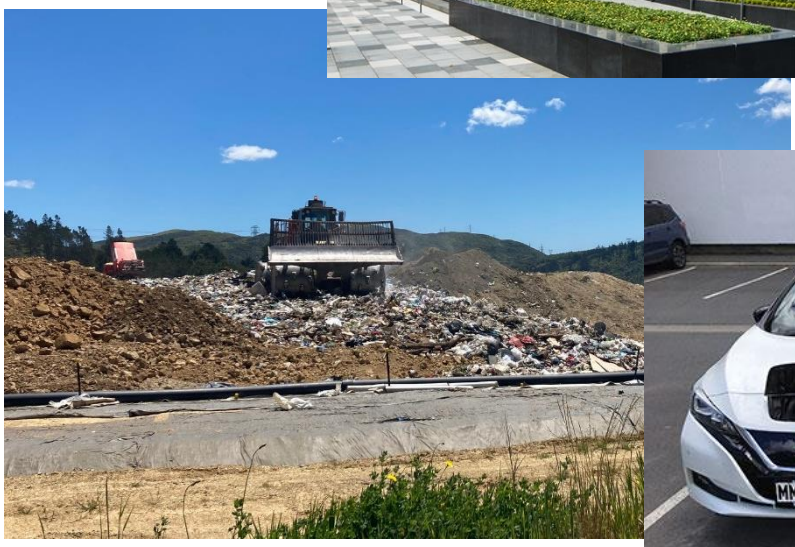
Hutt City Council's Organisational and Corporate Carbon Footprints



Date: 29/11/2021

Prepared by: Jonathan Linders and David Burt (HCC)

Reviewed by: Adrien Bouzonville (AECOM)

Contents

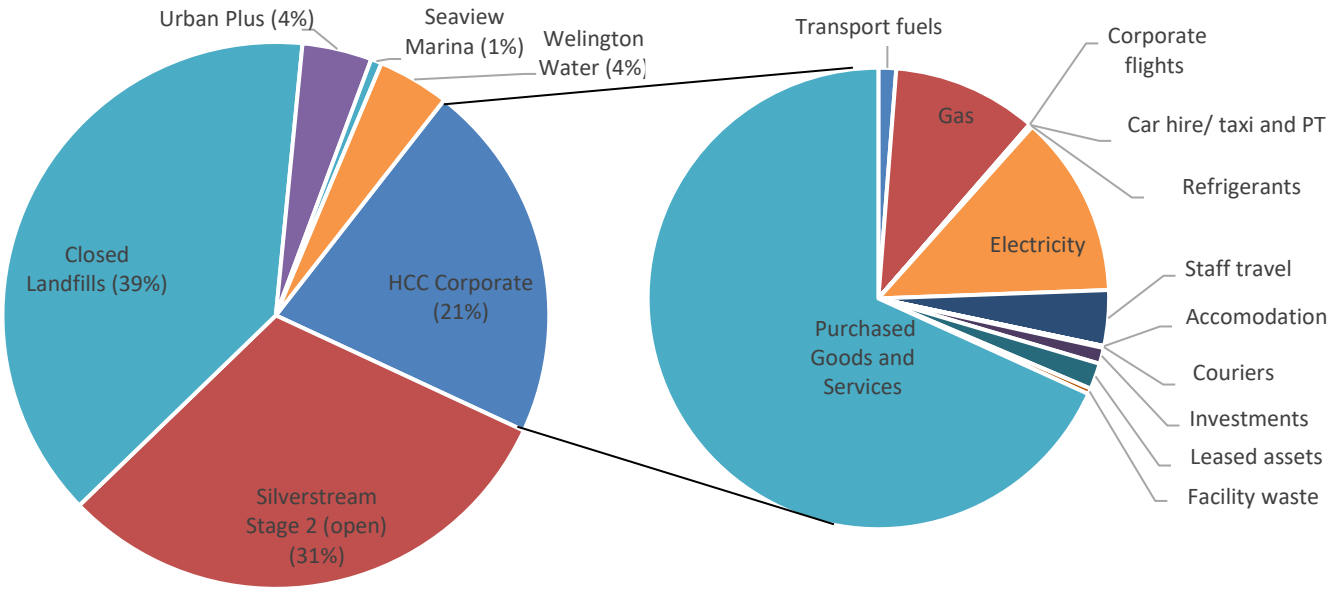
Executive summary

During the last three years, Hutt City Council has set a carbon target, declared a climate emergency, and developed its Interim Carbon Reduction and Resilience Plan 2021-31.

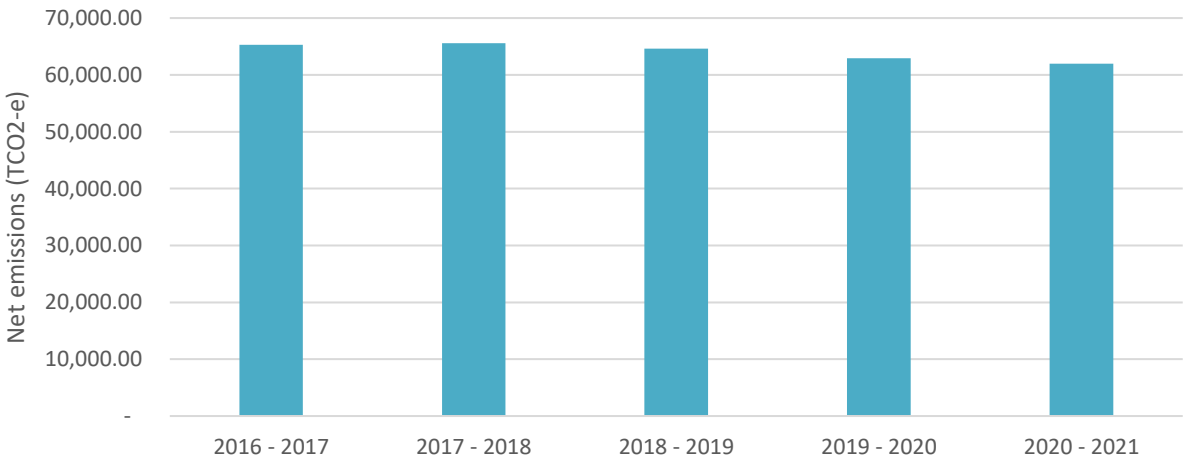
A full operational organisational footprint was last completed for the 2016/17 financial year. To measure our progress, an update has been prepared, for the 2020/21 financial year, and where possible, previous years.

The majority of Hutt City Council's organisational emissions are from the open landfill (Silverstream landfill Stage 2) and two closed landfills (Stage 1/1A at the Silverstream landfill, and Stage 3 of the old Wainuiomata landfill). The next largest emission sources are associated with the procurement of goods and services, and the use of energy at facilities. Other emissions sources, such as those associated with the operation of fleet vehicles and staff travel are relatively small.

