Absolutely Positively
Wellington City Council
Me Heke Ki Pōneke

20 December 2024

File Ref: IRC-7585

s7(2)(a)

Kia ora s7(2)(a)

Thank you for your email dated 28 November 2024, regarding emission rates caused by traffic congestion since the installation of cycle lanes.

Your request has been considered under the Local Government Official Information and Meetings Act 1987 (LGOIMA).

As per my refinement email on 6 December 2024, the Wellington City Council (the Council) does not hold the information that you have requested. We do not hold specific data on emission rates before and after the installation of the Molesworth Street and Oriental Parade- Kent Terrace cycle routes. Information that is held is city wide emission which is not broken down by ward, suburb, or cycle route. We have refused under section 17(g) of the LGOIMA as the information requested is not held by the Local Authority.

Please refer to our website for information published on city-wide emissions, particularly see Appendix C of the Wellington City Community Carbon Footprint Report 2022/23 , which outlines the research the Council has undertaken on on-road transport emissions. Greater Wellington Regional Council also publish their reports on their public website alongside the existing previous inventories, please see their page Greater Wellington — Monitoring emissions. The GHG Emission Inventory 2024 report will soon be made publicly available, however for convenience we have attached the report.

The Council has received your refinement and will treat this as a new request.

You have the right, by way of complaint under section 28(1) of the LGOIMA, to request an investigation and review of the Council's decision by the Ombudsman. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

If you require further information, please contact official.information@wcc.govt.nz.

Nāku noa, nā

Asha Harry
Official Information & Privacy
Wellington City Council

Prepared for
Greater Wellington Regional Council
Co No.: N/A

AECOM

Greater Wellington Region GHG Emissions Inventory 2024

10-Dec-2024

Commercial-in-Confidence

aecom.com

Delivering a better world

Greater Wellington Region GHG Emissions Inventory 2024

Client: Greater Wellington Regional Council

Co No.: N/A

Prepared by

,

10-Dec-2024

Job No.: 60737611

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Greater Wellington Region GHG Emissions Inventory 2024
Ref	60737611
Date	10-Dec-2024
Originator	Adam Swithinbank and Renee McKay
Checker/s	Suzanne Lowe
Verifier/s	Anthony Hume

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
1	10-Dec-2024	Final	Anthony Hume – Practice Lead, Sustainability and Resilience	

Table of Contents

Executive Summary

This report details the Greenhouse Gas (GHG) emissions within the geographic boundaries of the Greater Wellington Regional area administered by the Greater Wellington Regional Council. The emissions have been measured and reported using the production-based Global Protocol methodology for Community-Scale Greenhouse Gas Emissions Inventory (GPC). This document reports GHG emissions produced in or resulting from activity during the 2024 government financial year (FY24: 1st July 2023 to 30th June 2024).

The Greater Wellington Region's most recent complete GHG emissions inventory was produced for the FY22 financial year. For the FY24 inventory, Greater Wellington Regional Council (GWRC) have engaged AECOM to produce a streamlined inventory for FY23 and FY24. Data covering approximately 90% of emissions produced in Greater Wellington has been collected and calculated in a manner consistent with the last inventory. The remaining emission sources have been estimated based on the FY22 inventory. This is consistent with the approach used for the FY23 Wellington City Emissions Inventory.

Greenhouse gas emissions are generally reported in this document in units of carbon dioxide equivalent emissions (CO_2e) and are referred to as 'emissions'.

The GHG emission inventory results for each territorial authority in the Greater Wellington Region are provided in section 5.0. Net emissions (i.e., including forestry and land-use change) are outside the scope of this inventory.

Findings of the Greater Wellington Region FY24 inventory include:

- **Total gross emissions** in Greater Wellington were 3,725,477 tCO_2e.
- **Transport** (e.g. emissions resulting from road, marine, and air travel) represented 41% of Greater Wellington's total gross emissions, with on-road petrol and diesel consumption accounting for 28% of total gross emissions.
- **Agriculture** represented 33% of Greater Wellington's total gross emissions. Enteric fermentation (methane released from the digestive process of cattle and sheep) represented 24% of total gross emissions.
- **Stationary Energy** (e.g., emissions relating to electricity and natural gas consumption) produced 17% of total gross emissions, mainly from grid-connected electricity use and natural gas consumption.
- **Industrial Processes and Product Use** (IPPU) (e.g. emissions from refrigerant gases and aerosols) represented 5% of Greater Wellington's total gross emissions.
- **Waste** (e.g. emissions from landfill and wastewater treatment) was responsible for 4% of Greater Wellington's total gross emissions.

Emissions changes since the Baseline Year:

- Greater Wellington uses FY19 as its baseline year against which to track emissions and progress towards emission reduction targets.
- **Annual total gross emissions decreased 7% from FY19 to FY24** driven by a reduction in petrol and diesel fuel use in the Region, a reduction in air travel to and from the region post-COVID-19, a decrease in landfill emissions due to improvements in landfill gas capture, and a decrease in the emissions intensity of electricity per unit consumed from the grid.

Long-term emissions changes:

- Greater Wellington has estimated annual emissions to cover FY01 to FY24.
- **Annual total gross emissions decreased 17% from FY01 to FY24** driven by a reduction in the number of livestock in the Region, a decrease in landfill emissions due to improvements in landfill gas capture, and a decrease in the emissions intensity of electricity per unit consumed due to the greater use of renewable energy generation in Aotearoa New Zealand.

1.0 Introduction

Greater Wellington Regional Council commissioned AECOM New Zealand Limited (AECOM) to assist in developing a production-based community-scale Greenhouse Gas (GHG) emissions footprint for the Greater Wellington regional area for the 2023 and 2024 financial years (FY23 and FY24). The financial year used here covers 1st July to 30th June (Government financial year). The study boundary incorporates the jurisdiction of the Greater Wellington Regional Council. The Greater Wellington Region is hereafter referred to as Greater Wellington for ease.

The purpose of the GHG emissions inventory for FY24 is to estimate the relative scale of GHG emissions produced in the Greater Wellington area and the relative contribution of different emission sources to Greater Wellington's total emissions. The results of this inventory can be used to assess trends and changes in the emissions produced in Greater Wellington over time.

2.0 Approach

The method used to calculate emissions follows the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventory v1.1 (GPC) guidelines, published by the World Resources Institute (WRI) in 2021. The GPC methodology follows a production-based approach and allocates emissions to industries rather than final users. Production-based approaches exclude global emissions relating to consumption (i.e., embodied emissions relating to products produced elsewhere but consumed within the geographic area, such as imported food products, cars, phones, clothes, etc.).

This emissions footprint assesses both direct and indirect emissions sources. Direct emissions are production-based and occur within the geographic area (Scope 1 in the GPC reporting framework). Indirect emissions are produced outside the geographic boundary (Scope 2 and 3) but are allocated to the consumption location. An example of indirect emissions are those associated with electricity consumption supplied by the national grid (Scope 2). All other indirect emissions, such as cross-boundary travel (e.g., flights) and energy transmission and distribution losses, are Scope 3.

The FY24 GHG emission inventory calculation method differs from previous GHG emission inventories completed for Greater Wellington by AECOM. Data for this inventory has been collected for a selected list of emission sources covering approximately 90% of Greater Wellington's emissions. Selected emission sources were calculated as per previous inventories, and the remaining sources have been estimated based on the FY22 (1st July 2021 to 30th June 2022) inventory, applying a population change adjustment where appropriate.

The inventory is based on data and reporting guidance available at the time of calculation, using reasonable assumptions in line with the GPC reporting guidance, and may need to be updated in the future to account for changes in data availability or reporting guidance.

The emission factors and Global Warming Potential values (GWPs) used in these calculations use those from the Ministry for the Environment (MfE) National Emissions Inventory (2024) and IPCC Sixth Assessment report (2021). This represents the best practice for reporting GHG emissions at the regional level. The previously published FY19 to FY22 inventory results have been updated using these emission factors to allow direct comparison across this timeframe.

Greenhouse gas emissions are generally reported in this document in Carbon Dioxide Equivalent Emissions (CO_2e) units and are referred to as 'emissions'.

2.1 Data Collection Approach

The data collection approach for the FY24 GHG emissions inventory is shown in Figure 1. This figure details for each emission source whether data has been collected, adjusted based on the population change between FY22 and FY24, or not adjusted from FY22. Data sources where data was collected represent approximately 90% of Greater Wellington's total gross emissions.

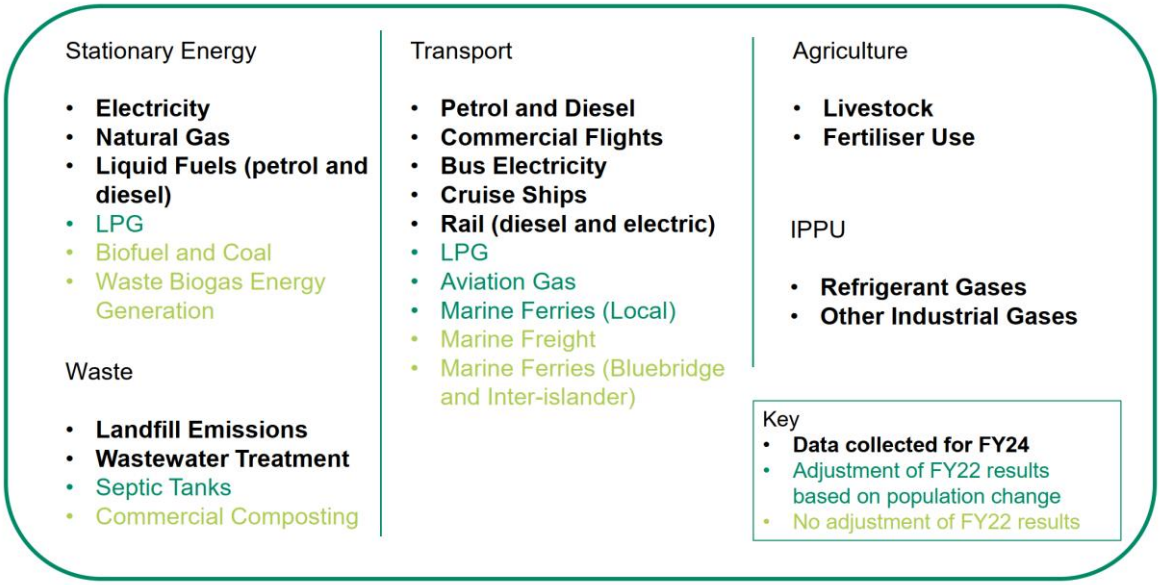

Figure 1 Data Collection Approach for each Emission Source

A description of the method used, and major assumptions made during data collection and analysis have been detailed within **Appendix B – Assumptions**.

Considering the uncertainty associated with the results is essential, particularly given the different datasets used. At the national level, in New Zealand's Greenhouse Gas Inventory, the estimate of gross emissions uncertainty was ±8.8% (MfE, 2024).

3.0 Greater Wellington Emissions Inventory for FY24

3.1 Total Gross Emissions

Total emissions can be reported as both gross emissions (excluding forestry harvesting and sequestration) and net emissions (including forestry harvesting and sequestration). This report solely reports gross emissions at the request of GWRC. This report focussed on FY24, however the annual emissions inventory for FY23 has also been calculated and results are presented in Appendix A.

During FY24, Greater Wellington's **total gross emissions** amounted to **3,725,477 tCO_2e.** Transport and Agriculture emissions are Greater Wellington's most significant contributors to total gross emissions. Section 4.0 details the change in Greater Wellington's gross emissions since the baseline year (FY19) as well as changes over the longer term (since FY01).

