

Upper Hutt City Council Corporate GHG Emissions

FY2018-19

Prepared for Upper Hutt City Council (UHCC)
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Executive Summary

Upper Hutt City Council (UHCC) commissioned Carbon EMS to calculate its organisational greenhouse gas (GHG) inventory for their financial year FY2018-2019.

This inventory is a calculated estimate of all GHGs emitted as a result of activities under the control of the Council between 1st July 2018 and 30th June 2019. An estimate of the GHG emissions from the waste generated by the community, thus outside of the operational boundary, has also been calculated.

This report serves to highlight key emission sources for future management, establishes a baseline year for the inventory, provides recommendations on carbon reducing opportunities and importantly demonstrates to key stakeholders that the Council is actively involved in measuring, monitoring and managing its GHG emissions.

Organisational GHG emissions for UHCC for the 2018/19 reporting period are estimated to be 3,879 tonnes carbon dioxide equivalent (tCO₂e).

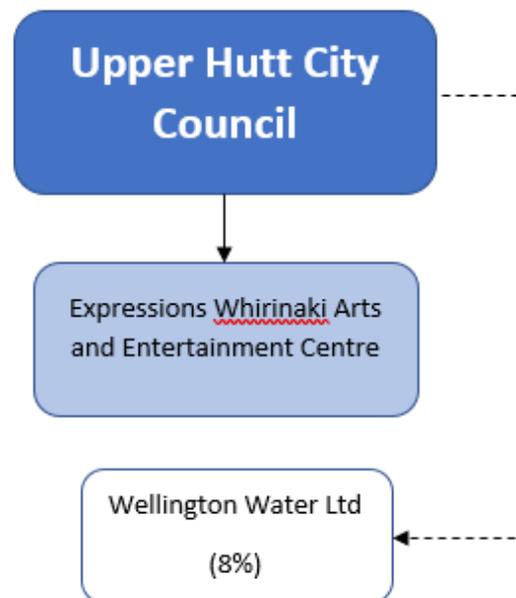
Methodology

The Upper Hutt City Corporate Carbon Footprint was developed in accordance with 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).

Boundary

The geographic boundary of the Upper Hutt City Council is defined by the Council's area of jurisdiction. The organisational boundary follows an operational control approach. As such, this emissions inventory includes all sources associated with activities UHCC had operational control over in the period 1st July 2018 to 30th June 2019.

Figure 1 - Upper Hutt City Council activities and groups defined within the organisational boundary



Results

Overall it was estimated that total emissions from Upper Hutt City Council were 5,875 tonnes of CO₂e from 2018/19. A large proportion of the total emissions were from the GHG emitted from the community waste and recycling, which lies outside of the organisational boundary of UHCC.

Excluding emissions from community waste and recycling; UHCC is responsible for approximately 3,879 CO₂e. Most of the corporate emissions are a result of purchased goods and services (54.2%) capital goods purchased (15.7%), and natural gas consumption (16%).

A high-level breakdown of the emission sources and their related emissions is provided below.

Table 1 – Emissions sources and their related emissions

Source	t CO ₂ e	% of total	% of Corporate
Scope 1			
Stationary Fuel Combustion (Gas)	622	10.6%	16.0%
Mobile Fuel Combustion (Diesel, Petrol)	102	1.7%	2.6%
Fugitive Emissions (HVAC)	31	0.5%	0.8%
Scope 2			
Purchased Electricity	260	4.4%	6.7%
Scope 3			
Purchased goods and services	2,101	35.8%	54.2%
Capital goods	608	10.3%	15.7%
Fuel and energy-related activities	117	2.0%	3.0%
Waste generated in operations	0.35	0.01%	0.01%
Business travel	15	0.3%	0.4%
Employee commuting	23	0.4%	0.6%
Outside of Organisational Boundary			
Community Waste Collected	1,728	29.4%	0%
Community Recycling Collected	268	4.6%	0%
Total	5,875	t CO₂e	
Corporate	3,879	t CO₂e	

Opportunities and Recommendations

We see opportunities to reduce organisational emissions around the natural gas use for public pools, electricity consumption and vehicle fuel usage.