Hutt City Councils net carbon emissions for the 2020/2021 financial year are 61,950 tCO_{2-e}:



In comparison to previous years, Hutt City Council's net organisational emissions have moderately decreased. Within the emission profile, some emissions have increased (eg Silverstream Landfill Stage 2), while others have decreased (eg air travel, vehicle fleet, closed Wainuiomata Landfill):



1 Disclaimer

1.1 Reporting organisation

Hutt City Council (Hutt City/HCC/Council)

1.2 Person responsible

Jörn Scherzer, Head of Climate and Solid Waste

1.3 Reporting framework

ISO 14064-1:2018[1] Annex F "*GHG inventory report structure and organization*" (pp 35 – 37)

1.4 Purpose of the report

To calculate the emissions and removals of Hutt City Council's organisational and corporate greenhouse gas (GHG) emissions. In 2018, Hutt City adopted a goal of zero organisational net GHG emissions by 2050, and regular reporting is required to monitor progress.

1.5 Intended users

- Hutt City staff, CLT and Council who will use the information to inform decision-making around organisational emission reduction and related activities, including the implementation of the Council's Interim Carbon Reduction and Resilience Plan 2021-31.
- Officers and elected members on Wellington regional bodies who will use the information to inform the development of regional emission reduction and related activities.
- Central or other government agencies, as applicable, who are charged with the monitoring of emissions and related activities.

1.6 Dissemination policy

The report will be made publicly available in a timely manner as part of the organisational reporting process to Council.

1.7 Reporting period and frequency of reporting.

The reporting period covers 1 July 2020 to 30 June 2021.

[1] Greenhouse gases – Part 1: "Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals." (Reference number ISO 14064-1:2018(E))

In addition, to the extent possible, emission data from the financial years 2016/2017 to 2019/2020 (1 July – 30 June) have also been calculated to measure our progress to enable a comparison with the carbon footprint developed by AECOM for 2016/2017[2].

In future, it is intended to measure GHG emissions and sinks on an annual (financial year) basis.

1.8 Data and information included in the report

Emissions and removals (as tCO_{2-e}) of the following greenhouse gases listed by the IPCC[3] are reported:

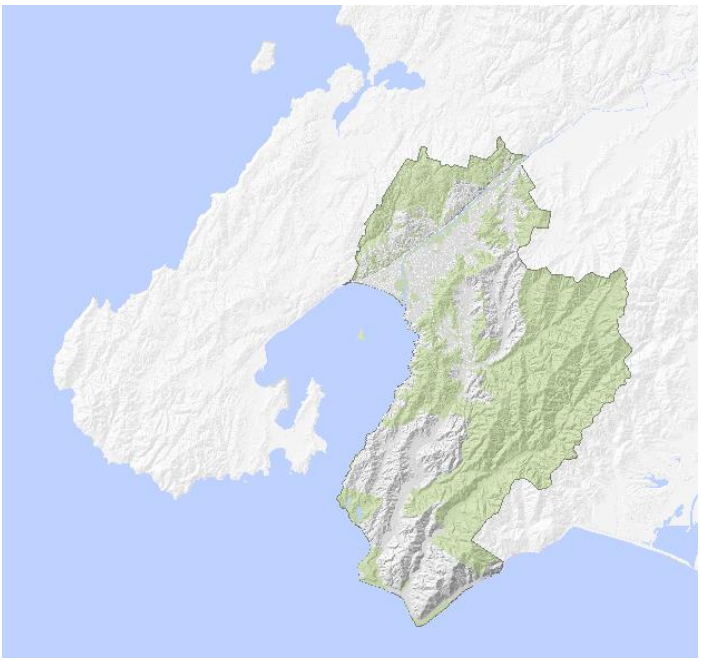
- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Fluorocarbons

[2] "Hutt City Council Corporate Carbon Footprint 2016/17", AECOM 13 August 2018 (Job No. 60577369). This report was developed using the "Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard" 2004. The emissions calculations for Scope 3 emission sources were informed by "Corporate Value Chain (Scope 3) Accounting and Reporting Standard" (2011).

[3] IPCC AR6, Working Group 1: "The Physical Science Basis" August 2021 Section A.1.1 Footnote 6 (page 41)

2 Organisational boundaries

Hutt City Council is the organisation established under the Local Government Act (2002) to administer the City of Lower Hutt.



Lower Hutt is New Zealand's sixth largest city with a population of 110,700 in 2020. Located at the north-eastern side of Wellington Harbour and extending over the bottom half of the Hutt Valley along the valley floor and sides. Lower Hutt is one of the four cities that constitute the Wellington metropolitan area.

While the organisation's activities are spread over several physical locations, (including the administration building, community facilities and libraries) these are reported collectively as the organisational GHG emissions and sinks.

The organisational boundary approach taken is that of equity share. For practicality the organisational footprint has been split into the following sub-groups:

- Corporate emissions, where Hutt City has full operational control, as well as full ownership. This includes council facilities (such as pools, and libraries), the corporate fleet, and corporate travel.

- Seaview Marina Ltd; of which HCC has full ownership, but not operational control. It is located at 100 Port Rd, Seaview, Lower Hutt 5010. The business provides berthing and other facilities for recreational and commercial boats. It is a Council Controlled Trading Organisation.

- Urban Plus Ltd (UPL); of which HCC has full ownership, but not operational control. It is located at Level 1, Corner of Queens Drive and Laings Road Lower Hutt 5010. UPL is a business involved in property development and rental housing. It is a Council Controlled Trading Organisation.

- Silverstream landfill (Stage 2) is the only operational landfill for the Hutt Valley. The landfill is owned and operated by Hutt City. It has a gas collection and destruction system in place, including a power plant and, since March 2021, a supplementary flare.

- Hutt City is also responsible for several closed landfills, including one in Silverstream (Stage 1/1A) and in Wainuiomata. Silverstream (Stage 1/1A) and Stage 3 of the old Wainuiomata landfill have been assessed to have remaining landfill gas production potential. These landfills will continue to produce emissions as the landfill contents decays over many years. While Silverstream (Stage 1/1A) has a gas collection and destruction system in place, Stage 3 of the Wainuiomata landfill does not have any current gas collection or destruction systems.

- The 20% equity share that Hutt City has in Wellington Water Ltd (WWL). WWL is the body responsible for providing "3 Waters" network management services to its local authority shareholders. Since the beginning of the 2020/2021 financial year, the entirety of the three waters pumping network's electricity has been paid for by HCC; prior to this some of the pumps and the associated electricity used were covered within Wellington Water's emissions. Hutt City has a 20% share in WWL, and varying degrees of ownership in particular assets (≈70% in the Wastewater Treatment Plant, 100% in the local pumps).

- It is noted that the Hutt City Community Facilities Trust[4] was wound up on 30 June 2021 and therefore, while reporting historical emissions from this source would be possible, it is asserted that this would serve no useful purpose from an emissions reporting or reduction perspective. The former Trust's assets are now operated by Hutt City, so the emissions are included in Hutt City's organisational emissions.

[4] HCC Minute No LTAP 20603 as noted in p148 in the Hutt City "Our 10-Year Plan 2021-2031"

3 Reporting boundaries

The reporting boundaries are defined (ISO 14064-1: 2018, #3.4.8 (page 6)) as the "*grouping of GHG emissions or GHG removals … within the organisational boundary, as well as those significant indirect emissions that are a consequence of the organisation's operations and activities".*

GHG emissions are classified as either direct (ie from GHG sources owned or controlled by the organisation), or indirect (ie GHG emissions that are a consequence of an organisation's operations or activities but that arise from GHG sources that are not owned or controlled by the organisation).