The population of Greater Wellington in FY24 was approximately 550,500 people, resulting in per capita gross emissions of 6.8 tCO_2e/person.

3.2 Emission Sectors and Sources

Figure 2 and Table 1 illustrate the six sectors that comprise the emissions inventory. Table 2 shows the breakdown of Greater Wellington's emissions by source. A discussion of emissions from each sector follows in Sections 3.3 through Section 3.7.

Due to rounding, there may be some discrepancies between totals and the sum of results in the tables.

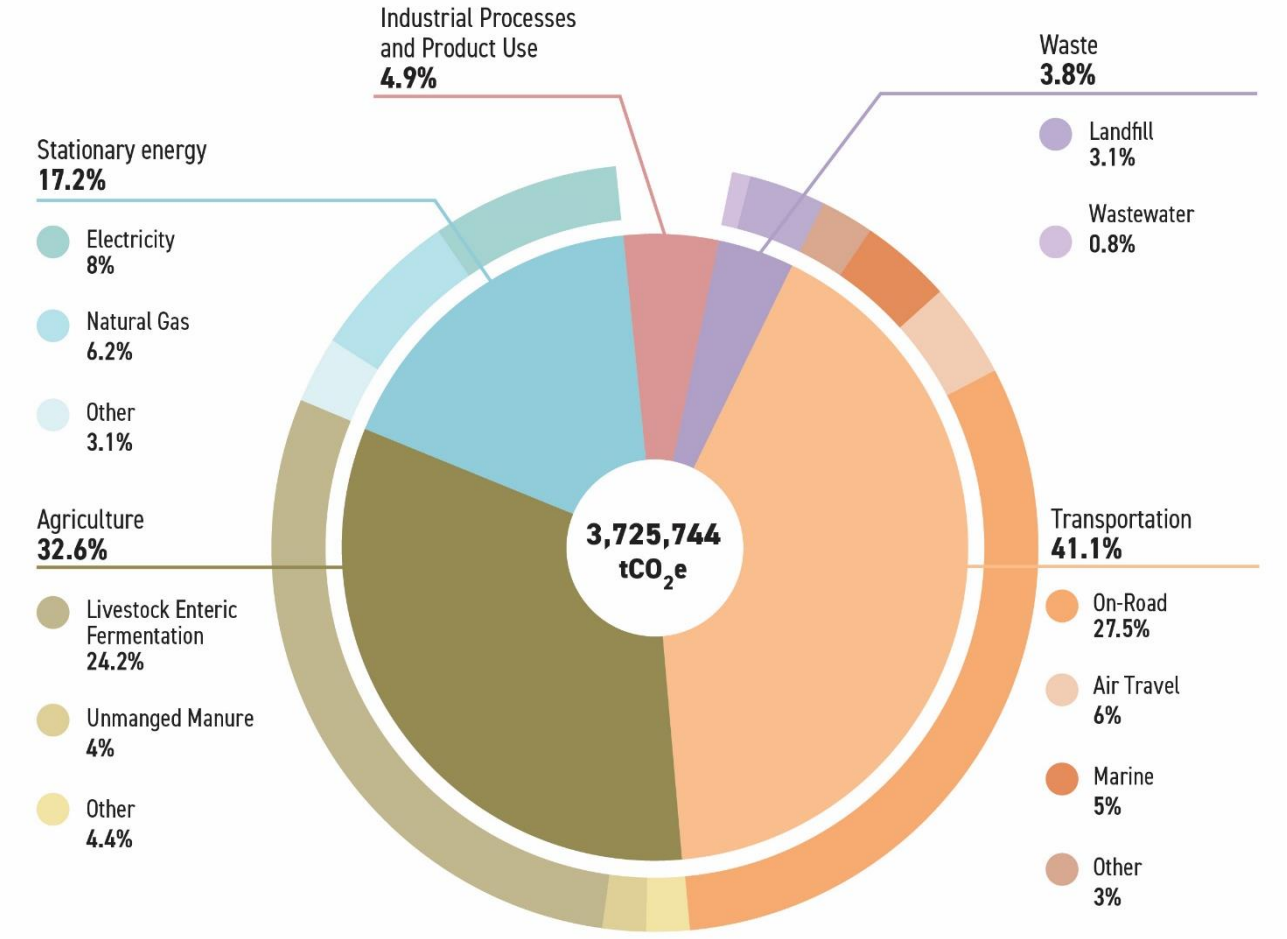

Figure 2: Greater Wellington's FY24 total gross GHG emissions split by sector (tCO_2e)

Table 1 Greater Wellington FY24 emissions by sector

Emissions Source	Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Transport	1,544,113	41.4%
Agriculture	1,213,503	32.6%
Stationary Energy	642,422	17.2%
Industrial Processes and Product Use (IPPU)	182,768	4.9%
Waste	142,670	3.8%
Total Gross Emissions	**3,725,477**	**100%**

Table 2 Greater Wellington FY24 emissions by source

Emissions Source	Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
On-Road Transport	1,025,445	28%
Enteric Fermentation from Livestock	901,402	24%
Other Agriculture Emissions	312,101	8%
Electricity Consumption (including transmission and distribution losses)	298,126	8%
Natural Gas (including transmission and distribution losses)	230,165	6%
Air Travel	222,599	6%
Marine Transport	184,607	5%
Refrigerant and Air Conditioning Gases (IPPU)	171,548	5%
Solid Waste	113,806	3%
Off-Road Transport	105,069	3%
Stationary Diesel and Petrol Use	56,998	2%
LPG (Stationary Use)	36,331	1%
Wastewater Treatment (incl. household septic tanks)	28,864	1%
Other Stationary Energy	20,803	1%
Other Industrial Gases (IPPU)	11,220	<1%
Rail	6,393	<1%
Total Gross Emissions	**3,725,477**	**100%**

3.3 Transport

Transport was the highest emitting sector in Greater Wellington in FY24, producing 1,544,113 tCO_2e (41% of total gross emissions). Petrol and diesel use represented 73% of the Transport emissions in Greater Wellington (630,739 tCO_2e and 494,567 tCO_2e, respectively).

Diesel and petrol transport emissions are split into on-road and off-road use. On-road transport, consisting of all standard road vehicles (cars, trucks, buses, etc.), was responsible for 66% of Transport emissions and 28% of total gross emissions. Off-road transport, consisting of all fuel used for off-road vehicles (agricultural tractors and vehicles, forklifts, etc.), was responsible for 7% of Transport emissions.

The next largest emission source in the transport sector was air travel, contributing 14% of the sector's emissions and 6% of total gross emissions. Marine Transport emissions (including marine freight, cruise ships, inter-island ferries, and local ferries) produced 12% of Transport emissions and 5% of total gross emissions. Cruise ship emissions have been included in Greater Wellington's emissions inventory for the first time using a method developed by AECOM for Wellington City Council. Cruise ship emissions represented 2% of Greater Wellington's emissions inventory in FY24.

Rail emissions produced <1% of the sector's emissions. Rail emissions were calculated for both rail freight and public commuter electric trains.

Cross-boundary journey emissions (e.g., for air travel, marine transport, and rail) are based on the fuel consumed during journeys to and from Greater Wellington, with emissions split equally between the origin and destination locations. It is acknowledged that marine transport and air travel hubs in Greater Wellington support an area wider than the immediate Wellington Region.

3.4 Agriculture

Agricultural livestock and crop farming emissions were responsible for 33% of Greater Wellington's total gross emissions in FY24. Enteric fermentation represented 74% of agricultural emissions. Enteric fermentation is the methane (CH_4) released from the digestive process of cattle and sheep. The second highest source of agricultural emissions was produced from nitrous oxide (N_2O) released by unmanaged manure from grazing animals on pasture.

Livestock was responsible for the majority of the Agriculture sector's GHG emissions. Sheep accounted for 45% of agricultural emissions in FY24 while accounting for 84% of the total number of livestock in Greater Wellington. Dairy and non-dairy cattle accounted for 23% and 24% of agricultural emissions in Greater Wellington, respectively, despite representing 15% of the total number of livestock due to their more significant annual GHG emissions impact per head compared to sheep. Fertiliser use and other livestock (e.g. pigs and deer) represented the remaining 4% of agricultural emissions.

Agriculture continues to be the largest contributor to the total gross emissions for Masterton, South Wairarapa, and Carterton districts.

It is important to note that these agricultural results do not include emissions related to the consumption of agricultural products supplied to Greater Wellington as per the GPC methodology.

3.5 Stationary Energy

Stationary Energy was the third-highest emission source in FY24, producing 17% of Greater Wellington's total gross emissions.

Electricity consumption (including transmission and distribution losses) accounted for 46% of Stationary Energy emissions and 8% of Greater Wellington's total gross emissions in FY24. Electricity consumption emissions depend upon the amount of consumption (in kWh) and the emissions intensity of the national grid (tCO_2e/kWh), which changes annually. The emissions intensity of the grid was relatively low in FY24 relative to recent years but higher than in FY23.

Natural gas consumption, including transmission and distribution losses from the reticulated gas system, accounted for 36% of Stationary Energy emissions (6% of total gross emissions).

The remaining stationary energy emissions were produced by LPG, petrol, diesel, coal, biofuels, and landfill biogas used for energy generation.

Biogenic CO_2 emissions from biofuels and landfill gas flaring have not been included in these totals as per GPC guidance and are reported separately in section 3.9.

3.6 Industrial Processes and Product Use (IPPU)

IPPU includes emissions associated with the consumption of industrial products and synthetic gases containing GHGs for refrigerants, foam blowing, fire extinguishers, aerosols, metered dose inhalers and Sulphur Hexafluoride for electrical insulation and equipment production. No known industrial processes (as defined in the GPC requirements) are present in Greater Wellington (e.g., aluminium manufacture).

IPPU contributed 5% to total gross emissions in FY24. The most significant contributor to IPPU emissions was refrigerant gases, which produced 94% of IPPU emissions.

IPPU emissions do not include energy use for industrial manufacturing, which is included in the relevant Stationary Energy sub-category (e.g., coal, electricity and/or petrol and diesel). These emissions are based on nationally reported IPPU emissions and apportioned based on population due to the difficulty of allocating emissions to geographic locations.

3.7 Waste

Waste processed in Greater Wellington (solid waste, wastewater, and compost) comprised 4% of Greater Wellington's total gross emissions in FY24.

Solid waste produced 77% of total Waste emissions. Solid waste emissions include emissions from open (operating) landfill sites (32,091 tCO_2e) and closed landfill sites (77,373 tCO_2e). Both open and closed landfills emit landfill (methane) gas from the breakdown of organic materials disposed of in the landfill for many years after waste enters the landfill. The reported emissions here relate to the emissions produced in FY24 from all waste produced in Greater Wellington that has entered landfill sites over the last 50+ years, as per the GPC guidance for region-level reporting. This approach differs from other reporting methods, which estimate the future emissions related to waste entering the landfill in the reporting year.

Open landfill emissions relate to emissions from waste produced in Greater Wellington and sent to landfill sites accepting waste in the most recent reporting year. Some landfill sites in Greater Wellington have landfill gas capture systems that reduce emissions released into the atmosphere. Landfill gas capture has improved in recent years, contributing to reduced annual solid waste emissions. Owing to the lack of gas capture systems at closed landfill sites, emissions from closed landfill sites were greater than those from currently open sites. It is noted that the annual emissions from closed landfill sites will continue to decrease over time as no new waste enters these sites.