Additionally, the emissions associated with products and services procured by UHCC are the most significant emissions source for the council, comprising 54.2% of the overall organisational footprint. Although making significant reductions in these emissions would be difficult, we recommend encouraging sustainable practices by UHCC suppliers, e.g. through sustainable procurement policies.

1.0 Introduction

Upper Hutt City Council has commissioned Carbon EMS in August 2019 to calculate its organisational greenhouse gas (GHG) inventory for their financial year 2018/2019. This report contains the results and discussion around that assessment and provides recommendations on possible GHG emission reduction measures.

This GHG inventory is a calculated estimate of all GHGs emitted as a result of activities under the control of the Council between 1st July 2018 and 30th June 2019.

There are objectives to this foot-printing project are to:

- Provide information to the Council on their overall organisational GHG emissions for Scope 1, 2 and 3 emission sources
- Highlight key emission sources for future management
- Recommend high level actions that would enable the Council to reduce its emissions
- Provide a GHG emissions baseline to measure future performance against and to provide the context in order to set a council wide (organisational) emissions target.

2.0 Methodology

This assessment follows the guidelines in the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard*, published by the World Business Council for Sustainable Development and the World Resources Institute, 2004. This section covers the following areas: boundary definition and exclusions, emission factors, activity data, assumptions and limitations.

Figure 3 - Upper Hutt City location and geographic boundary



Image source: <http://www.lgnz.co.nz/assets/North-Island-PNG.PNG>

2.1 Organisational Boundary

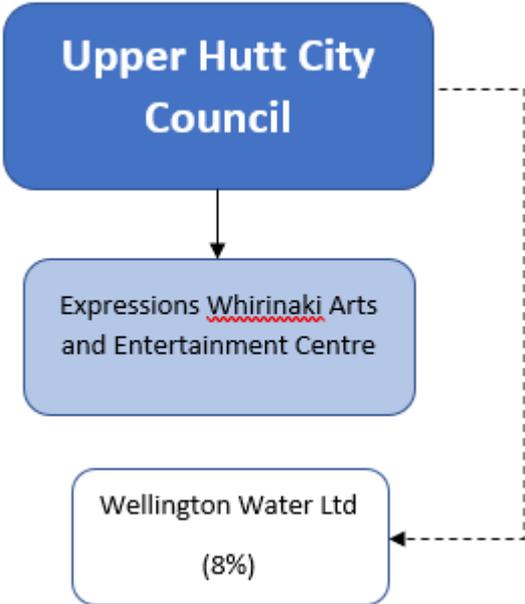
When undertaking an emissions inventory study, it is essential to first establish the organisational boundary for the inventory. In this study, the organisational boundary is defined using the operational control approach.

As such, this emissions inventory includes all sources and sinks associated with activities where UHCC has control and the full authority to introduce and implement its operating policies.

Figure 2 illustrates the organisational boundaries as defined in this report. UHCC fully owns the Expressions Whirinaki Arts and Entertainment Centre and is considered to have full operational control of the centre. UHCC also holds an 8% share of Wellington Water Ltd but does not have operational control over its activities.

Additionally, UHCC sends the community waste and recycling that it collects to the Silverstream landfill however the council does not own or have operational control over the landfill. Thus, these emissions are excluded from the organisational boundary. However, an estimate of these emissions is included in this report for council to understand the emissions generated by the community waste and recycling.

Figure 1 - Upper Hutt City Council activities and other groups defined within the organisational boundary



2.1.1 Exclusions

The following emissions have been excluded from the organisational carbon footprint.

Table 2 - Emission sources excluded from UHCC footprint

Potential emission source	Reason for Exclusion
Emissions from landfills (scope 1)	UHCC does not operate Silverstream Landfill for which the community waste is treated. It is wholly managed by Hutt City Council. Therefore, the emissions from community waste would fall under Hutt City Councils scope 1 emissions and not UHCC. However, these emissions have been estimated and included in this report as a reference.
Fugitive emissions from vehicles (scope 1)	Emissions from refrigerant loss from council owned vehicles have been excluded. No data on the type or volume of refrigerants contained in vehicle air conditioning systems was available. These emissions are assumed to be insignificant.
Downstream leased assets (i.e. assets leased to 3rd parties – Scope 3, Category 13)	No operational control
Downstream transportation and distribution (Scope 3, Category 9)	None identified or not applicable
Processing of sold products (Scope 3, Category 10)	
Use of sold products (Scope 3, Category 11)	
End-of-life treatment of sold products (Scope 3, Category 12)	
Franchises (Scope 3, Category 14)	
Investments (Scope 3, Category 15)	None identified or not applicable
Upstream transportation and distribution (Scope 3, Category 4)	
Upstream leased assets (i.e. assets leased by 3rd parties - Scope 3, Category 8)	Already included in scope 1 & 2 emissions