Indirect emissions may be further classified into significant emissions (and included in this GHG report) or insignificant indirect emissions which are not included in the report.

As per ISO 14064-1: 2018, emissions are grouped into six categories. The Greenhouse Gas Protocol groups emissions into three scopes. For comparison to other greenhouse gas inventories these terms may be used interchangeably as they translate directly, as below:

Scope	Category	Description
1	1	Direct GHG emissions and removals
2	2	Indirect GHG emissions from imported energy
3	3	Indirect GHG emissions from transportation
	4	Indirect GHG emissions from products used by an organisation
	5	Indirect GHG emissions associated with the use of products from the organisation
	6	Indirect GHG emissions from other sources

3.1 Direct emissions

Category 1 emissions accounted for include:

- Stationary fuel combustion: Carbon dioxide generated from burning gas and diesel, such as gas used in boilers to heat water in pool facilities.
- Mobile fuel combustion: Carbon dioxide generated from burning diesel and regular or premium unleaded petrol used in Hutt City vehicles (but excluding business travel outside Hutt City that requires hiring a car).
- Fugitive refrigerant gases: Hydro- and Perfluorocarbons used in HVAC equipment.
- Fugitive methane emissions from the Silverstream landfill (Stage 1/1A and Stage 2)[5].
- Flaring of methane combustion from the Silverstream landfill[6]. Expressed as tCO_{2-e} per annum and required by ISO 14061-1[7]. Outside this requirement in the standard (eg MfE[8]) where methane is recovered and flared or combusted for energy, the carbon dioxide emitted from the combustion process is regarded as part of the natural carbon cycle.
- Fugitive methane emissions from the closed Wainuiomata landfill (Stage 3).

3.2 Indirect emissions

Indirect (Category 2 to 6) GHG emissions are a consequence of an organisation's operations or activities but arise from GHG sources that are not owned or controlled by the organisation. The classification system used (ISO 14064-1: 2018, Annex B) is provided below:

- Imported energy - From the production of energy and utilities such as the use of electricity imported by the organisation.
- Transportation - Car hire, accommodation, and air travel for business trips; Employee commuting and working from home.
- Purchased goods and services - Emissions (including upstream) from capital goods purchased (equipment, machinery, buildings, facilities, and vehicles), and services located outside the organisational boundaries.
- Sold products – Lifetime emissions from the products sold (eg UPL houses).

[5] Arising from the anaerobic decomposition of organic material – to produce methane - that is neither collected for electricity generation nor destroyed by flaring.

[6] Used as a mitigation measure to reduce methane emissions when the gas that is collected is not, for operational reasons, burnt to produce electricity

[7] Required to be reported by the ISO 14064-1:2018 standard (Annex B.2.2 d) NOTE 3)

[8] Ministry for the Environment 2020 Measuring Emissions a Guide for Organisations: 2020 Detailed Guide Wellington Ministry for the Environment

3.3 Significance

The standard (ISO 14064-1, H.3.2) suggests several criteria that could be used to evaluate the significance of indirect emissions, such as:

- Magnitude.
- The level of influence around monitoring and reduction.
- The extent to which the source is an organisational risk or opportunity.
- Whether the source is deemed as significant by a key stakeholder.
- The impact on employee engagement around emission reduction activities.

Identifying and quantifying GHG emission sources (and sinks) enables the users of the information in this report to make informed decisions about the emission reduction measures to meet organisational goals.

With reduction efforts in mind, the key criterion for Hutt City in determining the significance is magnitude. Indirect emission sources that do not meet this standard (at least 1% of organisational gross emission) are insignificant (*de minimis*) and are therefore not reported. The other criteria are then also considered, with a focus on the need to engage employees to develop and embed a change management process and mind-set around emissions reduction. This applies both inside and outside the workplace, and any external (eg community, regional or central government driven) factors that need to be taken into consideration.

Hutt City owns several parcels of exotic and native forested land and plans to increase the areas planted in native forest[9]. The estimated sequestration of carbon from these areas (sinks) over the 2020/21 year has been taken as the values registered under the New Zealand Emission Trading Scheme.

3.4 Omissions and exclusions

Minimal information was available about IT networking and data storage. The spend on these services was captured within the 'Contracts' category of emissions.

No information was available about staff working from home.

Refrigeration leaks from Hutt City vehicle fleet were excluded on the basis that no information was available. It is noted that the fleet vehicles are relatively new (up to years 6 old) and no service problems relating to air conditioning systems were reported.

Emissions from demolition waste were not directly counted, as they are captured within the scope of emissions from Silverstream landfill.

Financial records are only held for seven years. As such, emissions from capital goods are excluded. However, these could potentially be included in the future based on the insured value.

Emissions from the use and end of life treatment of sold products are excluded as no data is available on these.

[9] "Interim Carbon Reduction and Climate Resilience Plan for Hutt City Council 20210 – 2031", Actions 17 and 18, page 36

3.5 Comparison of the 2016/17 and 2020/21 footprints

Hutt City's organisational emissions were last quantified by AECOM in 2018, for the 2016/17 financial year[10]. The 2018 report is not directly comparable to this update report, as methodologies and scope differ, as follows:

- The 2016/17 carbon footprint used the "Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard" 2004, whereas this update report uses "ISO 14064 -1:2018 Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals".

- The 2016/17 carbon footprint utilised the operational control approach, but this update report uses an equity approach, to better identify and quantify the organisational emissions.

- Carbon sequestered on forest land owned by Hutt City was not included in the scope of the 2016/17 carbon footprint, but this update report covers the carbon sequestered on forest land registered under the ETS

- Emissions from closed landfills were estimated in the 2016/17 carbon footprint. However, further work has since been carried out to assess the emission potential of all closed landfills, based on when they closed. Stage 3 of the closed Wainuiomata landfill has been modelled to still produce a significant number of emissions, and it is therefore included in this report.

3.6 Data confidence

Where available, uncertainty has been calculated from quantified values. If only qualitative uncertainties are available, these have been roughly quantified with a simple conservative approximation, as below. Standard error propagation rules were used.

Description	δ
Very high confidence	10%
High confidence	20%
Medium confidence	50%
Low confidence	80%
Very low confidence	90%

[10] "Hutt City Council Corporate Carbon Footprint 2016/17", AECOM 13 August 2018 (Job No. 60577369).

4 Methodology

Generally, emissions were calculated as per the guidelines described in *MFE, (2020). Measuring Emissions: A Guide for Organisations, 2020 Detailed Guide.*

Where data was insufficient to enable following the MFE guide, emissions were calculated by applying Motu derived emission factors to spending. See, *Romanos, C., Kerr, S., & Will, C. (2014). Greenhouse gas emissions in New Zealand: a preliminary consumption-based analysis.*

An inherent flaw of using the Motu factors ($tCO_{2-e}/\$$) is that this necessarily double counts emissions from waste going to a landfill. This is due to there being no clear method to quantify the waste portion of this emission factor, which should either be removed here, or from our landfill emissions.