Wastewater treatment (treatment plants and individual septic tanks) accounted for 20% of total Waste emissions. Most households in Greater Wellington (88%) are connected to wastewater treatment plants, which resulted in emissions of 21,338 tCO_2e from wastewater treatment and processing. Households not connected to wastewater treatment plants (i.e., using individual septic tanks) produced 7,526 tCO_2e in wastewater emissions. Due to methane production, septic tanks have a higher emissions intensity per quantity of wastewater than the wastewater treatment plants in Greater Wellington.

Waste diverted from landfill for commercial composting in Greater Wellington includes horticultural, animal waste products, green waste, bark, and sawdust. Composting this organic waste produces lower emissions than if sent to a landfill. Diverted and composted organic waste produced 4,343 tCO_2e in FY24.

3.8 Total Gross Emissions by Greenhouse Gas

Each greenhouse gas has a different level of impact on climate change, which is accounted for when converting quantities of each gas into units of carbon dioxide equivalent (CO_2e). This assessment uses conversion figures (i.e. global warming potentials with climate change feedback) from the IPCC 6th Assessment Report (2021). Other/Unknown gases are either industrial gases (e.g. SF_6), or where calculation of the carbon dioxide equivalent emissions was possible however it was difficult to determine the breakdown of these emissions into the respective greenhouse gases.

Table 3: Greater Wellington's total gross emissions by greenhouse gas

Greenhouse Gas	Tonnes	Global Warming Potential (GWP)	Tonnes of CO_2e
Carbon Dioxide (CO_2)	2,060,412	1	2,060,412
Biogenic Methane (CH_4)	39,306	27.2	1,069,134
Non-biogenic Methane (CH_4)	1,100	29.8	32,790
Nitrous Oxide (N_2O)	1,177	273	321,412
Other / Unknown Gas (in CO_2e)	241,728	1	241,728
Total	**2,343,725**	**-**	**3,725,477**

3.9 Biogenic Emissions

Biogenic CO_2 emissions result from the combustion of biomass materials that store and sequester CO_2, including materials used to make biofuels (e.g., trees, crops, vegetable oils, or animal fats). Biogenic CO_2 emissions from plants and animals are excluded from gross emissions as they are part of the natural carbon cycle.

Table 4: Biogenic Carbon Dioxide in Greater Wellington in FY24 (Excluded from gross emissions)

Biogenic Carbon Dioxide (CO_2) (Excluded from gross emissions)		
Biofuel	127,017	tCO_2
Landfill Gas (Biogas)	56,146	tCO_2
Total Biogenic CO_2	**183,163**	**tCO_2**

Biogenic CH_4 emissions (e.g., produced by farmed cattle via enteric fermentation) are included in gross emissions due to their relatively large impact on global warming relative to biogenic CO_2. Biogenic methane represented 2% of the total gross tonnage of GHG emissions in Greater Wellington but 30% of total gross GHG emissions when expressed in CO_2e. This is due to the relatively higher global warming impact of methane per tonne compared to carbon dioxide. Table 5 shows biogenic methane in Greater Wellington in FY24 in tonnes of methane by emission source.

Table 5: Biogenic Methane in Greater Wellington in FY24 (Included in gross emissions)

Biogenic Methane (CH_4) (Included in gross emissions)		
Enteric Fermentation	33,140	tCH_4
Landfill Gas	4,016	tCH_4
Manure Management	1,126	tCH_4
Wastewater Treatment	530	tCH_4
Biofuel	398	tCH_4
Composting (Green Waste)	97	tCH_4
Total Biogenic CH_4	**39,306**	**tCH_4**

4.0 Gross Emissions Changes

This section presents changes and trends in emissions since Greater Wellington's baseline year (FY19) and longer-term changes since the FY01 financial year (2000/01).

To calculate the FY23 and FY24 inventory years for this inventory, updated emission factors and global warming potential values since the last published inventory for Greater Wellington (June 2023) have been used. To enable direct comparison of annual emissions since the baseline year, the FY19 to FY22 inventory years have been updated using the same emission factors and global warming potential values as for FY23 and FY24. These changes alongside the inclusion of cruise ship emissions to the FY19 to FY22 inventory, are explained in detail in Section 7.1.

The updated FY19 to FY22 inventory results presented here differ from those previously published by Greater Wellington, particularly for agriculture, waste, and IPPU. The results presented in this report supersede previously published inventory results.

4.1 Changes Since Baseline Year

Greater Wellington uses FY19 as its baseline year against which to track emissions and progress towards emission reduction targets. Annual total gross emissions decreased by 7% from FY19 to FY24. This decrease was driven by reduced Transport, Waste, and Stationary Energy emissions.

Transport emissions decreased 8% between FY19 and FY24, primarily due to a reduction of on-road transport emissions (-7%) and air travel emissions (-15%). The number of international flights in FY24 was still below pre-COVID levels for air travel.

Stationary Energy emissions have also decreased (-4%), with electricity emissions lower than in FY19. Despite an increase in electricity consumption there was a reduction in the emission intensity of electricity per unit generated. A greater proportion of grid electricity generation from renewable energy sources during this period has reduced the emissions intensity of electricity consumption during the reporting period.

Waste emissions have also reduced by 28% during this time, primarily due to improved gas capture methods at open landfill sites and a gradual reduction in emissions from closed landfill sites.

Industrial Processes and Product Use (IPPU) emissions have increased by 2%, following nationwide trends, particularly because of an increase in the usage of refrigerant and air conditioning gases.

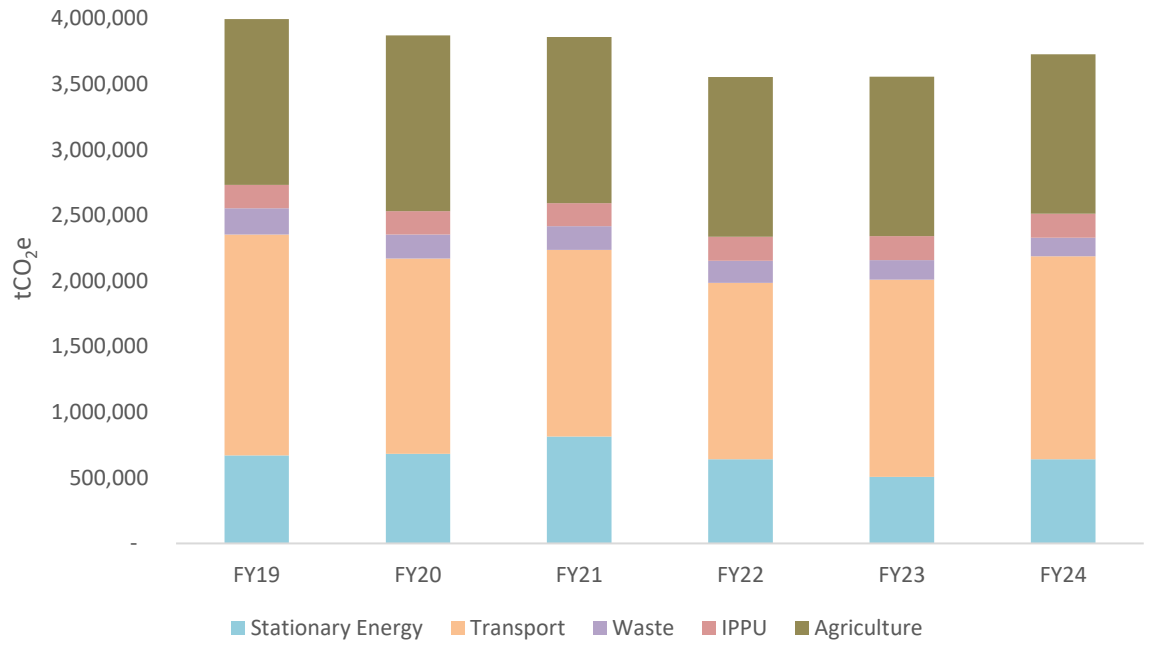

Figure 3 Change in Greater Wellington total gross emissions from FY19 to FY24

4.2 Longer Term Changes

Greater Wellington has estimated annual emissions each year from FY01 to FY24. Before the FY19 year, differences in the methodology and data used to calculate emissions exist; however, these differences do not prevent the ability to assess trends in emissions over this period.

Annual total gross emissions have decreased by 17% from FY01 to FY24. The decrease has been driven by reductions in Waste (-65%), Stationary Energy (-28%), and Agriculture emissions (-29%). Of note are emissions reductions due to the improvements to landfill emission capture, improvements in the emissions intensity of the electricity grid, and a reduction in livestock numbers. These reductions were partially balanced by increased Transport fuel emissions (+10%) and IPPU emissions (+486%).

As the population has increased (by 25%), and gross emissions have decreased (by 17%), per capita gross emissions have reduced by 33%.

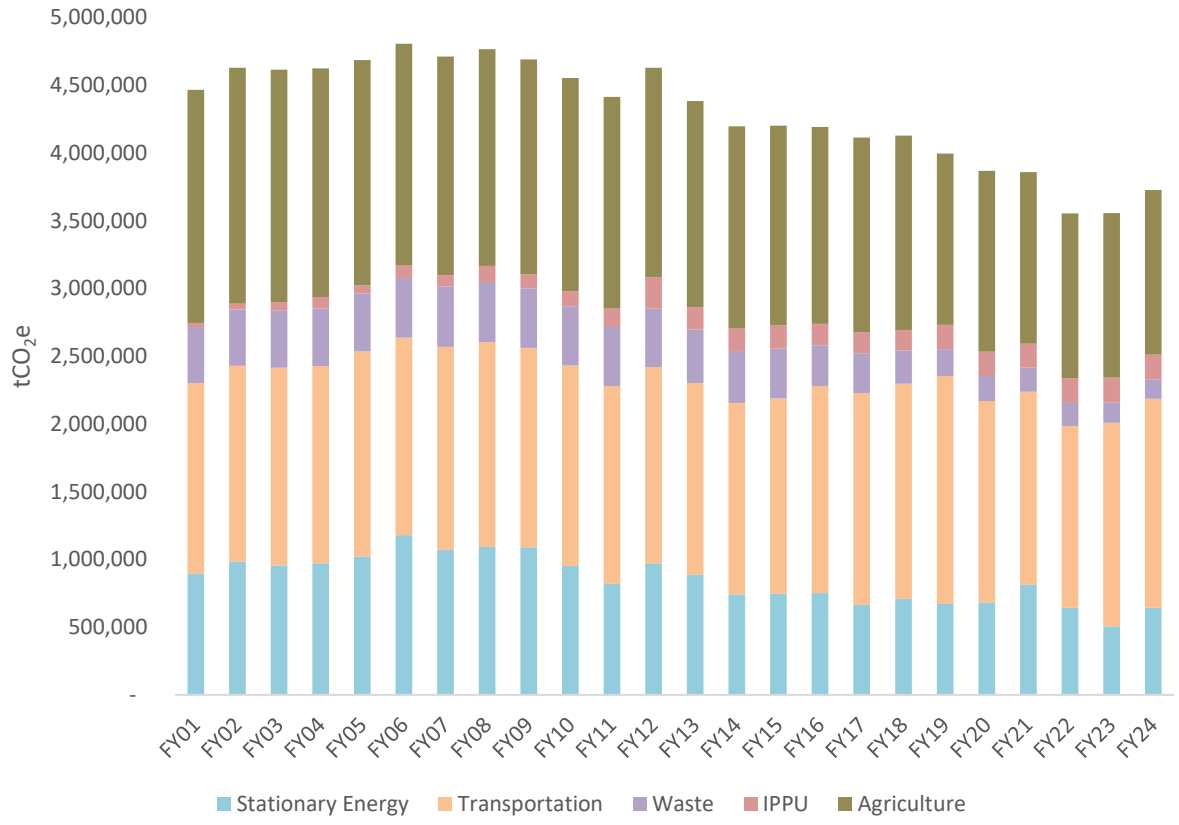

Figure 4 Change in Greater Wellington total gross emissions from FY01 to FY24

5.0 Territory Authorities in Greater Wellington

5.1 Overview

The Greater Wellington regional area contains eight territorial authorities, comprised of Wellington City, Porirua City, Kāpiti Coast District, Hutt City, Upper Hutt City, Masterton District, Carterton District, and South Wairarapa District. These areas are those under the jurisdiction of the respective city or district council.