2.2 Operational Boundary

Within the organisational boundary, an operational boundary of emission sources or activities is then defined. Using the operational control approach, all direct emission sources within the organisational boundary defined above are reported as Scope 1, with all remaining emissions reported as Scope 2 or 3 emissions. The table below provides more explanation on the concept of scope.

Table 3 - Scopes as defined in the Greenhouse Gas Protocol

	Definition	Example
Scope 1: Direct emissions	Direct emissions that occur from sources owned or controlled by UHCC	The combustion of fuels in the vehicle fleet
Scope 2: Electricity indirect emissions	Emissions associated with the generation of electricity that is purchased by UHCC	Electricity consumed by street lights and council buildings
Scope 3: Other indirect emissions	Emissions that are a consequence of UHCC's activities, but from sources they do not own or control	Business taxi and air travel

2.3 *Inventory Emission Sources, Emission Factors and Activity Data*

This section describes the activities covered within each scope. A brief description is provided on each activity, covering where activity data was collected and where emission factors were sourced, along with a comment on the data quality (see Appendix A for details). Emission factors all include the 7 greenhouse gases (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃) in accordance with requirements under the GHG Protocol. Emission factors are derived from a range of sources, principally from MfE (2019) with missing factors acquired from DEFRA (2019) and Motu (2014). The individual sources are provided in the accompanying Excel spreadsheet.

2.3.1 Scope 1 Direct Emissions

Stationary Fuel Combustion (Natural Gas)

Natural gas is consumed at 3 UHCC operated locations, mostly for hot water heating at the H20 Xtream public pools. e-Bench® was used as a recording tool for Natural Gas consumption. The emission factor was taken from MfE (2019). Both data collected and emission factors are considered to be of a high quality (M1).

Mobile Combustion

UHCC has approximately 33 vehicles in its fleet. The vehicles run on either diesel, regular or premium unleaded petrol. Fuel consumption data has been provided through e-Bench®. Emission factors were taken from MfE (2019). Both activity data and emission factors are considered to be of a high quality (M1).

Fugitive Emissions (HVAC)

This covers the leakage of refrigerant gases used in both the domestic-sized refrigerators and the heating, ventilation and cooling (HVAC) systems of Council operated entities. Refrigerant consumption data has been recorded in e-Bench®. Emissions factors were taken from MfE (2019). Both activity data and emission factors are considered to be of a high quality (M1).

2.3.2 Scope 2 Indirect Emissions

Electricity

Electricity consumption data has been provided by e-Bench®. Data is available for electricity usage across the different Council operated entities. Emission factors were provided by MfE (2019) for the 2016 calendar year. Both activity data and emission factors are considered to be of a high quality (M1).

2.3.3 Scope 3 Other Indirect Emissions

Purchased Goods and Services and Capital Goods

Activity data for these Scope 3 indirect emission sources are extracted from the Council's annual report (with the exception of purchased paper). Emissions under this category were estimated based on Motu (2014) emissions factors for average industry sectors and activities in New Zealand. Quantities of purchased paper was obtained from UHCC and these emissions were calculated using an DEFRA (2019) emission factor. The quality of this data is considered to be satisfactory (E2).

Fuel and Energy-Related Activities

Activity data was the same as the relevant scope 1 and 2 emissions sources (Electricity, Petrol, Diesel, Gas) already mentioned. Emissions factors were from MfE (2019) and DEFRA (2019). This data is considered to be of a high quality (M1).

Waste Generated in Operations

Activity data for waste generated solely in council operations was unavailable. Community waste data was provided however, it was not possible to isolate waste generated by council operations. Hence, an estimate was made using the number of staff days during the financial year. The average office waste per staff day was sourced from World Bank (2018). The quality of this data is considered to be satisfactory (E2).