The detailed calculations are available in a separate spreadsheet (DOC/21/113785).

- Electricity: The emissions were calculated as per MfE guidelines, within e-Bench[11] software. Energy consumption is supplied from the retailer through invoices, which includes line losses. This data is stored in e-Bench. This emission group includes all electricity that HCC is invoiced for; including electricity consumed in council facilities, the three waters, and street lighting.
- Natural Gas: The emissions were calculated as per MfE guidelines, within e-Bench. Energy consumption is supplied from the retailer through invoices, which includes distribution losses. This data is stored in e-bench. This emission group includes natural gas consumed in council facilities.
- Transport fuels (vehicle fleet): The emissions were calculated as per MfE guidelines. Volume of fuel used is supplied from the retailer (BP) to e-Bench. Council's vehicle fleet consumes both diesel and petrol. However, note that emissions from the electric fleet vehicles are captured within "Electricity", see above).
- Refrigerants: The emissions were calculated as per MfE guidelines. Refrigerant losses are noted by the maintenance company. This emission group includes refrigerants lost from Council's facilities.
- Corporate travel and public transport: The emissions were calculated as per MfE guidelines. Distance travelled and vehicle type are supplied from the retailer through e-bench. This emission group includes flights (short haul, long haul, and domestic), car hire, taxis, and shuttles.
- Urban Plus: Two calculation processes were used, as they yielded comparable results, we can be confident that the emissions are accurate. This emission group includes transport fuel, electricity, corporate flights, capital goods, and contracted services. The two methods are:
    - A calculation using Motu's emission factors and financial information supplied by UPL, yielding ≈2,680 tCO_{2-e}. Since this method is standard, it has been taken as the emission value for the net figures.
    - A calculation using a guide from the British Institute of Structural Engineers yielding ≈2,400 tCO_{2-e} (*J. Orr, O. Gibbons, W. Arnold, A brief guide to calculating embodied carbon, 2020)*.

[11] e-Bench is an energy and utility management cloud platform that tracks and benchmarks the total energy and carbon emission performance of any building, facility, or asset. It is operated by CarbonEES.

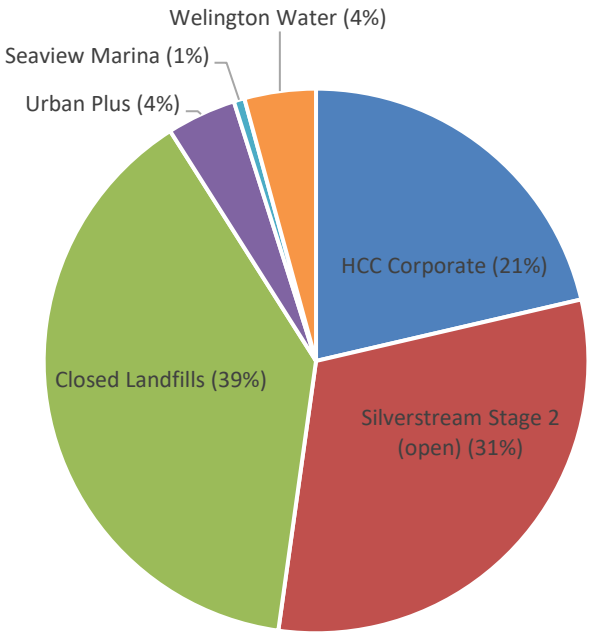
- Three waters: Data for the 2020/2021 financial year was not available. As such the emissions from Wellington Water Ltd's (WWL) most recent footprint were used. These emissions were adjusted, to account for the transfer of wastewater pumping electricity consumption from WWL's budget to HCC's budget. Upstream and downstream maintenance emissions were also included, taken from 2020/2021 budget information.
- Land Use: The sequestration data used was the amount of Hutt City owned forest land registered under the NZ Emission Trading Scheme.
- Landfills:
    - Silverstream Stage 2 (Open): See Appendix 2. The emissions reported here are not comparable to the emissions reported for the ETS liability. The emissions reported here are the actual emissions released in a year, while the ETS liability emissions are the lifetime emissions from the waste deposited in the landfill in the given year. The total emission value includes diffuse emissions.
    - Closed landfills (Wainuiomata Stage 3, and Silverstream Stage 1 and 1a): Discussed in Appendix 2.
- Seaview Marina: Data was supplied by the Seaview Marina Chief Executive. Emissions were calculated as per MfE guidelines. This emission group includes consumed diesel and LPG, and diesel sold to boat owners. Approximately 5% of this sold diesel is consumed within the Marina boundary.
- Domestic Staff Travel (to/from work): The emissions were calculated as per MfE guidelines. Data received via a staff survey. The travel options included were light vehicles, buses, trains, and active transport.
- Accommodation (associated with travel): The emissions were calculated as per MfE guidelines. Spend data was supplied by the HCC Finance team. MfE provides an emission factor based on number of nights spent in a room. Average nightly New Zealand hotel costs were retrieved from Statista.
- Facility waste: The emissions were calculated as per MfE guidelines. The mass of waste was supplied by council's waste management service provider. The waste categories used were general waste, co-mingled, food, and glass.
- Purchased Goods and Services: These emissions were primarily calculated by using Motu's emission factors and contract spend. Contract expenditure was supplied by either Hutt City Council's Head of Procurement, or the finance department. For some contracts, information regarding fuel use, energy use, and waste to landfill, or emissions data, were supplied directly by the contractor.
- Investments: The emissions were calculated by applying a Motu emission factor to financial information supplied by the HCC finance team.
- Leased assets: The emissions were calculated by applying a Motu emission factor to financial information supplied by the HCC finance team. Leased assets from CCO's were excluded due to a lack of data.

5 Results

5.1 Organisational footprint overview

Hutt City Councils organisational Carbon Footprint for 2020/21 is 61,950 $tCO_{2-e}year^{-1}$, 74% of these emissions occur as direct emissions (category 1) activities (46,050 $tCO_{2-e}year^{-1}$). 2,270 $tCO_{2-e}year^{-1}$ occur in category 2, and 13,630 $tCO_{2-e}year^{-1}$ occur as other indirect emissions (category 3-6).