Using the GPC methodology, emissions are predominantly allocated to where they are produced (e.g. on-road transport and agriculture), with grid electricity generation emissions allocated to where the electricity is consumed. For cross-boundary transport emissions (e.g. air travel, marine freight, and cruise ships), emissions are calculated for each journey and allocated equally between the origin and destination location. Emissions related to air travel to/from Wellington airport, marine freight, and inter-island ferries to/from Wellington have been allocated across the region based on the relative population size of each territorial authority, meaning that all territorial authorities have some air travel and marine transport emissions. Cruise ship emissions related to travel to/from CentrePort have been solely allocated to Wellington City.

Figure 5 shows total gross emissions for the territorial authorities in the Greater Wellington Region, split by sector.

Wellington City is the territorial authority with the highest annual emissions in the region, representing 27% of Greater Wellington's total gross emissions. Transport and Stationary Energy represent most of Wellington City's emissions inventory, with the remaining smaller proportion produced by IPPU, Waste, and Agriculture. Wellington City's emissions profile generally reflects all territorial authorities in Greater Wellington except the three territorial authorities in Wairarapa.

The GHG emissions profile of the three Wairarapa districts (Carterton, Masterton, and South Wairarapa) are dominated by Agricultural emissions, mainly from livestock, with relatively small Transport and Stationary Energy emissions.

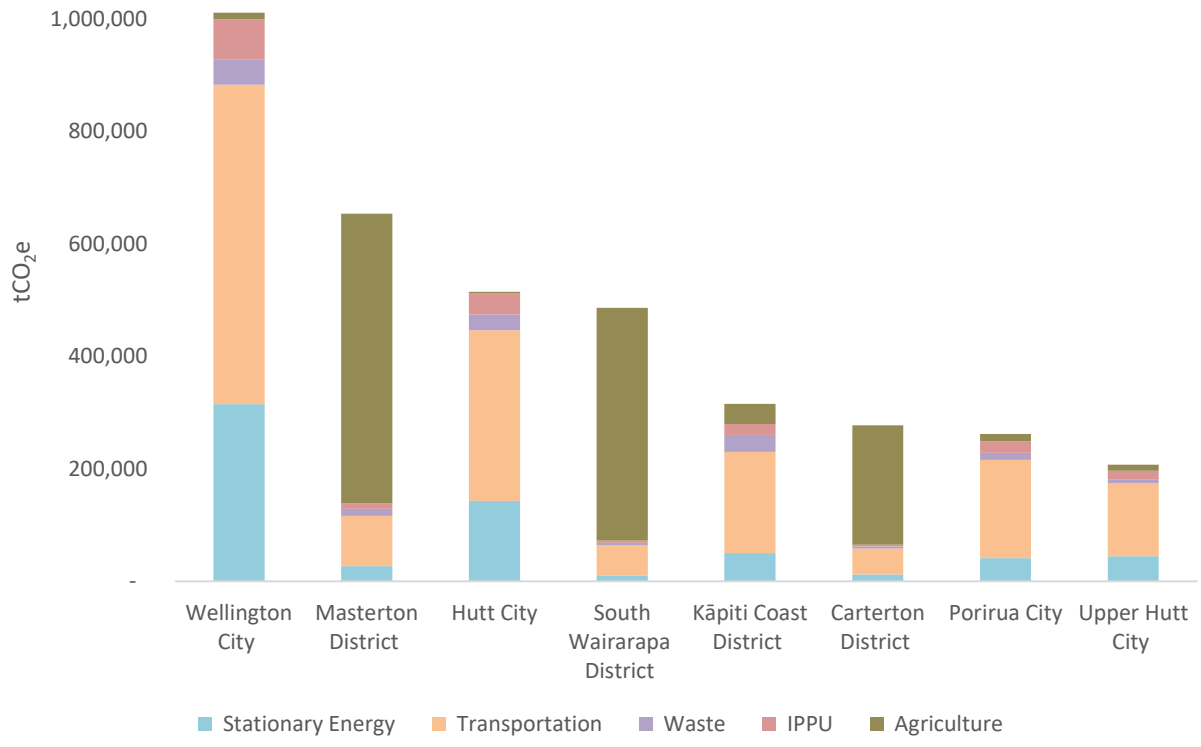

Figure 5 Total gross emissions by territorial authority in the Greater Wellington region FY24 (tCO_2e).

This section presents an overview of the FY24 emissions inventory for each territorial authority area in Greater Wellington. A detailed breakdown of each territorial authority's FY24 emissions inventory and gross emissions changes since FY19 is provided in section 7.3.

The full emissions inventory results for each territorial authority have been supplied separately covering the FY23 and FY24 reporting years and the updated FY19-FY22 reporting years which supersede those previously published (as described in section 7.3).

Due to rounding, there may be some discrepancies between totals and the sum of results in the tables.

5.2 Wellington City

Table 6 Wellington City FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Transport	567,518	56%
Stationary Energy	314,775	31%
Industrial Processes and Product Use (IPPU)	72,048	7%
Waste	44,560	4%
Agriculture	11,491	1%
Total Gross Emissions	**1,010,392**	**100%**

During FY24, Wellington City's total gross emissions were 1,010,392 tCO_2e. Transport and Stationary Energy emissions were the City's most significant contributors to total gross emissions.

Transport was the highest emitting sector estimated in Wellington City, producing 567,518 tCO_2e (56% of total gross emissions). Petrol and diesel use represented 65% of the Transport emissions in Wellington City (213,791 tCO_2e and 155,197 tCO_2e, respectively). Diesel and petrol transport emissions are split into on-road and off-road use. On-road transport, consisting of all standard road vehicles (cars, trucks, buses, etc.), was responsible for 60% of Transport emissions and 33% of total Wellington City gross emissions. Cruise ship emissions have been included in Greater Wellington's emissions inventory for the first time using a method developed by AECOM for Wellington City Council. Cruise ship emissions represented 6% of Wellington City's emissions inventory in FY24.

The next largest emission source in Wellington City was Stationary Energy, contributing 31% to the city's total gross emissions. Electricity consumption (including transmission and distribution losses) accounted for 48% of Stationary Energy emissions and 15% of Wellington City's total gross emissions. In contrast, natural gas consumption, including transmission and distribution losses from the reticulated gas system, accounted for 40% of Stationary Energy emissions (12% of total gross emissions). Electricity consumption emissions depend upon the amount of consumption (in kWh) and the emissions intensity of the national grid (tCO_2e/kWh), which changes annually. The emissions intensity of the grid was relatively low in FY24 compared to recent years but higher than in FY23.

When combined, estimated emissions from Waste (e.g., from landfill and wastewater treatment), Industrial Processes and Product Use (e.g., from refrigerant gases and aerosols), and Agriculture accounted for 13% of Wellington City's total gross emissions.

5.3 Hutt City

Table 7 Hutt City FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Transport	303,487	59%
Stationary Energy	142,775	28%
Industrial Processes and Product Use (IPPU)	37,781	7%
Waste	28,016	5%
Agriculture	2,603	<1%
Total Gross Emissions	**514,662**	**100%**

During FY24, Hutt City's total gross emissions were 514,662 tCO_2e. Transport and Stationary Energy emissions were the city's most significant contributors to total gross emissions.

Transport was the highest emitting sector estimated in Hutt City, producing 303,487 tCO_2e (59% of total gross emissions). Petrol and diesel use represented 77% of the Transport emissions in Hutt City (135,859 tCO_2e and 98,624 tCO_2e, respectively).

Diesel and petrol transport emissions are split into on-road and off-road use. On-road transport, consisting of all standard road vehicles (cars, trucks, buses, etc.), was responsible for 71% of Transport emissions and 42% of total gross emissions.

The next largest emission source in Hutt City was Stationary Energy, contributing 28% to the city's total gross emissions. Electricity consumption (including transmission and distribution losses) accounted for 49% of Stationary Energy emissions and 14% of Hutt City's total gross emissions, while natural gas consumption, including transmission and distribution losses from the reticulated gas system, accounted for 35% of Stationary Energy emissions (10% of total gross emissions). Electricity consumption emissions depend upon the amount of consumption (in kWh) and the emissions intensity of the national grid (tCO_2e/kWh), which changes annually. The emissions intensity of the grid was relatively low in FY24 compared to recent years but higher than in FY23.

When combined, estimated emissions from Waste (e.g., from landfill and wastewater treatment), Industrial Processes and Product Use (e.g., refrigerant gases and aerosols), and Agriculture accounted for 13% of Hutt City's total gross emissions.

5.4 Upper Hutt City

Table 8 Upper Hutt City FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Transport	129,474	62%
Stationary Energy	44,560	21%
Industrial Processes and Product Use (IPPU)	15,973	8%
Agriculture	10,787	5%
Waste	6,655	3%
Total Gross Emissions	**207,449**	**100%**

During FY24, Upper Hutt City total gross emissions amounted to 207,449 tCO_2e. Transport emissions were Upper Hutt City's most significant contributor to total gross emissions, followed by Stationary Energy.

Transport was the highest emitting sector estimated in Upper Hutt City, producing 129,474 tCO_2e (62% of total gross emissions). Petrol and diesel use represented 77% of the Transport emissions in Upper Hutt City (57,455 tCO_2e and 41,708 tCO_2e respectively). Diesel and petrol transport emissions are split into on-road and off-road use. On-road transport, consisting of all standard road vehicles (cars, trucks, buses, etc.), was responsible for 70% of Transport emissions and 44% of total gross emissions.

The next largest emission source in Upper Hutt City was Stationary Energy, contributing 21% to the city's total gross emissions. Natural gas consumption, including transmission and distribution losses from the reticulated gas system, accounted for 48% of Stationary Energy emissions (10% of total gross emissions), while electricity consumption (including transmission and distribution losses) accounted for 31% of Stationary Energy emissions and 7% of Upper Hutt's total gross emissions. Electricity consumption emissions depend upon the amount of consumption (in kWh) and the emissions intensity of the national grid (tCO_2e/kWh), which changes annually. The emissions intensity of the grid was relatively low in FY24 compared to recent years but higher than in FY23.

When combined, estimated emissions from Waste (e.g., from landfill and wastewater treatment), Industrial Processes and Product Use (e.g., refrigerant gases and aerosols), and Agriculture accounted for 16% of Upper Hutt's total gross emissions.

5.5 Porirua City

Table 9 Porirua City FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Transport	174,527	67%
Stationary Energy	41,224	16%
Industrial Processes and Product Use (IPPU)	20,631	8%
Agriculture	12,888	5%
Waste	12,298	5%
Total Gross Emissions	**261,568**	**100%**

During FY24, Porirua City total gross emissions were 261,568 tCO_2e. Transport emissions were the most significant contributors to total gross emissions, followed by Stationary Energy.