Business Travel

Air Travel - data has been sourced from e-Bench® and has been reported for “Domestic’, ‘Short Haul International’ and ‘Long Haul International’. The emissions factors applied to this data have been sourced from MfE (2019). Both activity data and emission factors are considered to be of a high quality (M1).

Hotel Accommodation - room nights were sourced from e-Bench® and were reported as either Australian based (AU) or New Zealand based (NZ). Emissions factors were sourced from MfE (2019). Both activity data and emission factors are considered to be of a high quality (M1).

Taxi/Uber travel – spend data was sourced from e-Bench® and the emissions factor was sourced from MfE (2019). The quality of this data is considered to be satisfactory (E2).

Employee Commuting

A voluntary staff survey (n=94) was carried out in order to estimate the emissions from employee commuting. Given that the survey was voluntary, and participants were not randomised there may be some bias towards those who are environmentally conscious. With that in mind, the response rate was high, and the sample size was roughly half of the full-time employees. Emissions factors for each mode of commute was sourced from MfE (2019). The quality of this data is considered to be satisfactory (E2).

2.3.4 Outside of Organisational Boundary

Community Waste & Recycling

Activity data for community waste and recycling was sourced from e-Bench®. It was originally provided by UHCC. The emissions factor used for estimating the emissions from this waste was sourced from MfE (2019). The emissions factor used for estimating the emissions from Recycling was sourced from David A. Turner, Ian D. Williams, Simon Kemp (2015). Both activity data and emission factors are considered to be of a high quality (M1).

3.0 Results

This section presents the results of this GHG Emissions Inventory. It offers a broad overview covering all of the activities or groups combined and a detailed review at each individual activity or group. It concludes with a focus on each of the key emission sources.

3.1 All Activities and Scopes

In 2018/19, UHCC's total GHG emissions is calculated as 5,875 tonnes CO₂e, of which 755 tonnes are direct emissions (Scope 1), 260 tonnes are from electricity indirect emissions (Scope 2) and 2,864 tonnes are indirect Scope 3 emissions. Additionally, 1,996 tonnes of emissions are outside of the organisational boundary.

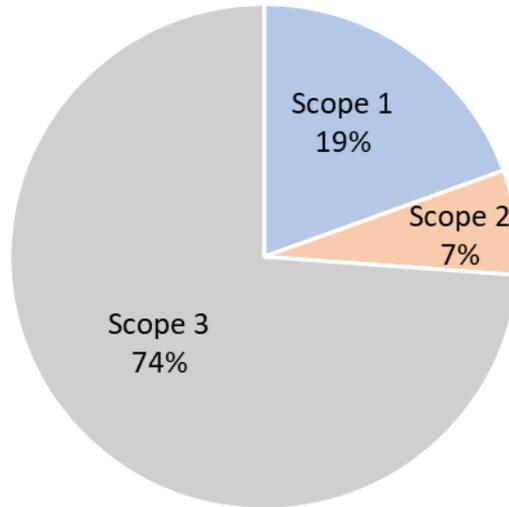
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Total	5,875	t CO₂e	
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3.2 Corporate Emissions (excl. Community Waste & Recycling)

The majority of UHCC corporate emissions are Scope 3 (74%), followed by Scope 1 emissions (19%) and Scope 2 emissions (7%). As shown in the breakdowns below, Purchased Goods and Services (Scope 3) are the largest emissions source followed by Stationary Fuel Combustion (Gas, Scope 1).