When considering the organisational footprint in line with the organisational structure, the footprint can be viewed as follows, with the pie chart illustrating the relative significance:



Organisational emission source	Tonnage ($tCO_{2-e}year^{-1}$)
Closed landfills (Wainuiomata Stage 3, and Silverstream Stage 1/1A)	24,600
Open landfills (Silverstream Landfill Stage 2)	19,560
HCC Corporate	13,550
Wellington Water[12]	2,690
Urban Plus	2,610
Seaview Marina	410
Land Use	-1,470
Total	**61,950**

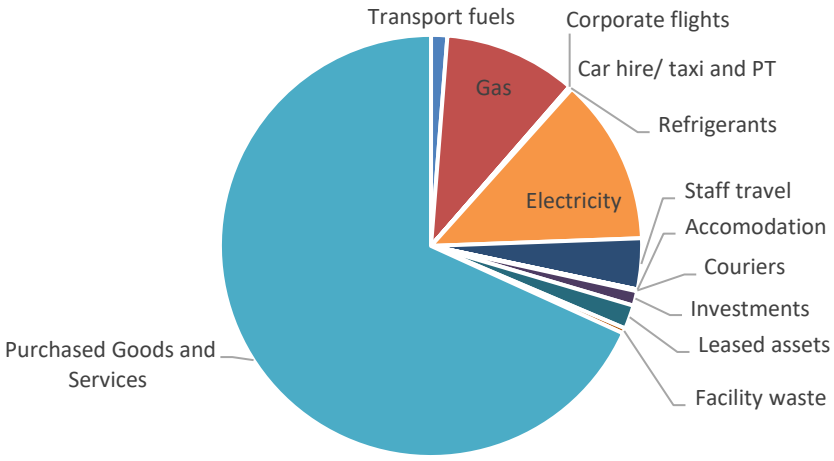
5.2 Corporate footprint overview

Hutt City Councils Corporate Carbon Footprint is 13,550 $tCO_{2-e}year^{-1}$. 75% of these emissions occur in indirect (category 3-6) activities (10,250 $tCO_{2-e}year^{-1}$), 1,735 $tCO_{2-e}year^{-1}$ (13%) occur in category 2, and 1,565 $tCO_{2-e}year^{-1}$ (12%) occur in category 1.

Indirect emissions are heavily skewed to one emission source, with purchased goods and services (9,280 $TCO_{2-e}year^{-1}$). Within indirect emissions, the other significant emission sources are Staff Travel (530 $TCO_{2-e}year^{-1}$), Investments (150 $TCO_{2-e}year^{-1}$), and leased assets (250 $TCO_{2-e}year^{-1}$). As below, there are already efforts in place to address these emissions.

Category 1 is equally dominated by a single emission source, natural gas use (1,380 $tCO_{2-e}year^{-1}$). However, Transport fuels, refrigerant leakage, and facility waste remain as significant emission sources within category 1.

When considering the corporate footprint in line with key emission sources, the footprint can be viewed as follows, with the pie chart illustrating the relative significance:



Corporate emission source	Tonnage ($tCO_{2-e}year^{-1}_{unrounded}$)
Purchased Goods and Services	9,281
Electricity	1,735
Natural gas	1,377
Staff travel (to and from work)	533
Leased assets	249
Transport fuels (vehicle fleet)	169
Investments	152
Facility waste[13]	*(55)*
Refrigerants	20
Couriers	18
Car hire, taxi, and public transport	8
Corporate Flights	5
Accommodation	1
Total	**13,548**

[13] Facility waste data is collected but not included in the total emissions figure, as they are captured in the Open landfills (Silverstream Landfill Stage 2) emissions figure.

5.3 Biogenic emissions

Hutt City Council has two sources of biogenic emissions: (open and closed) landfills, and wastewater sludge disposal. Emissions for wastewater sludge disposal are captured within the landfill's emissions. For the 2020/21 financial year, the total organisational biogenic emissions were 44,160 tCO_{2-e}, of which ≈596 tCO_{2-e} are due to Hutt City Council's portion of the wastewater treatment plant.

As discussed in Appendix 2. *Hutt City Carbon Footprint – Active and Closed Landfill Assessment*, biogenic CO_2 emissions are estimated at 1,330 tCO_{2-e}.

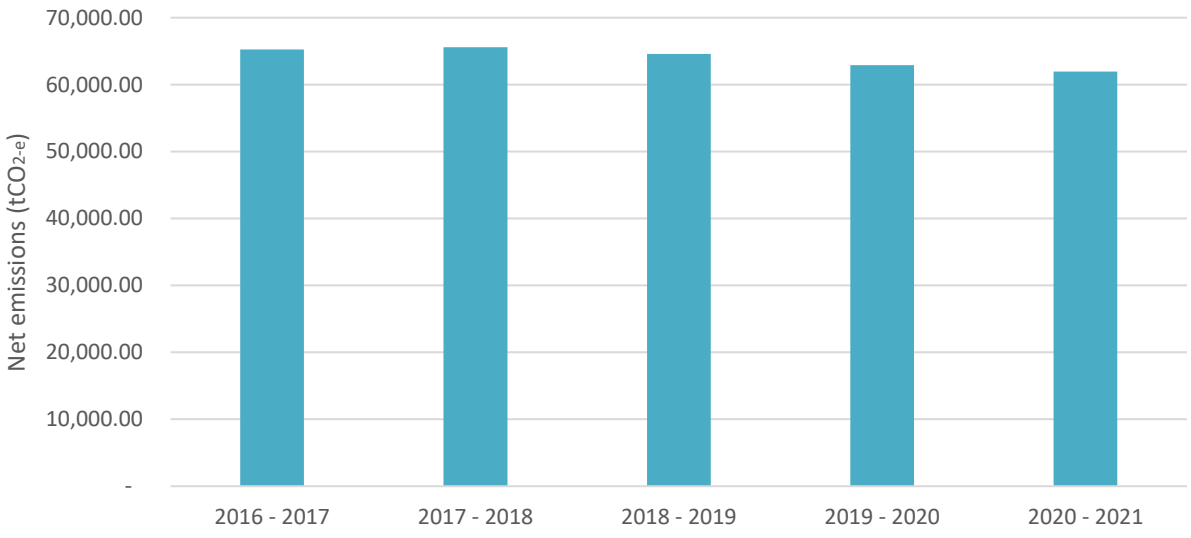
5.4 Carbon removals

Carbon sequestration has been estimated and included in this report by taking the forestry registered under the New Zealand Emission Trading Scheme. This only provides complete sequestration amounts for the 2018/19 and 2019/20 financial years. As such the other reported years take an average of these two. The total carbon sequestration for 2020/21 financial year was estimated at 1,468 tCO_{2-e}.

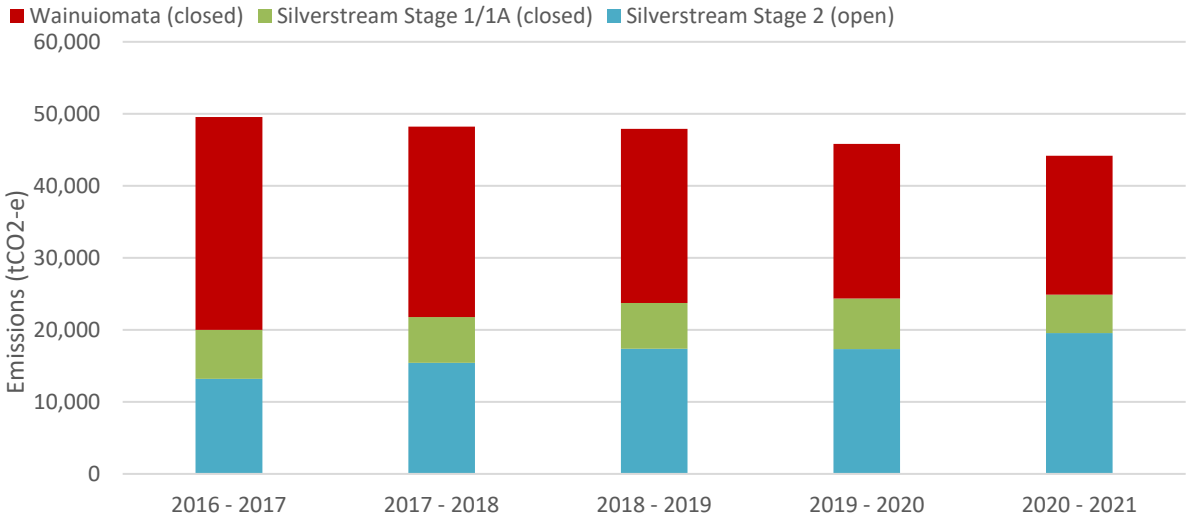
A planned increase in native forest cover will see the sequestration (LULUCF) figure and net emission position improve over time. However, this should not be taken as a signal that efforts to reduce organisational gross emissions can be reduced as both actions (reducing carbon emissions and increasing carbon sequestration by forests) are complementary and beneficial to our environment and the achievement of our net zero emissions organisational goal.