Transport produced 174,527 tCO_2e in FY24 (67% of total gross emissions). Petrol and diesel use represented 78% of the Transport emissions in Porirua City (78,903 tCO_2e and 57,278 tCO_2e respectively). Diesel and petrol transport emissions are split into on-road and off-road use. On-road transport, consisting of all standard road vehicles (cars, trucks, buses, etc.), was responsible for 71% of Transport emissions and 48% of total gross emissions.

The next largest emission source in Porirua City was Stationary Energy, contributing to 16% of the city's total gross emissions. Electricity consumption (including transmission and distribution losses) accounted for 17% of Stationary Energy emissions and 3% of Porirua's total gross emissions. In comparison, natural gas consumption, including transmission and distribution losses from the reticulated gas systems, accounted for 53% of Stationary Energy emissions (8% of total gross emissions). Electricity consumption emissions depend upon the amount of consumption (in kWh) and the emissions intensity of the national grid (tCO_2e/kWh), which changes annually. The emissions intensity of the grid was relatively low in FY24 compared to recent years but higher than in FY23.

When combined, estimated emissions from Waste (e.g., from landfill and wastewater treatment), Industrial Processes and Product Use (e.g., refrigerant gases and aerosols), and Agriculture accounted for 18% of Porirua City's total gross emissions.

5.6 Kāpiti Coast District

Table 10 Kāpiti Coast District FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Transport	179,733	57%
Stationary Energy	50,300	16%
Agriculture	35,474	11%
Waste	30,332	10%
Industrial Processes and Product Use (IPPU)	19,336	6%
Total Gross Emissions	**315,176**	**100%**

During FY24, Kāpiti Coast total gross emissions amounted to 315,176 tCO_2e. Transport and Stationary Energy emissions were Kāpiti Coast's most significant contributors to total gross emissions.

Transport was the highest emitting sector estimated in Kāpiti Coast, producing 179,733 tCO_2e (57% of total gross emissions). Petrol and diesel use represented 78% of the Transport emissions in Kāpiti Coast (81,451 tCO_2e and 59,128 tCO_2e respectively).

Petrol and diesel transport emissions are split into on-road and off-road use. On-road transport, consisting of all standard road vehicles (cars, trucks, buses, etc.), was responsible for 72% of Transport emissions and 41% of total gross emissions.

The next largest emission source in Kāpiti Coast was Stationary Energy, contributing to 16% of the district's total gross emissions. Electricity consumption (including transmission and distribution losses) accounted for 53% of Stationary Energy emissions and 9% of Kāpiti Coast's total gross emissions. Electricity consumption emissions depend upon the amount of consumption (in kWh) and the emissions intensity of the national grid (tCO_2e/kWh), which changes annually. The emissions intensity of the grid was relatively low in FY24 compared to recent years but higher than in FY23. Natural gas consumption, including transmission and distribution losses from the reticulated gas system, accounted for 22% of Stationary Energy emissions.

When combined, estimated emissions from Waste (e.g., from landfill and wastewater treatment), Industrial Processes and Product Use (e.g., from refrigerant gases and aerosols), and Agriculture accounted for 27% of Kāpiti Coast's total gross emissions.

5.7 Carterton District

Table 11 Carterton District FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Agriculture	212,274	77%
Transport	45,767	17%
Stationary Energy	12,212	4 %
Waste	3,541	1%
Industrial Processes and Product Use (IPPU)	3,422	1%
Total Gross Emissions	**277,216**	**100%**

During FY24, Carterton City total gross emissions amounted to 277,216 tCO_2e. Agriculture emissions were Carterton's most significant contributors to total gross emissions, followed by Transport.

Agriculture produced 212,274 tCO_2e in FY24 (77% of total gross emissions). Livestock Enteric Fermentation represented 74% of the Agriculture emissions in Carterton (156,718 tCO_2e). Unmanaged Manure on Pasture accounted for 12% (25,533 tCO_2e) with Agricultural Leaching and Deposition responsible for 8% (17,606 tCO_2e) Sheep and cattle represented most agricultural emissions in Carterton.

Carterton's next largest emission source was Transport, producing 45,767 tCO_2e (17% of total gross emissions). Petrol and diesel use represented 82% of the Transport emissions in Carterton (16,200 tCO_2e and 21,154 tCO_2e respectively).

Total estimated emissions from Waste (e.g. emissions from landfill and wastewater treatment), Industrial Processes and Product Use (e.g. emissions from refrigerant gases and aerosols), and Stationary Energy accounted for 7% of Carterton's total gross emissions.

5.8 Masterton District

Table 12 Masterton District FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Agriculture	514,659	79%
Transport	89,792	14%
Stationary Energy	26,682	4%
Waste	12,459	2%
Industrial Processes and Product Use (IPPU)	9,651	1%
Total Gross Emissions	**653,243**	**100%**

During FY24, Masterton district total gross emissions amounted to 653,243 tCO_2e. Agriculture emissions were Masterton's most significant contributors to total gross emissions, followed by Transport.

Agriculture produced 514,659 tCO_2e in FY24 (79% of total gross emissions). Livestock Enteric Fermentation represented 74% of the Agriculture emissions in Masterton (383,272 tCO_2e). Unmanaged Manure on Pasture accounted for 13% (65,359 tCO_2e), with Agricultural Leaching and Deposition

responsible for 9% (44,372 tCO_2e). Sheep and cattle represented most agricultural emissions in Masterton.

Masterton's next largest emission source was Transport, producing 89,792 tCO_2e (14% of total gross emissions). On-road petrol and diesel use represented 63% of Transport emissions in Masterton (56,835 tCO_2e).

Total estimated emissions from Waste (e.g. emissions from landfill and wastewater treatment), Stationary Energy, and Industrial Processes and Product Use (e.g. emissions from refrigerant gases and aerosols) accounted for 7% of Masterton's total gross emissions.

5.9 South Wairarapa District

Table 13 South Wairarapa District FY24 emissions by sector (tCO_2e)

Emissions Source	FY24 Emissions (tCO_2e)	Percentage of Total Gross Emissions (%)
Agriculture	413,327	85%
Transport	53,814	11%
Stationary Energy	9,894	2%
Waste	4,809	1%
Industrial Processes and Product Use (IPPU)	3,926	<1%
Total Gross Emissions	**485,770**	**100%**

During FY24, South Wairarapa's total gross emissions were 485,770 tCO_2e. Agriculture emissions are by far the most significant contributors to total gross emissions.

Agriculture produced 413,327 tCO_2e in FY24 (85% of total gross emissions). Livestock Enteric Fermentation represented 74% of the Agriculture emissions in South Wairarapa (306,242 tCO_2e). Unmanaged Manure on Pasture accounted for 12% (48,684 tCO_2e) with Agricultural Leaching and Deposition responsible for 8% (33,451 tCO_2e). Sheep and cattle represented the vast majority of agricultural emissions in South Wairarapa.

The next largest emission source in South Wairarapa was Transport, producing a total of 53,814 tCO_2e (11% of total gross emissions). Petrol and diesel use represented 83% of the Transport emissions (19, 312 tCO_2e and 25,217 tCO_2e respectively).

Total estimated emissions from Waste (e.g. emissions from landfill and wastewater treatment), Industrial Processes and Product Use (e.g. emissions from refrigerant gases and aerosols), and Stationary Energy accounted for 4% of South Wairarapa's total gross emissions.

6.0 Closing Statement

Greater Wellington's GHG emissions inventory provides information for decision-making and action by the council, Greater Wellington stakeholders, city and district councils, and the wider community. We encourage the council to use the results of this study to update current climate action plans, set and measure emission reduction targets, and track changes in emissions over time.

The emissions footprint developed for Greater Wellington covers emissions produced in the Stationary Energy, Transport, Waste, IPPU, and Agriculture sectors using the GPC reporting framework. Sector-level data allows Greater Wellington to target and work with the sectors that contribute the most emissions to the footprint.

Appendix A

7.0 Appendix A: Additional Inventory Results

Due to rounding, there may be minor discrepancies between totals and the sum of results in the tables.

Further detailed breakdowns of emissions have been provided to the Greater Wellington Regional Council and the respective city and district councils separately from this report.

7.1 FY19 to FY22 Inventory Updates

To calculate the FY23 and FY24 inventory years for this inventory, updated emission factors and global warming potential values since the last published inventory for Greater Wellington (June 2023) have been used. To enable direct comparison of annual emissions since the baseline year (FY19), the FY19 to FY22 inventory years have been updated using the same emission factors and global warming potential values as for FY23 and FY24.

The updated FY19 to FY22 results presented in this report differ from those previously published and supersede the previously published inventory results.

The updated FY19 to FY22 results for the Greater Wellington Region and the territorial authorities within it are presented alongside the FY23 and FY24 years in sections 7.2 and 7.3.

Global Warming Potential Values

- Global warming potential values are used to calculate the carbon dioxide equivalent (CO_2e) impact of methane, nitrous oxide, and other greenhouse gases. The previous inventory used IPCC AR5 values with climate feedbacks (IPCC, 2014). For this report IPCC AR6 values (IPCC, 2021) have been used.
- Using AR6 values instead of AR5 values has reduced the estimated CO_2e impact of methane by approximately 20% and the estimated CO_2e impact of nitrous oxide by approximately 8%, particularly affecting the results for agriculture and waste. The CO_2e impact of industrial gases such as refrigerants has been increased between AR5 and AR6, impacting the IPPU results.

Emission Factors

- The previous inventory used Ministry for the Environment 2022 emission factor values. For this report Ministry for the Environment 2022 values have been used. This update has affected most emission sources to a small extent. The largest impacts of this update were in natural gas transmission and distribution losses, jet kerosene, aviation gas, and biofuels.

Other updates

- Minor updates to data on IPPU emissions, aviation gas, and coal have also been applied to the FY19 to FY22 calculations to allow direct comparison with the FY23 and FY24 years.
- Cruise ship emissions have been included in Greater Wellington’s emissions inventory for the first time.