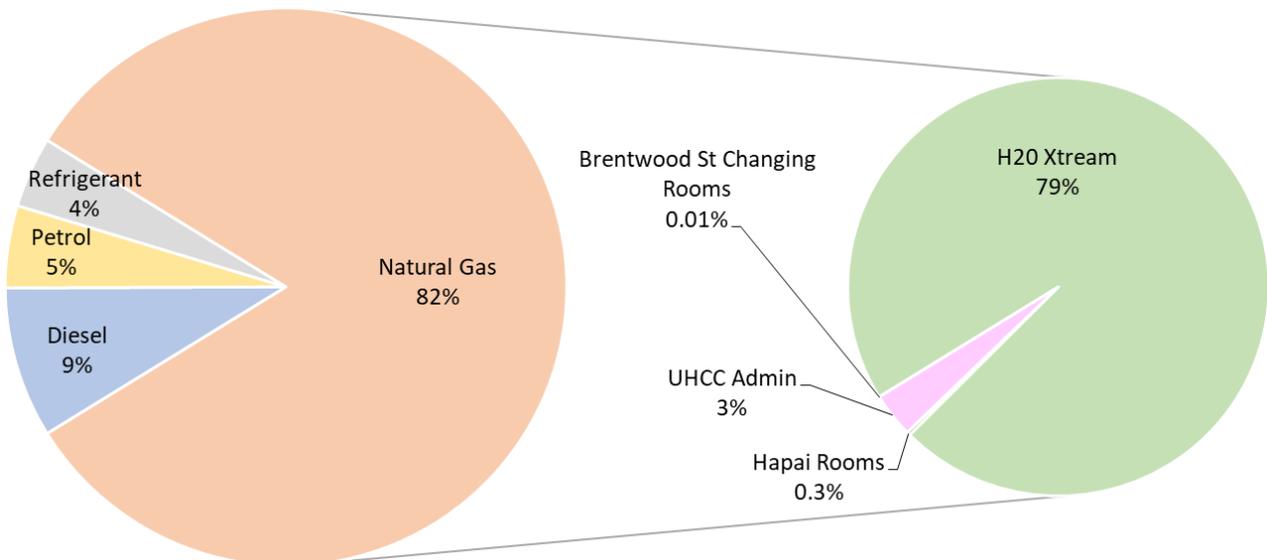
Figure 2 – Corporate Emissions by Scope



3.2.1 Scope 1 Emissions

Scope 1 emissions represent the second largest source of emissions, accounting for 19% of the overall corporate footprint. Most of these direct emissions come from the gas consumption at the H2O Xtream public pools, which is responsible for 598 tCO₂e.

Figure 3 - Scope 1 Emissions by Source (total 755 tCO₂e)

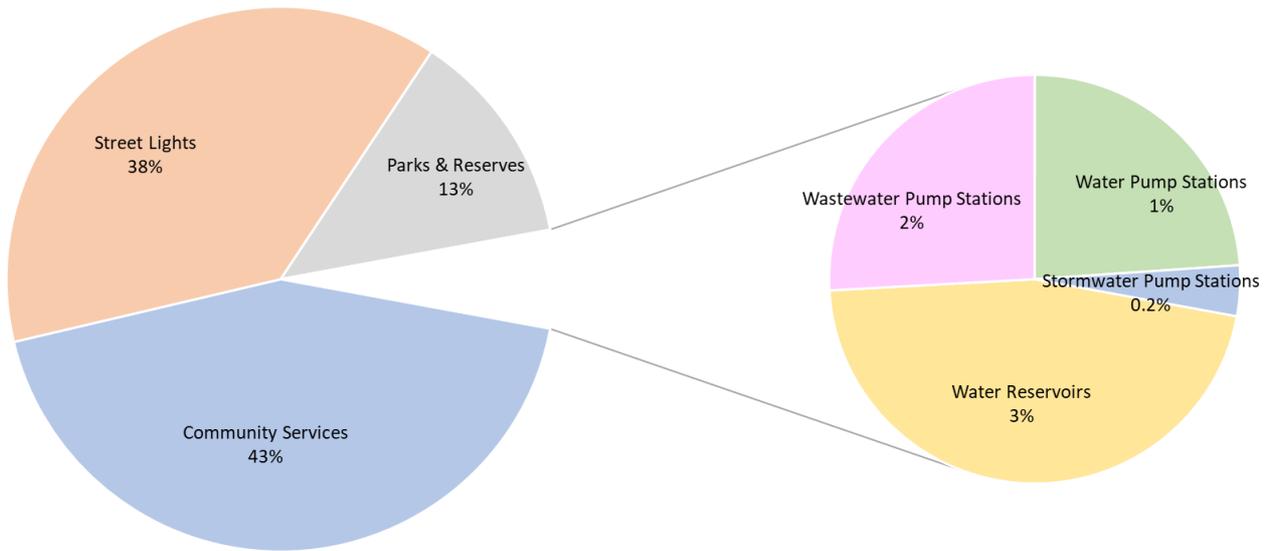


Natural gas at the H2O Xtream public pools is consumed for water heating and represents 79% of the total scope 1 emissions. This is followed by fuel consumption in council vehicles with Diesel at 9% and Petrol at 5%.