5.5 Five-year trends

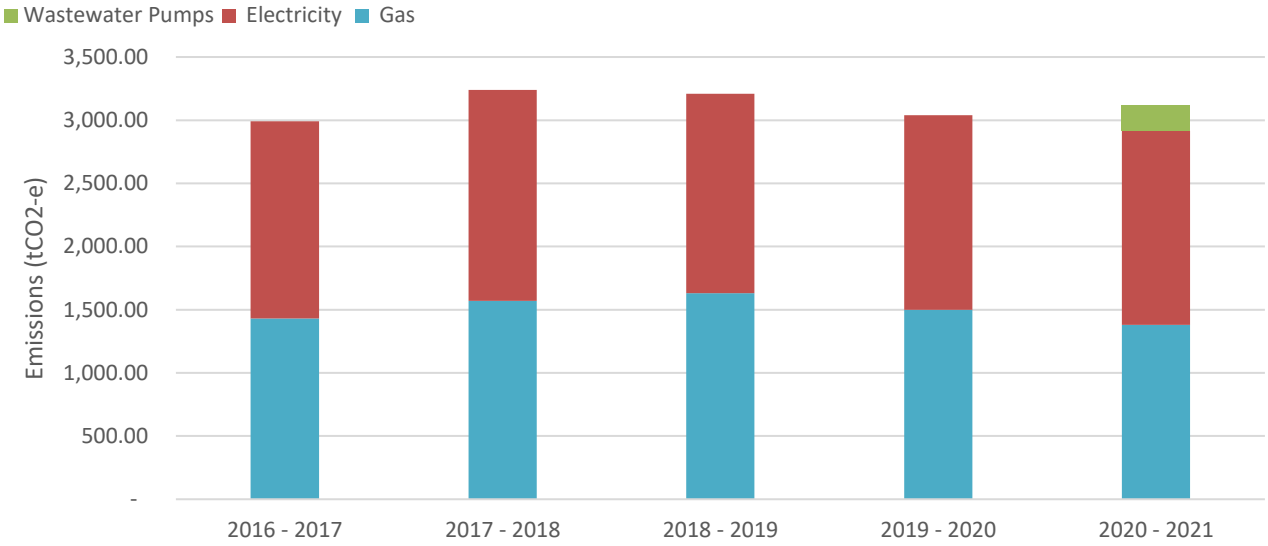
Over the five financial years considered in this report, HCC's organisational emissions have decreased by approximately 3,330 tCO_{2-e}:



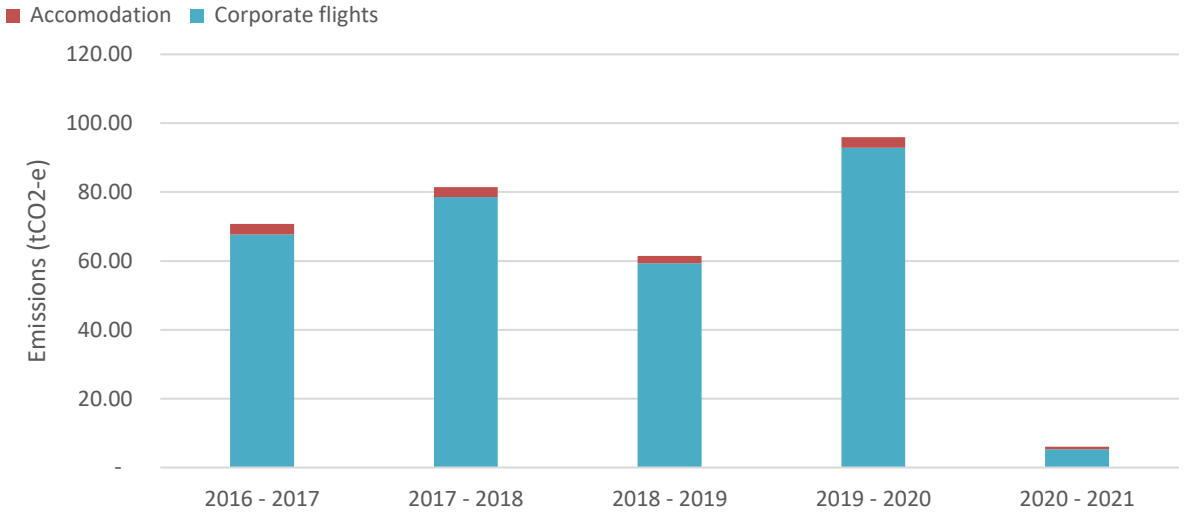
The only emission source to have significantly increased is the open landfill (Silverstream Stage 2), this is offset by a reduction in emissions from the closed landfills:



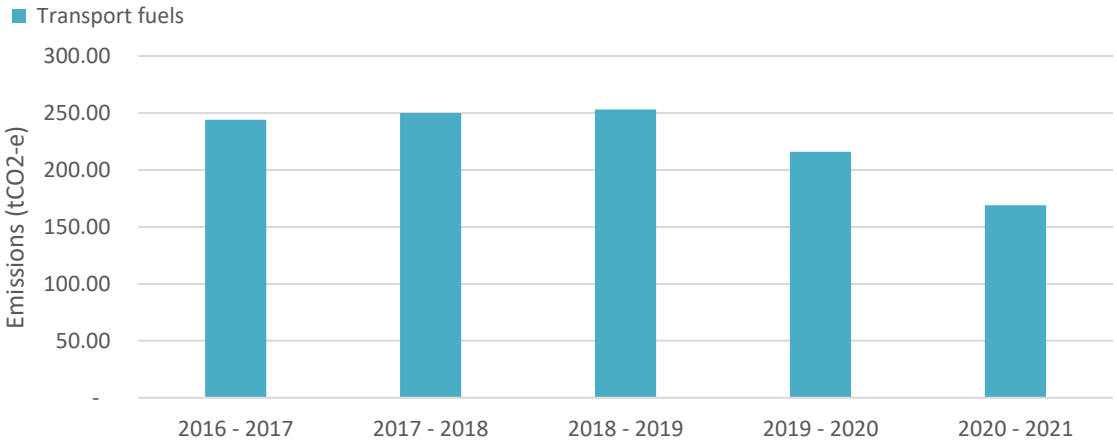
Emissions from electricity are also reported to have moderately increased, but this is primarily due to a transfer of the wastewater pumping stations from WWL to HCC ownership (as well as a decrease in the renewability of the national grid compared to 2016). When excluding the transferred wastewater pumps, energy emissions have also trended down over recent years:



As might be expected, the COVID-19 incursion in 2020 had a strong impact on some areas of the organisation, such as corporate flights and accommodation associated with travel. While a rebound can be expected in future years, we do not expect emissions from these sources to return to pre-pandemic levels, as online meetings/conferences have become more established.