7.2 FY19 to FY24 Inventory Results (Region)

Table 14 Greater Wellington FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Transport	1,682,623	1,485,869	1,423,226	1,343,717	1,502,805	1,544,113
Agriculture	1,263,315	1,336,958	1,265,229	1,217,354	1,214,188	1,213,503
Stationary Energy	671,177	683,486	813,759	642,091	506,646	642,422
Industrial Processes and Product Use (IPPU)	179,292	178,744	177,159	182,768	182,768	182,768
Waste	198,475	183,970	178,480	168,134	149,837	142,670
Total Gross Emissions	**3,994,882**	**3,869,027**	**3,857,852**	**3,554,064**	**3,556,244**	**3,725,477**

Table 15 Greater Wellington FY19 to FY24 emissions by source (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
On-Road Transport	1,097,132	996,002	1,089,262	999,199	1,046,875	1,025,445
Air Travel	262,227	193,853	74,040	109,202	174,460	222,599
Electricity Consumption	321,194	337,869	457,188	302,496	168,274	298,126
Natural Gas	232,852	230,484	238,574	226,913	223,518	230,165
Marine Transport	205,800	186,160	141,317	124,883	167,951	184,607
Other Transport	117,464	109,854	118,607	110,433	113,519	111,463
Stationary Diesel and Petrol Use	60,024	55,757	60,028	56,044	58,195	56,998
LPG (Stationary Use)	34,669	34,879	36,209	35,866	35,866	36,331
Other Stationary Energy	22,439	24,497	21,760	20,773	20,794	20,803
Solid Waste	167,537	152,065	146,091	137,820	120,213	113,806
Wastewater Treatment (incl. household septic tanks)	30,937	31,906	32,389	30,314	29,624	28,864
Refrigerant and Air Conditioning Gases (IPPU)	166,266	166,329	165,663	171,548	171,548	171,548
Other Industrial Gases (IPPU)	13,026	12,416	11,496	11,220	11,220	11,220
Enteric Fermentation from Livestock	934,871	989,824	941,849	905,691	901,958	901,402
Other Agriculture Emissions	328,444	347,134	323,380	311,664	312,229	312,101
Total Gross Emissions	**3,994,882**	**3,869,027**	**3,857,852**	**3,554,064**	**3,556,244**	**3,725,477**

7.3 FY19 to FY24 Inventory Results (Territorial Authorities)

Wellington City

Table 16: Wellington City FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Transport	605,365	544,411	458,191	434,250	543,547	567,518
Stationary Energy	326,464	332,485	403,679	314,647	246,580	314,775
Industrial Processes and Product Use (IPPU)	71,824	71,435	70,495	72,048	72,048	72,048
Waste	78,655	64,383	62,311	59,513	52,633	44,560
Agriculture	12,282	12,499	12,231	12,176	12,176	11,491
Total Gross Emissions	**1,094,590**	**1,025,213**	**1,006,906**	**892,634**	**926,984**	**1,010,392**

Table 17 Wellington City FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
On-Road Transport	350,601	325,895	338,730	308,961	348,152	337,893
Electricity Consumption	160,748	173,010	236,014	154,105	85,977	151,052
Natural Gas	126,842	120,764	129,229	124,164	121,967	125,401
Marine Transport	112,083	105,038	52,861	47,832	88,737	105,393
Air Travel	103,647	76,343	28,279	41,926	67,404	86,389
Refrigerant and Air Conditioning Gases	66,606	66,473	65,921	67,625	67,625	67,625
Solid Waste	68,947	54,675	52,246	49,837	43,009	35,654
Off-Road Transport	33,631	31,969	32,667	30,305	34,383	33,483
Stationary Diesel and Petrol Use	18,138	17,173	17,550	16,215	18,530	18,001
LPG (Stationary)	13,888	13,939	14,408	14,134	14,058	14,263
Wastewater Treatment	9,708	9,708	10,065	9,676	9,624	8,906
Enteric Fermentation from Livestock	9,468	9,641	9,518	9,463	9,463	8,907
Rail	5,403	5,166	5,655	5,226	4,870	4,361
Other Industrial Gases	5,218	4,962	4,574	4,423	4,423	4,423
Biofuel and Biogas (Stationary)	3,272	3,156	3,131	3,097	3,118	3,127
Coal (Stationary)	3,577	4,442	3,346	2,931	2,931	2,931
Other Agriculture Emissions	2,814	2,858	2,712	2,712	2,712	2,584
Total Gross Emissions	**1,094,590**	**1,025,213**	**1,006,906**	**892,634**	**926,984**	**1,010,392**

Hutt City

Table 18: Hutt City FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Transport	295,079	253,248	267,758	254,891	294,438	303,487
Stationary Energy	150,633	152,347	179,098	140,482	110,682	142,775
Industrial Processes and Product Use (IPPU)	37,004	36,882	36,562	37,781	37,781	37,781
Waste	40,602	39,981	40,927	38,992	29,291	28,016
Agriculture	2,499	2,864	2,827	2,604	2,603	2,603
Total Gross Emissions	**525,818**	**485,321**	**527,171**	**474,749**	**474,794**	**514,662**

Table 19 Hutt City FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
On-Road Transport	194,561	171,836	206,290	189,881	215,422	214,365
Natural Gas	53,827	54,474	53,832	50,113	49,555	50,556
Electricity Consumption	76,075	77,667	103,716	69,792	39,041	70,067
Air Travel	53,400	39,416	14,666	21,985	35,584	45,552
Refrigerant and Air Conditioning Gases	34,316	34,320	34,189	35,462	35,462	35,462
Solid Waste	36,837	36,144	37,166	35,156	25,547	24,150
Marine Transport	28,131	24,659	26,379	24,073	21,983	21,983
Off-Road Transport	18,596	16,840	19,732	18,476	21,126	21,081
Stationary Diesel and Petrol Use	10,067	9,057	10,690	9,973	11,473	11,439
LPG (Stationary)	7,155	7,197	7,473	7,415	7,425	7,524
Wastewater Treatment	3,766	3,837	3,761	3,835	3,743	3,866
Other Industrial Gases (IPPU)	2,688	2,562	2,372	2,319	2,319	2,319
Enteric Fermentation from Livestock	1,900	2,173	2,171	2,005	1,999	1,999
Biofuel and Biogas (Stationary)	1,666	1,658	1,652	1,652	1,652	1,652
Coal (Stationary)	1,843	2,293	1,735	1,537	1,537	1,537
Other Agriculture Emissions	599	691	655	599	604	604
Rail	392	497	691	475	323	506
Total Gross Emissions	**525,818**	**485,321**	**527,171**	**474,749**	**474,794**	**514,662**

Upper Hutt City

Table 20: Upper Hutt City FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Transport	124,347	110,947	113,966	107,542	125,135	129,474
Stationary Energy	45,970	46,926	52,741	43,843	37,815	44,560
Industrial Processes and Product Use (IPPU)	15,513	15,471	15,359	15,973	15,973	15,973
Agriculture	10,776	11,650	12,049	11,247	10,787	10,787
Waste	10,101	10,325	11,195	10,752	6,861	6,655
Total Gross Emissions	**206,707**	**195,320**	**205,311**	**189,357**	**196,572**	**207,449**

Table 21 Upper Hutt City FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
On-Road Transport	81,393	75,751	87,242	79,623	90,662	90,655
Natural Gas	22,565	22,851	22,614	21,187	20,744	21,313
Air Travel	22,386	16,534	6,161	9,295	15,088	19,300
Refrigerant and Air Conditioning Gases	14,386	14,397	14,362	14,993	14,993	14,993
Electricity Consumption	14,722	15,406	21,043	13,990	7,747	13,873
Marine Transport	12,530	10,995	11,895	10,638	10,350	10,350
Off-Road Transport	7,780	7,404	8,342	7,751	8,894	8,916
Enteric Fermentation from Livestock	8,290	8,954	9,411	8,779	8,399	8,399
Solid Waste	8,487	8,680	9,584	9,108	5,256	4,998
Stationary Diesel and Petrol Use	4,211	3,992	4,521	4,182	4,828	4,838
LPG (Stationary)	3,000	3,019	3,139	3,135	3,148	3,188
Other Agriculture Emissions	2,486	2,697	2,638	2,468	2,388	2,388
Wastewater Treatment	1,614	1,644	1,612	1,644	1,604	1,657
Other Industrial Gases (IPPU)	1,127	1,075	997	981	981	981
Biofuel and Biogas (Stationary)	698	696	694	698	698	698
Coal (Stationary)	773	962	729	650	650	650
Rail	258	263	325	235	143	254
Total Gross Emissions	**206,707**	**195,320**	**205,311**	**189,357**	**196,572**	**207,449**

Porirua City

Table 22: Porirua City FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Transport	205,603	183,691	177,195	175,344	173,787	174,527
Stationary Energy	40,103	42,373	45,470	41,152	37,186	41,224
Industrial Processes and Product Use (IPPU)	20,102	20,030	19,864	20,631	20,631	20,631
Agriculture	13,956	14,142	13,397	13,119	12,888	12,888
Waste	15,540	15,733	13,948	11,488	12,306	12,298
Total Gross Emissions	**295,305**	**275,968**	**269,874**	**261,734**	**256,798**	**261,568**

Table 23 Porirua City FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
On-Road Transport	146,569	135,087	140,604	136,527	128,947	124,497
Air Travel	29,009	21,406	7,968	12,005	19,484	24,934
Natural Gas	18,934	21,400	22,159	21,196	20,685	21,775
Refrigerant and Air Conditioning Gases	18,642	18,638	18,575	19,364	19,364	19,364
Off-Road Transport	13,816	13,015	13,317	13,121	12,597	12,211
Marine Transport	15,819	13,787	14,765	13,391	12,576	12,576
Enteric Fermentation from Livestock	10,767	10,915	10,399	10,171	9,980	9,980
Solid Waste	11,930	12,071	10,246	8,411	8,638	8,912
Electricity Consumption	7,792	7,799	10,124	6,995	3,827	6,945
Stationary Diesel and Petrol Use	7,584	7,120	7,286	7,171	6,868	6,644
LPG (Stationary)	3,887	3,908	4,060	4,049	4,066	4,119
Wastewater Treatment	3,610	3,662	3,702	3,077	3,668	3,387
Other Agriculture Emissions	3,190	3,227	2,998	2,948	2,909	2,909
Other Industrial Gases (IPPU)	1,460	1,391	1,289	1,267	1,267	1,267
Biofuel and Biogas (Stationary)	905	901	897	902	902	902
Coal (Stationary)	1,001	1,246	943	839	839	839
Rail	389	396	540	300	183	309
Total Gross Emissions	**295,305**	**275,968**	**269,874**	**261,734**	**256,798**	**261,568**

Kāpiti Coast

Table 24: Kāpiti Coast District FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Transport	200,050	167,894	173,513	157,825	175,052	179,733
Stationary Energy	53,493	54,195	64,923	49,647	37,994	50,300
Agriculture	34,674	38,959	37,745	35,216	35,474	35,474
Waste	27,617	27,242	25,252	24,102	27,298	30,332
Industrial Processes and Product Use (IPPU)	18,849	18,848	18,705	19,336	19,336	19,336
Total Gross Emissions	**334,684**	**307,137**	**320,138**	**286,127**	**295,153**	**315,176**

Table 25 Kāpiti Coast District FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
On-Road Transport	140,530	119,593	135,326	119,102	129,135	128,517
Solid Waste	23,232	23,042	20,940	20,766	24,258	27,268
Electricity Consumption	30,106	31,200	41,614	27,710	15,115	26,836
Air Travel	30,697	22,970	10,477	14,099	20,769	25,946
Enteric Fermentation from Livestock	25,076	28,256	27,614	25,734	25,885	25,885
Refrigerant and Air Conditioning Gases	17,480	17,539	17,491	18,149	18,149	18,149
Off-Road Transport	13,237	11,550	12,807	11,480	12,581	12,554
Marine Transport	15,173	13,355	14,353	12,805	12,350	12,350
Natural Gas	10,684	10,994	10,739	10,254	10,568	11,120
Other Agriculture Emissions	9,599	10,702	10,131	9,482	9,589	9,589
Stationary Diesel and Petrol Use	7,271	6,303	7,013	6,256	6,878	6,858
LPG (Stationary)	3,645	3,678	3,823	3,795	3,802	3,855
Wastewater Treatment	4,386	4,200	4,312	3,336	3,040	3,065
Other Industrial Gases	1,369	1,309	1,214	1,187	1,187	1,187
Biofuel and Biogas (Stationary)	848	847	845	845	845	845
Coal (Stationary)	939	1,172	888	787	787	787
Rail	412	426	550	340	217	366
Total Gross Emissions	**334,684**	**307,137**	**320,138**	**286,127**	**295,153**	**315,176**