3.2.2 Scope 2 Emissions

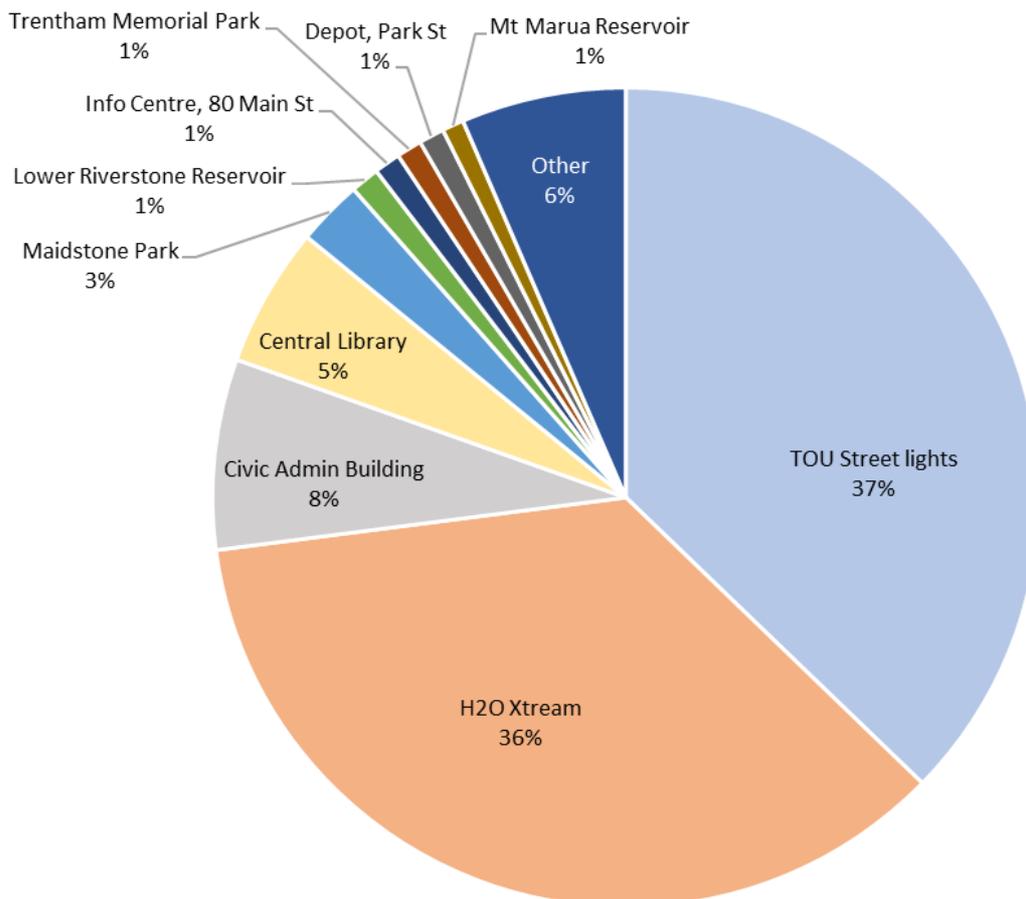
Scope 2 emissions are entirely generated from consumption of grid supplied electricity, resulting in 260 tCO₂e or 7% of the corporate emissions of UHCC.

Figure 4 - Scope 2 Emissions by Meter Group (total 260 tCO₂e)



As shown in Figure 4, most of the Scope 2 emissions come from the electricity consumed by activities categorised as Community Services (43%). The second largest source of Scope 2 emissions are the Street Lights (38%) and the third are the Parks & Reserves (13%).