The on-going initiative to electrify the Hutt City vehicle fleet has resulted in a significant drop in emissions associated with petrol and diesel vehicles, as shown below.



6 GHG reduction initiatives and internal performance tracking

Hutt City has committed to reducing its organisational emissions to net-zero by 2050[14], with a 50% reduction in emissions by 2030. HCC has already undertaken several initiatives to achieve this and further actions in the emissions reduction space are planned. Note that this section discusses mitigation only and excludes adaptation initiatives.

6.1 Planned reduction initiatives

The carbon reduction activity areas below are currently under a planned programme of work over the coming decade. Details of this work are provided in *Mahere Hukihuki Whakaiti Waro me te Manawaroa ā-Āhuarangi mō Te Kaunihera o Te Awa Kairangi Interim Carbon Reduction and Climate Resilience Plan for Hutt City Council 2021–2031*.

6.1.1 Category 1: Landfill emissions

Emissions from the Silverstream Landfill comprise the bulk of Hutt City Council's GHG emissions.

A new kerbside weekly rubbish collection and fortnightly recycling collection service has recently been introduced to Lower Hutt in July 2021. A new green-waste collection service is also available for households to take up, an initiative that will reduce emissions by diverting this material to a facility that uses this resource to produce compost.

Other activities are planned to further divert organic waste from landfill. These include the establishment of a new resource recovery park and the potential to recover food waste that could instead be used as a feedstock for a compost production facility.

The reduction of closed landfill emissions is also being investigated – such as the installation of a flare to burn off methane at the closed Wainuiomata landfill, which could reduce methane emissions at the site, potentially by 25–50 percent.

6.1.2 Category 1: Stationary fuel combustion

After open and closed landfills, this is the largest source of Category 1 emissions, primarily because of gas burnt in facilities such as pools for water heating. This source has stayed at similar levels over the past 5 years– between 1,380 tCO_{2-e}in 2020/21and 1,620 tCO_{2-e}in 2018/19. However, this emission source will decrease rapidly in the future as Council phases out gas heating and replaces all gas boilers with heat pumps by 2030. By 2050 council will have avoided ≈30,000 tCO_{2-e}.

6.1.3 Category 1: Transport fuel

Emissions from this source have reduced from 255 tCO_{2-e} in 2018/19 to 169 tCO_{2-e} in the past year because of efficiencies gained from a review looking at fleet utilisation and operating efficiency together with a staged transition away from ICE vehicles to electric vehicles in the vehicle fleet. As of

[14] Refer Footnote #13, e.g., Page 2

30 June 2021, Council had an EV share of 21% in its fleet. Council is aiming to achieve the target of 50% electric fleet by 2025 and 100% by 2030.

6.1.4 Category 1; Fugitive Refrigerants

Refrigerant losses were estimated at 36 tCO_{2-e} in 2016/17 and 20 tCO_{2-e} in 2020/21 and are not thought likely to have significantly exceeded this range in the intervening period.

By 2022 Council has committed to include a weighting factor (based on their Global Warming Potential impact) when new plant utilising refrigerants is purchased and will also consider potential drop-in replacements where appropriate.

6.1.5 Category 1: Corporate waste from facilities

At an estimated 54.6 tCO_{2-e}, this area is a small contributor (3.4%) to corporate emission and in practical terms is included in the Silverstream landfill emissions figure (above).

However, waste reduction is an important organisational goal and the collection process used to determine emissions in this area – bins of rubbish are regularly collected from various facilities – enables a focus on this area (eg staff education and other measures) at an area/facility level to help drive staff behaviour change in the waste minimisation area

6.1.6 Category 2: Electricity

Electricity, at 1,740 tCO_{2-e} (corporate) and 2,370 tCO_{2-e} (organisational) for the 2020/21 year is a significant contributor to both corporate (15%) and organisational (3.5%) level emissions for Hutt City. The current corporate figure is higher than the 2016/17 figure of 1,620 tCO_{2-e} primarily due to additional sites, such as the wastewater pumping network.

Hutt City has some initiatives planned in this area however, including:

- A programme of energy audits of facilities to reduce energy related expenditure where possible
- Upgrading the city's streetlights to LED lighting, which will save approximately 2,000 tCO_{2-e} by 2050.
- In addition, central government targets to improve the National Grid renewability, will also help deliver the desired carbon reductions in this area

6.1.7 Category 3: Corporate travel (flights, accommodation, car hire)

Air travel is a relatively small emissions source at 5.2 tCO_{2-e}. Due to Covid-19, a reduction of ≈90% on previous years has been achieved (from a peak of 93 tCO_{2-e}).

Corporate travel will be minimised by utilising online meeting technologies where practical. Council can also move to offset unavoidable flight emissions and establish a preference for electric vehicle technology when selecting a preferred taxi operator. The expected annual emission reduction from this initiative is likely less than 40 $tCO_{2-e}year^{-1}$.

6.1.8 Category 3: Staff Travel

Estimated at 630 tCO_{2-e} for the 2020/21 year and likely to have been at similar levels since 2016/17.

Hutt City Council is working toward installing secure active transport storage at the main administration building and will promote alternatives to ICE based transport options to/from work.

6.1.9 Categories 4 and 5: Emissions from Council Controlled Trading Organisations

6.1.9.1 Urban Plus Ltd

Presently the primary emission source for UPL is a result of construction and demolition activities (estimated based on spend).

In future the use of a Homestar v5 Technical Manual (Green Building Council) tool will be introduced which will enable a more accurate calculation of UPL's emissions. From 2021, Urban Plus will be building all housing to Homestar 6 which is expected to lead to a reduction in emissions.

6.1.9.2 Seaview Marina Ltd

Seaview Marina emits a relatively small volume of emissions through energy use and vehicles used; however, the primary emission source is via diesel sold to boat owners moored at the Marina. Opportunities to reduce emissions include the electrification of its vehicles and equipment, removal of gas from ablution facilities, offering electric vehicle charging to marina users, and possible options to decarbonise boat use (eg move to electric boats, offering electric boat charging, etc).

6.1.10 Category 4; Emissions from purchased goods and services

These emissions are from contracts (such as cleaning and a of range maintenance activities).

The emissions from these sources are calculated at 9,280 tCO_{2-e}CO2 for the 2020/21 year. Emissions from this source are thought to be more accurate than for the 2016/17 year, owing to the current data set being more comprehensive than earlier iterations.