Carterton District

Table 26: Carterton District FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Agriculture	218,809	234,435	221,231	211,715	212,274	212,274
Transport	61,474	55,263	57,705	53,246	46,439	45,767
Stationary Energy	13,729	13,753	16,374	13,103	9,614	12,212
Waste	4,793	5,559	5,214	4,663	3,652	3,541
Industrial Processes and Product Use (IPPU)	3,247	3,252	3,263	3,422	3,422	3,422
Total Gross Emissions	**302,052**	**312,262**	**303,787**	**286,148**	**275,400**	**277,216**

Table 27 Carterton District FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Enteric Fermentation from Livestock	160,753	172,383	163,550	156,514	156,718	156,718
Other Agriculture Emissions	58,056	62,052	57,681	55,201	55,556	55,556
On-Road Transport	46,971	42,968	46,355	42,268	34,447	33,158
Electricity Consumption	6,829	6,969	9,385	6,307	3,486	6,187
Off-Road Transport	5,881	5,597	5,990	5,668	4,466	4,283
Air Travel	4,685	3,476	1,309	1,991	3,242	4,096
Marine Transport	3,447	2,973	3,639	2,907	3,642	3,642
Refrigerant and Air Conditioning Gases	3,011	3,026	3,051	3,212	3,212	3,212
Biofuel and Biogas (Stationary)	2,846	2,846	2,848	2,850	2,850	2,850
Stationary Diesel and Petrol Use	3,265	3,101	3,320	3,135	2,462	2,360
Solid Waste	2,823	2,730	2,459	2,228	2,055	1,944
Wastewater Treatment	1,969	2,829	2,756	2,435	1,597	1,597
LPG (Stationary)	628	635	667	672	677	677
Rail	490	249	413	413	642	589
Other Industrial Gases (IPPU)	236	226	212	210	210	210
Coal (Stationary)	162	202	155	139	139	139
Total Gross Emissions	**302,052**	**312,262**	**303,787**	**286,148**	**275,400**	**277,216**

Masterton District

Table 28: Masterton District FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Agriculture	549,568	566,123	531,264	518,518	514,659	514,659
Transport	117,700	104,681	106,616	97,748	89,875	89,792
Stationary Energy	29,884	30,137	37,203	28,319	19,341	26,682
Waste	15,244	14,974	14,162	13,429	12,838	12,459
Industrial Processes and Product Use (IPPU)	9,027	9,083	9,157	9,651	9,651	9,651
Total Gross Emissions	**721,424**	**725,000**	**698,403**	**667,665**	**646,364**	**653,243**

Table 29 Masterton District FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Enteric Fermentation from Livestock	409,008	421,408	396,801	386,712	383,272	383,272
Other Agriculture Emissions	140,560	144,715	134,463	131,806	131,387	131,387
On-Road Transport	80,513	73,651	79,457	72,451	59,046	56,835
Marine Transport	13,988	11,510	13,047	9,791	13,885	13,885
Electricity Consumption	18,987	19,377	26,093	17,536	9,692	17,202
Air Travel	13,026	9,707	3,673	5,616	9,173	11,628
Refrigerant and Air Conditioning Gases	8,371	8,452	8,563	9,059	9,059	9,059
Solid Waste	11,078	10,706	9,777	8,943	8,320	7,926
Off-Road Transport	10,166	9,681	10,360	9,811	7,751	7,439
Wastewater Treatment	4,166	4,268	4,385	4,487	4,517	4,533
Stationary Diesel and Petrol Use	5,596	5,315	5,691	5,374	4,221	4,045
Biofuel and Biogas (Stationary)	3,107	3,109	3,114	3,122	3,122	3,122
LPG (Stationary)	1,745	1,772	1,872	1,894	1,914	1,921
Other Industrial Gases (IPPU)	656	631	594	592	592	592
Coal (Stationary)	450	565	435	393	393	393
Rail	7	132	79	79	20	5
Total Gross Emissions	**721,424**	**725,000**	**698,403**	**667,665**	**646,364**	**653,243**

South Wairarapa District

Table 30: South Wairarapa District FY19 to FY24 emissions by sector (including updated results for FY19 to FY22)

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Agriculture	420,750	456,286	434,485	412,759	413,327	413,327
Transport	73,006	65,733	68,282	62,871	54,532	53,814
Stationary Energy	10,900	11,270	14,272	10,899	7,433	9,894
Waste	5,922	5,774	5,470	5,194	4,961	4,809
Industrial Processes and Product Use (IPPU)	3,726	3,743	3,754	3,926	3,926	3,926
Total Gross Emissions	**514,304**	**542,805**	**526,262**	**495,650**	**484,178**	**485,770**

Table 31 South Wairarapa District FY19 to FY24 emissions by source

Emissions Source	FY19 (tCO_2e)	FY20 (tCO_2e)	FY21 (tCO_2e)	FY22 (tCO_2e)	FY23 (tCO_2e)	FY24 (tCO_2e)
Enteric Fermentation from Livestock	309,610	336,093	322,383	306,312	306,242	306,242
Other Agriculture Emissions	111,140	120,192	112,101	106,447	107,085	107,085
On-Road Transport	55,993	51,221	55,258	50,386	41,064	39,526
Electricity Consumption	5,935	6,442	9,199	6,060	3,391	5,964
Off-Road Transport	7,007	6,669	7,137	6,753	5,319	5,103
Air Travel	5,377	4,000	1,506	2,285	3,717	4,755
Marine Transport	4,629	3,843	4,379	3,446	4,428	4,428
Refrigerant and Air Conditioning Gases	3,455	3,483	3,510	3,685	3,685	3,685
Solid Waste	4,204	4,016	3,673	3,370	3,130	2,955
Stationary Diesel and Petrol Use	3,892	3,696	3,957	3,737	2,935	2,813
Wastewater Treatment	1,719	1,758	1,797	1,824	1,830	1,854
LPG (Stationary)	720	730	767	771	776	785
Other Industrial Gases (IPPU)	271	260	244	241	241	241
Biofuel and Biogas (Stationary)	168	168	170	172	172	172
Coal (Stationary)	186	233	178	160	160	160
Rail	-	0	2	2	4	2
Total Gross Emissions	**514,304**	**542,805**	**526,262**	**495,650**	**484,178**	**485,770**

8.0 Appendix B: Assumptions and Data Sources

The calculation method for the FY24 GHG emission inventory for Greater Wellington differs from previous GHG emission inventories completed for Greater Wellington by AECOM. Data for this GHG emissions inventory has been collected for a list of emission sources which cover approximately 90% of Greater Wellington's emissions. These emission sources were calculated as per previous inventories, and remaining sources have been based on the FY22 GHG emissions inventory, with some of these sources adjusted based on population change where this was deemed relevant.

The following table details assumptions, exclusions and whether data has been collected, adjusted or not adjusted based on the FY22 emissions inventory.

Sector / Category	Assumptions and Exclusions
General	
Geographical Boundary	LGNZ local council mapping boundaries have been applied.
Population	Population figures are provided by StatsNZ. The 2022 calendar year population was used for the 2023 financial year population, with the 2023 calendar year used for the 2024 financial year population.
Global Warming Potential Used	Emissions are expressed on a carbon dioxide-equivalent basis (CO_2e) using the 100-year Global Warming Potential (GWP) values from the IPCC 6th Assessment Report (AR6).
Full Inventory	Emissions for all sources broken down by individual main greenhouse gases are provided in the supplementary spreadsheet information supplied with this report.
GPC Production Approach	GPC reporting is predominately production-based (as opposed to consumption-based) but includes indirect emissions from energy consumption. Production-based emissions reporting is generally preferred by policy-makers due to robust established methodologies such as the GPC, which enables comparisons between different studies. Production-based approaches exclude globally produced emissions relating to consumption (e.g., embodied emissions relating to products produced elsewhere but consumed within the geographic area such as imported food products, cars, phones, clothes etc.). Cross-boundary movements such as air travel and marine freight journeys departing or arriving in Greater Wellington have been included with emissions related to the journeys split equally between the origin and destination, despite the emissions being produced outside the Greater Wellington geographical boundary, as per the GPS requirements.
Emission Factors	All emission factors have detailed source information in the calculation tables within which they are used. Where possible, the most up to date, NZ-specific emission factors have been applied. This inventory uses applicable emission factors predominantly from the New Zealand Ministry of the Environment Measuring emissions: A guide for organisations: 2024 detailed guide. The emission factors for electricity are obtained from MBIE data fro the financial year.
Transport Emissions	
Petrol and Diesel:	Total petrol and diesel consumption in Greater Wellington was calculated from total petrol and diesel sold in the Wellington Region which was then apportioned out to the territorial authorities within the region based on the total distance

	travelled by vehicles in each territorial authority in the financial year (known as Vehicle Kilometres Travelled or VKT). Allocating fuel consumption across a region based on VKT does not account for the likely makeup of the vehicle fleet of a particular geographic area (e.g. where a more rural area may use more diesel, or a more urban area may have more hybrid or electric vehicles travelling). Fuel sold in an area does not always mean that the fuel is used in that area, however this approach is considered to be a robust and comparable estimate of fuel consumption in a geographic area. Total petrol and diesel fuel use was then divided by likely end use. The division into Transport and Stationary Energy end use (and within Transport, on-road and off-road) was calculated using fuel end use data provided by the Energy Efficiency and Conservation Authority (EECA) in April 2020. - On-road Transport is defined as all standard transport vehicles used on roads e.g. cars, bikes, buses. - Off-road Transport is defined as machinery for Agriculture, construction and other industry used off-roads. - Stationary Energy petrol and diesel use is defined as fuel not used for transport either on or off roads. Petrol and diesel used for Stationary Energy has been reported in the Stationary Energy sector. This method produces results for off-road and stationary uses of petrol and diesel that are heavily impacted by changes in on-road transport uses of petrol and diesel as this represents the largest proportion of petrol and diesel sales. Better data and understanding of off-road and stationary uses of petrol and diesel are required to improve the applicability of these results. *Data collected for FY23 and FY24.*
Rail Diesel	Consumption was calculated by Kiwi Rail using the induced activity method for system boundaries. The following assumptions were made: - Net Weight is product weight only and excludes container tare (the weight of an empty container) - The Net Tonne-Kilometres (NTK) measurement has been used. NTK is the sum of the tonnes carried, multiplied by the distance travelled. - National fuel consumption rates have been used to derive litres of fuel for distance. - Type of locomotive engine used, and jurisdiction topography, have not been incorporated in the calculations. Using the induced activity method, the trans-boundary routes were determined, and the number of stops taken along the way derived. The total litres of diesel consumed per route was then split between the departure territorial authority, arrival territorial authority and any territorial authority the freight stopped at along the way. If the freight travelled through but did not stop within a territorial authority, no emissions were allocated. This data is subject to commercial confidentiality. Data was not available for FY22 therefore the FY21 value has been used for FY22. *Data collected for FY23 and FY24.*
Jet Kerosene	Calculated using the induced activity method as per rail diesel. An estimate of fuel use was calculated for flights arriving and departing from Wellington and Kāpiti Airports:

