5000	2:15	LAMC		46252205	1249	58.86	48.38				
2/10/2024	42.8	34.9	3.1	6	436	19.2	GA5000 - hire	12:01	SELO	49.7	46611426	1271	53.65	48.43				Stage 1 CO2-30.2, O2-1.5, CO 0, H2S-FILTERED, Balance 18.6, total flow 7191601
18/12/2024	45.3	37.6	0.4	6	FILTERED	16.7	GA500	2:27	SELO + RUTU	47.6	48974055	1287	43.67	45.15				Stage 1 CO2 - 30.4, O2 - 1.1, CO - 1, H2S - FILTERED, Balance - 20.5, Total Flow - 7259084.
6/01/2025	46.2	35.9	0.8	9	FILTERED	17.1	GA5000	11:51	LAMC + RUTU	54.1	49527931	1060	34.9	44.2				Stage 1 CO2 - 30.5, O2 - 1.7, CO - 0, H2S - FILTERED, Balance - 13.8, Total Flow - 7277867.
28/01/2025	44.1	36	0.9	7	FILTERED	19	GA5000	1:26	LAMC	48.6	50247476	1330	59	42.62				Stage 1 CO2 - 30.3, O2 - 1.5, CO - 1, H2S - FILTERED, Balance - 19.6, Total Flow - 7300369.
3/04/2025	46.4	37.1	0.7	10	FILTERED	15.9	GA5000	11:30	RUTU	40.1	5.2E+07	1262	55.89	42.73				Stage 1 CO2-29.9, O2-0.8, CO-3, H2S-FILTERED, Balance-29.9, Total Flow-738966.
9/04/2025	42.4	34.8	0.8	11	FILTERED	22	GA5000	1:00	RUTU	41.6	5.3E+07	1218	55.65	39.27				Stage 1 CO2-29.4, O2-1.0, CO-5, H2S-FILTERED, Balance-28.0, Total Flow-7397708.
12/05/2025	45.6	37.4	0.9	13	FILTERED	16.1	GA5000	2:30	RUTU	51.9	5.3E+07	1060	53.18	41.73				Stage 1 CO2-30.9, O2-1.4, CO-7, H2S-FILTERED, Balance-15.8, Total Flow - 7440453.
6/06/2025	50.1	37.4	0.7	10	FILTERED	11.8	GA5000	12:15	RUTU	57.2	5.4E+07	1263	52.55	43.22				Stage 1 CO2-31.6, O2-1.1, CO-3, H2S-FILTERED, Balance-10.0, Total Flow-7470393.
24/06/2025	50.5	37.4	0.5	10	FILTERED	11.7	GA5000	2:00	RUTU	54.9	5.5E+07	1231	47.35	42.88				Stage 1 CO2-30.9, O2-1.2, CO-3, H2S-FILTERED, Balance-13.1, Total Flow-7488102.

Appendix C Waste tonnage data

Table Appendix C.1 : Waste tonnage data from July 2024-June 2025

Month	Received Tonnage	Diverted Tonnage	Asbestos Tonnage	Net Tonnage	Comments
Jul-24	12568.19	255.80	68.80	12243.59	Data sourced from levy data
Aug-24	11851.03	681.90	109.26	11059.87	
Sept-24	12873.95	199.98	79.54	12594.43	
Oct-24	13730.70	284.84	104.36	13341.50	
Nov-24	12834.61	339.02	136.48	12359.11	
Dec-24	12199.11	250.94	134.20	11813.97	
Jan-25	12091.08	442.10	57.54	11591.44	Data sourced from payment claims
Feb-25	13027.60	292.78	82.76	12652.06	
Mar-25	12657.40	248.30	168.46	12240.64	
Apr-25	13043.58	335.24	77.14	12631.20	
May-25	13117.52	291.16	334.30	12492.06	
Jun-25	11353.94	244.26	289.00	10820.68	
Total	**151348.71**	**3866.32**	**1641.84**	**145840.55**	

APPENDIX 3 – INDEPENDENT REVIEW OF REPORT

Tonkin+Taylor

Memo

To:	Shane Gogo	**Job No:**	1101052
From:	Lisa Bridson, Elisha Willeam Peter (T+T) & Danielle Clarke (T+T)	**Date:**	3 December 2025
cc:	Jörn Scherzer, Miriam Randall		
Subject:	Findings of 2024/25 GHG emissions inventory review – Hutt City Council		

1 Background and purpose

Hutt City Council ('HCC' or 'Council') has been reporting on its greenhouse gas emissions (GHG) emissions since its base year of 2016/2017. HCC uses its emissions inventory to measure its operational GHG emissions and track its progress against its carbon reduction and net zero commitments under the Council's *Climate Change and Resilience Strategy*. The 2024/25 GHG emissions inventory covers the period from 1 July 2024 to 30 June 2025 and follows the ISO 14064:1-2018 Standard, the Greenhouse Gas Protocol and the Ministry for the Environment's (MfE Guidance) – *Measuring emissions: A guide for organisations: 2024 detailed guide*.

This memo summarises the key findings and recommendations from the review of HCC's 2024/25 GHG emissions inventory. The review included a high-level assessment of the following:

- Methodology consistency with the ISO 14064:1-2018 Standard, the Greenhouse Gas Protocol and the Ministry for the Environment's – *Measuring emissions: A guide for organisations: 2024 detailed guide*.
- Organisational and operational boundaries including exclusions.
- Data completeness and transparency.
- Reasonableness of assumptions, emission factors chosen, and emissions calculations.
- Clarity and usability of documentation and reporting.

The assessment findings were summarised in an Excel spreadsheet with recommendations for improvements. Two rounds of assessments were conducted which were as follows:

1. An initial assessment which involved highlighting gaps with the stated standards and recommendations for better alignment with the standard; and
2. A review to finalise the residual recommendations as listed in Section 2.

Note: Both assessments were not a third-party certification audit and do not provide assurance for compliance with the listed standards for GHG inventories.

2 Findings summary and recommendations

Overall, the emissions inventory is assessed as accurate and complete. However, following the second findings meeting, there remains several areas identified where the inventory could be further improved to align with the Ministry for the Environment (MfE) Guidance, ISO 14064-1:2018 Standard and the Greenhouse Gas (GHG) Protocol, including:

- Recalculate the baseline to ensure that any future changes in reported emissions reflect actual changes in emissions rather than adjustments to methodology or reporting boundaries.
- Breakdown Scope 1 emissions to show individual greenhouse gases, enabling more detailed analysis and transparency (i.e., CO_2, CH_4, N_2O, SF_6, NF_3, HFCs, and PFCs,)
- Simplify the report layout to improve accessibility and clarity for both internal and external audiences.
- Develop a base year recalculation policy to guide consistent treatment of structural or methodological changes in future reporting cycles.
- Undertake an uncertainty assessment to quantify the confidence level associated with current emissions estimates.
- Establish significance criteria or thresholds to determine when recalculations or methodological updates are required.

Last year's external review also recommended that work on the emissions inventory should commence earlier in the reporting cycle to allow sufficient time for data verification and quality assurance. This recommendation remains for this review.

3 Conclusion

The 2024 review confirms that Hutt City Council's 2024/25 emissions data is robust and aligns with accepted reporting standards. Continued improvements in both emissions management and data quality will support the Council's pathway to net zero.

4 Applicability

This memo has been prepared for the exclusive use of our client Hutt City Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
.....	.....
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3-Dec-25
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