Hutt City will be carrying out work to better understand the carbon footprint of the goods and services supplied by our contractors. To do this, rather than use industry-level emission factors, we will obtain data on emissions for each specific product or service (for example, through contractors doing their own detailed carbon footprints and enabling them to report those emissions to us). This will enable us to improve the way that we measure emissions associated with purchased goods and services, which can then be used drive changes to reduce emissions in this area.

6.1.11 Land Use

Increasing the amount of Council owned land planted in native forest will provide several benefits including increased biodiversity and an increase in the long-term sequestration of carbon dioxide.

Planned actions in this area include accelerating the reforestation of parts of Belmont Regional Park, improving the quality of forests on other reserve land, and setting up a carbon reduction acceleration fund. (If around 80 percent of council land in Belmont Regional Park were planted in native forest by 2025, it would have carbon sequestration benefits of approximately 86,000 tCO_{2-e} by 2050.

6.1.12 The Three waters

WWL has been operating a successful efficiency initiative for several years, optimising the pump stations to demand, and reducing energy use.

There is an opportunity to carry out an energy audit for the Wastewater Treatment Plant, with a subsequent study into sludge treatment options, and dryer replacement options.

6.1.13 Demolition waste

This is being reduced by efforts to recycle building material and divert waste from landfill. For example, the Naenae Pool rebuild has diverted 70% of waste from landfill, by recycling and repurposing.

6.2 Data quality recommendations

The largest sources of uncertainty in Hutt City's Carbon Footprint are within category 4 emissions: Purchased Goods and Services. To improve data, actual emissions data associated with relevant contracts should be established, working in collaboration with our contractors. This information should be compiled by August 31st of each year for inclusion in the annual carbon footprint. Estimating emissions based on contract spend provides highly uncertain values; this method accounts for waste generated by a contract industry, which then necessitates double counting as Hutt City Council has complete ownership of Silverstream landfill.

Presently corporate flights are grouped as short haul, long haul, or domestic flights, in pkm. In future these should also be categorised by aircraft type, if possible.

A Hutt City Council annual staff survey should be run specifically for carbon foot printing purposes, to ensure that all desired indirect emissions information is captured, and that this information is in a useful and accurate form. This should be run annually, preferably near the end of every financial year.

In future, more detail is needed from the three council-controlled organisations.

Tonkin+Taylor

Job No: 82948.017
22 October 2021

Hutt City Council
By email

Attention: Jörn Scherzer

Dear Jörn

Hutt City Carbon Footprint - Active and Closed Landfill Assessment

Tonkin and Taylor are pleased to provide an estimate of the carbon emissions from selected waste disposal sites. This work was requested by Hutt City Council (HCC) for inclusion in HCC's 2021 carbon footprint inventory.

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 below.

Table 1: Estimated emissions

Financial year	Emissions estimate (t CO_2e)		
	Silverstream		Wainuiomata
	Stage 1 & 1a	Stage 2	
2016/17	6,814	13,182	29,545
2017/18	6,375	15,416	26,412
2018/19	6,375	17,362	24,173
2019/20	6,995	17,356	21,487
2020/21	5,350	19,559	19,249

Note – The Silverstream emissions are after extraction and destruction is taken into account. No rounding undertaken to above figures at request of HCC, to match rounding elsewhere in inventory.

2 Comment on previous Silverstream assessment for 2016/17

In August 2018, Aecom provided Hutt City Council with a Corporate Carbon Footprint inventory[1], which included assessment of emissions from Silverstream Landfill (Stages 1, 1a and 2). The assessment estimated that 12,581 tCO_2e was emitted from Silverstream landfill during the 2016/17 financial year, which differs from the 20,000 tCO_2e in the table above for the combined emissions from Silverstream Stages 1, 1a and 2. The overall method used was the same to arrive at both figures, but the input parameters differed. The main difference is that the efficiency of the gas extraction was assumed to be 90% by Aecom, however in 2016 the efficiency dipped to an estimated

[1] Aecom (Aug 2018) Hutt City Council Corporate Carbon Footprint, 2016-17, prepared on behalf of Hutt City Council.

Tonkin & Taylor Ltd | Harbour Tower, Level 4, 2 Hunter Street, Wellington 6011, New Zealand | PO Box 2083, Wellington 6140
P +64-4-381 8560 F +64-9-307 0265 E wlg@tonkintaylor.co.nz

value of 84.2%[2]. If the Aecom report had assumed an efficiency of 84.2%, the emissions estimate in the Aecom report would have been 20,000 tCO_2e.

3 Comment on previous Wainuiomata assessment

A previous assessment of emissions for Wainuiomata Closed Landfill for the Hutt City Carbon Reduction Plan estimated lower volumes of carbon than those detailed in Table 1 above. The reason for this is that a methane Global Warming Potential (GWP) factor of 25 was used for the Reduction Plan estimate (the Ministry for the Environment standard) and a GWP of 34 was used for Table 1 above. The request to use a GWP of 34 came from the Carbon Inventory peer reviewer, Aecom, for the following reasons:

- *The GWP for Methane (34) was chosen as based on IPCC 5th report's figure with climate change feedback because it is appropriate for the type of assessment done e.g. it produces a conservative first order assessment of emissions.*
- *The use of the GWP 34 for methane is based on the recommendation of NZ's IPCC representatives. The use of climate change feedbacks is likely to be included in the IPCC 6th Assessment to be published in early 2022.*

4 Data sources

- Wainuiomata
  - Landfill gas generated (at 50% methane) has been estimated from Figure 3.1 of a Landfill Emissions Report[3], using the T+T Model (Red) line.
  - Wainuiomata has no gas extraction system, however, a 10% oxidation of methane when passing though the cap has been assumed.
- Silverstream, Stage 1 and 1a
  - Gas generation has been estimated assuming the same extraction and destruction efficiency as Stage 2.
  - 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 provided data only during the following periods:
    - 18 October 2019 to 19 November 2019 – average flow 267m3/hr
    - 4 January 2020 to 10 June 2020 – average flow 290m3/hr
    - 2 January 2020 to Present (11 October 2020) – average flow 210m3/hr
    - Using this data, the following average flows have been assumed:
      - July 2016 to June 2019 - average of the entire dataset, which is 229m3/hr
      - July 2019 to June 2020 – average of the data available during this time, which is 293m3/hr
      - July 2020 to June 2021 – average of the data available during this time, which is 210m3/hr
- Silverstream Stage 2
  - Carbon emissions have been estimated using the data from the UEF assessments for calendar years 2016 to 2020. For 2021, an interim UEF assessment has been used to estimate the gas generation and flow.

[2] Efficiency for financial year 2016/17 calculated by taking an average of the efficiency in calendar years 2016 (78.5%) and 2017 (90%)

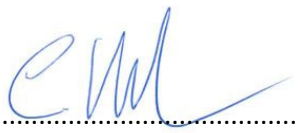
[3] T+T (March 2021) Wainuiomata closed landfill emissions investigation: Task 2 – Gas generation modelling, draft letter report, prepared on behalf of Hutt City Council.

5 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

Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
	
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Chris Hillman	Ed Breese
Senior Environmental Engineer	Project Director

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