	- The schedule of flights arriving and departing from the airport containing details on the aircraft used for each flight was used to calculate fuel consumption. - Flight distances and aircraft fuel burn rates were used for these calculations. - As per the induced activity method, only 50% of emissions calculated per one-way arrival and departure were allocated to Greater Wellington. The remaining 50% of each leg was allocated to the originating or destination location. An estimation of fuel use from military, freight, private, and other flights for FY22 has been estimated based on data provided in 2023. Wellington Airport has been treated as a regional airport, so emissions have been split between the territorial authorities in the region on a population basis. Kāpiti Airport has been treated as a local airport with all emissions allocated to Kāpiti Coast District. *Data collected for FY23 and FY24.*
Aviation Gas	Aviation gas is mostly used by small aircraft for relatively short flights. Data for Wellington and Kāpiti airports was not available for the FY22 inventory, so an assumption was made based on similar sized airports in New Zealand. This is the same assumption used in the FY20 inventory. Wellington Airport has been treated as a regional airport, so emissions have been split between the territorial authorities in the region on a population basis. Kāpiti Airport has been treated as a local airport with all emissions allocated to Kāpiti Coast District. No estimate of aviation gas usage has been made for aerodromes and other flights outside these two airports. This is expected to be a small emission source. *Adjustment of FY22 results based on population change for FY23 and FY24.*
Marine Diesel – Freight	Calculated using the induced activity method as per rail diesel and jet kerosene. An estimate of fuel use was calculated for vessels arriving and departing from CentrePort (Wellington Port): - The schedule of vessels arriving and departing from Wellington Port containing details on size of the vessel was used to calculate fuel consumption. - Shipping distances and vessel fuel burn rates were used for these calculations. - As per the induced activity method, only 50% of emissions calculated per one-way arrival and departure were allocated to Wellington Port. The remaining 50% of each leg was allocated to the originating or destination Port. International shipping passing through CentrePort was split by weight of cargo into ‘Logs’ and ‘All other cargo’. Emissions generated by ‘All other cargo’ has been allocated on a per capita basis between all territorial authorities in the Wellington Region. Emissions generated by ‘logs’ was split between territorial authorities, proportionally, by the percentage share of district forest area of harvest age (>26 years old). *FY23 calculated for the Wellington City Emissions Inventory 2023. No adjustment of the FY23 results for FY24.*

Marine Diesel (Local)	Port operational vessels: - Fuel use has been provided directly from Wellington Port (CPL) for FY21 - The FY21 figure has also been used for years since. - All emissions from this source have been allocated to Wellington City Local ferries: - Diesel fuel use has been provided directly by the ferry operator. - Electricity usage has been provided directly by the ferry operator (beginning in FY22) - All emissions from this source have been allocated to Wellington City Private use, other commercial operators, and commercial fishing: - Most small private boats use fuel purchased at vehicle gas stations so this consumption will be included in off-road transport petrol and diesel emissions. - No data was available to determine emissions from other commercial operators, and commercial fishing. *Adjustment of FY22 results based on population change for FY23 and FY24.*
Marine fuels – Inter-island ferries	Data has been provided by the ferry operators in commercial confidence. Assumptions of fuel use have been used where data was not provided. *No adjustment of FY22 results for FY23 and FY24.*
Cruise Ships	The GHG emissions from cruise ships for FY19 to FY24 has been calculated as part of a separate piece of work for Wellington City Council to understand the impact on Wellington City's emissions inventory profile. Cruise ship emissions have been estimated using the induced activity method as per rail diesel, jet kerosene, and marine freight. An estimate of fuel use was calculated for each vessel arriving and departing from Greater Wellington based on the estimated fuel consumption of each vessel, the distance travelled to and from Wellington, and while stationary in port. As per the induced activity method, for emissions produced during the journey to/from Wellington the emissions are allocated equally between Greater Wellington and the next/last port. Within Greater Wellington, 100% of Greater Wellington's cruise ship emissions are allocated to Wellington City. *Data collected for FY23 and FY24.*
LPG	Total North Island consumption data was used and then split on a per capita basis to determine the territorial authority's consumption. National LPG end use data has been used to breakdown consumption into Stationary Energy and Transport usage, these are then reported separately in their respective categories. *Adjustment of FY22 results based on population change for FY23 and FY24.*
Stationary Energy Emissions	
Consumer Energy End Use	Stationary Energy demand (e.g. electricity use, natural gas, etc.) is broken down by the sector in which they are consumed. We report Stationary Energy demand in the following categories: industrial (which includes Agriculture, forestry, and fishing); commercial; and residential. These sectors follow the Australia New Zealand Standard Industrial Classification 2006 definitions.

	In addition to Agriculture, forestry and fishing, the industrial sector includes mining, food processing, textiles, chemicals, metals, mechanical/electrical equipment and building and construction activities. Emissions from petrol and diesel used for Stationary Energy are not broken down into these sectors. Energy demand used for transport is reported in the Transport sector.
Electricity Consumption	Electricity demand has been calculated using grid demand trends from the EMI website (www.emi.ea.govt.nz) to obtain raw grid exit point data for Greater Wellington. Reconciled demand has been used as per EMI's confirmation. The breakdown into sectors is based on NZ average consumption per sector (residential, commercial, and industrial). *Data collected for FY23 and FY24.*
Public Transport Electricity	Electricity used in the public transport system is included in the Transport sector (where known). *Data collected for FY23 and FY24.*
Private Transport Electricity	Electricity used for private transport (e.g. electric cars, electric bikes, electric micro-mobility) has not been separated from other Stationary Energy electricity consumption due to a lack of reliable data.
Coal Consumption	National coal consumption data has been provided by MBIE for 2022. Regional industrial coal data has been provided by EECA. National residential and commercial coal consumption has been divided between territorial authorities on a per capita basis. Regional industrial coal consumption has been divided between territorial authorities on a per capita basis. *No adjustment of FY22 results for FY23 and FY24.*
Biofuel and Wood Consumption	For FY24, national biofuel consumption data has been provided by the Ministry for the Environment (MfE, 2023) for the 2021 year. This is the most recent year available. Biofuel consumption has been divided between territorial authorities on a per capita basis. Biofuel emissions are considered to be biogenic. Biofuel CO_2 emissions are not included in total gross emissions but are reported separately. FY20, FY21, and FY22 use the FY19 figure, adjusted for population change. *No adjustment of FY22 results for FY23 and FY24.*
LPG Consumption	North Island LPG sales data (tonnes) has been provided by the LPG Association for 2020 and 2021. Data interpolated between known data points or copied from the most recent data point where data is not available. 'Auto' and 'Forklift' sales represent Transport uses of LPG. All other sales represent Stationary Energy uses of LPG. Sales have been divided between territorial authorities on a per capita basis. The breakdown into sectors (Residential, Commercial, and Industrial) is based on NZ average consumption per sector as per MfE data. *Adjustment of FY22 results based on population change for FY23 and FY24.*

Petrol and Diesel (Stationary Energy end use)	Total petrol and diesel consumption in Greater Wellington was calculated from total petrol and diesel sold in the Wellington Region which was then apportioned out to the territorial authorities within the region based on the total distance travelled by vehicles in each territorial authority in the financial year (known as Vehicle Kilometres Travelled or VKT). As most petrol and diesel is used for transport uses, this provides the most accurate way of calculating this data. Total petrol and diesel fuel use was then divided by likely end use. The division into Transport and Stationary Energy end use (and within Transport, on-road and off-road) was calculated using fuel end use data provided by the Energy Efficiency and Conservation Authority (EECA) in April 2020. - On-road Transport is defined as all standard transport vehicles used on roads e.g. cars, bikes, buses. - Off-road Transport is defined as machinery for Agriculture, construction and other industry used off-roads. - Stationary Energy petrol and diesel use is defined as fuel not used for transport either on or off roads. Petrol and diesel used for Stationary Energy has been reported in the Stationary Energy sector. This method produces results for stationary uses of petrol and diesel that are heavily impacted by changes in transport uses of petrol and diesel. Better data and understanding of stationary uses of petrol and diesel are required to improve the applicability of these results. *Data collected for FY23 and FY24.*
Natural Gas Consumption	Natural gas consumption data has been provided by FirstGas. Territorial Authorities supplied by gas from each Point of Connection (POC) have been confirmed by FirstGas. *Data collected for FY23 and FY24.*
Biogenic Emissions	Some Carbon Dioxide (CO_2) emissions are considered to be biogenic. These are CO_2 emissions where the carbon has been recently derived from CO_2 present in the atmosphere (for example, some agricultural and Waste emissions). These emissions are not included in calculating total CO_2e.
Agricultural Emissions	
Agriculture	Agriculture emissions relates to emissions produced by livestock, crops and fertiliser in the geographic area. Agriculture emissions do not relate to imported foods or goods (reported in a consumption-based footprint), or agricultural activities such as farm transport or food processing within the geographic area (these are reported in this inventory under Transport or Stationary Energy respectively). Regional agricultural data from StatsNZ for 2023 has been used to calculate agricultural emissions, with the 2023 value used for 2024. Territorial authority-level livestock numbers and fertiliser data was taken from the 2017 Agricultural Census (StatsNZ) with the change in regional data used to estimate the change in livestock and fertiliser use in the individual territorial authorities since 2017. *Data collected for FY23 and FY24.*
Solid Waste Emissions	
Landfill Emissions	Landfill Waste volume and landfill gas capture system information has been provided by the respective council departments. Solid Waste emissions from landfill are measured using the IPCC First Order Decay method that covers landfill activity between 1950 and the present day, as per the GPC reporting requirements. This method accounts for the gradual

	release of emissions from waste over a long period of time, and so calculates the emissions produced per year from waste in landfill (including emissions from closed landfill sites). This approach differs from that used by individual councils for their organisational footprints which includes council-owned landfill sites. The predominant organisational footprint method calculates the likely future emissions from the waste entering landfill that year, and attributes those emissions to that year (and doesn't include emissions from waste already in the landfill, or emissions from closed landfill sites). Waste volume: - Where information is not available, waste volumes have been estimated based on historical national data on a per capita basis (MfE, 2023). - Contaminated soil has been excluded from the calculation to be consistent with previous years as it is considered to be inert for the purposes of this assessment (this differs from Council's organisational emissions inventory) Landfill gas capture system efficiency and Landfill gas flaring / burning for energy generation: - Data or assumptions provided directly from council or landfill management contacts Emissions are allocated to territorial authorities based on where the waste was produced, even if the waste is disposed in landfill outside the territorial authority. *Data collected for FY23 and FY24.*
Wastewater Emissions	
Wastewater Treatment Plants	Wastewater Treatment Plants: - Calculation of emissions includes emissions released directly from wastewater treatment, flaring of captured gas (if present) and from discharge onto land/water. - Wastewater treatment plant emissions have been calculated following the WaterNZ (2021) guidance based on information provided at the time of calculation. - Where data was not available, assumed values have been used based on the WaterNZ (2021) guidance. - Emissions relating to discharge of biosolids sent to landfill has been included in the Solid Waste emissions source. - The results for each treatment plant may differ from emissions calculated for other purposes (e.g. council organisational GHG reporting) due to the different requirements of GHG reporting for different purposes. - Emissions are allocated to territorial authorities based on where the wastewater was produced, even if the wastewater is treated outside the territorial authority. *Data collected for FY23 and FY24.*
Individual Septic Tanks	Individual Septic Tanks: - Populations not connected to known wastewater treatment plants are assumed to be using septic tanks. - The population not connected to centralised wastewater treatment has been estimated based on the number of rateable properties not connected to sewerage.

	Adjustment of FY22 results based on population change for FY23 and FY24.
Industrial Processes and Product Use Emissions	
Industrial processes	It is assumed that there are no significant non-energy related emissions of greenhouse gases from industrial processes in the Region (e.g. aluminium manufacture). *Data collected for FY23 and FY24.*
Industrial Product Use	National data covering industrial product use (e.g. fire extinguishers, refrigerants) have been estimated based on data provided in the New Zealand Greenhouse Gas Emissions 1990-2021 report (MfE 2023). Emissions are estimated on a per capita basis applying a national average per person. *Data collected for FY23 and FY24.*