Figure 5 - Scope 2 Emissions by Site (total 260 tCO₂e)

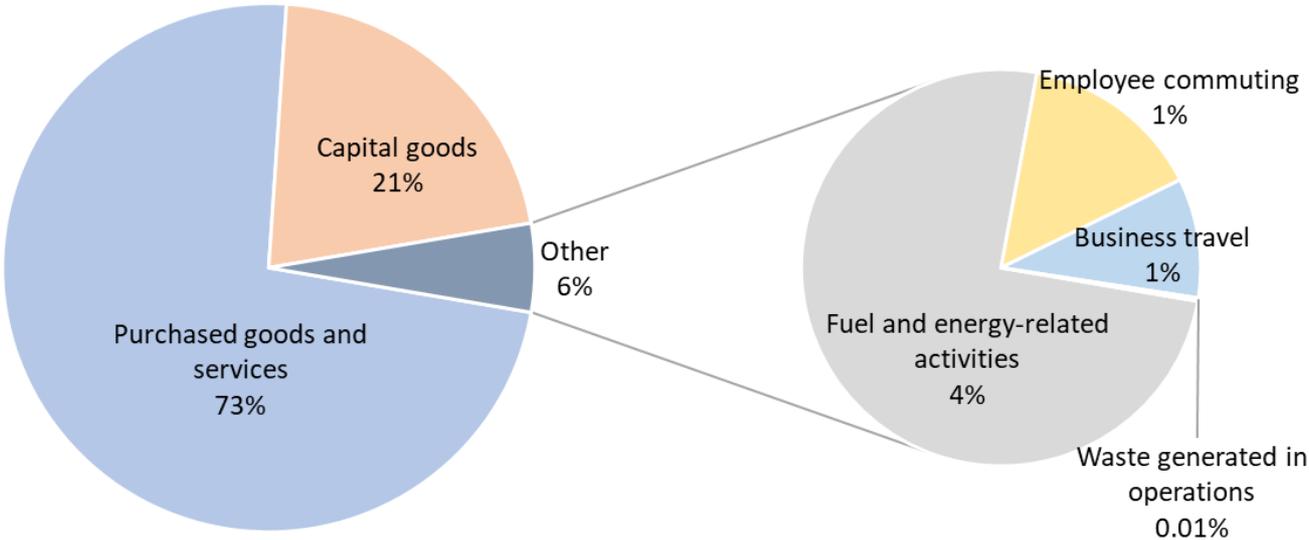


When the Scope 2 emissions are broken down by site, TOU Street Lights (multiple sites) are the largest source (37%) and the H20 Xstream site is the second source (36%) of Scope 2 emissions. The third largest source is the Civic Admin Building (8%) followed by the Central Library (5%).

3.2.3 Scope 3 Emissions

Scope 3 emissions are the other indirect emissions from UHCC's activities, resulting in 2,864 tCO₂e or 74% of the corporate emissions of UHCC.

Figure 6 - Scope 3 Emissions by Category (total 2,864 tCO₂e)



Purchased goods and services (73%) represent the largest Scope 3 emission source followed by Capital goods (21%). Four additional sources make up the remainder of Scope 3 emissions including Fuel and energy-related activities (4.1%), Employee commuting (0.8%), Business travel (0.5%), and Waste generated in operations (0.01%).

4.0 GHG Emissions Reduction Opportunities

This section describes a range of GHG emission reduction opportunities that UHCC might consider implementing. In many cases, there will be financial savings or other economic benefits associated with implementing these recommendations.

4.1 *Reduce Natural Gas Consumption*

Most of the natural gas consumption is used for heating the H20 Xstream public swimming pools. We suggest UHCC to investigate opportunities to change the heating systems to electric systems (e.g. electric boilers, ground sourced heat pumps or solar hot water systems) or biomass sources such as wood pellet burners when undergoing upgrades or renewal projects in the future.

4.2 *Reduce Electricity Consumption*

Most of the electricity consumption is from traffic related sources, mainly street lighting. Investigate opportunities to convert to LED lighting (if not already implemented).

Additionally, UHCC should investigate whether other opportunities for LED lighting exists across all other sites. It would be wise to start with H20 Xstream, then the Civic Admin Building and the Central Library as these are the sites that consume the most electricity, after the street lighting.

4.3 *Reduce Vehicle and Machinery Fuel Usage*

Direct emissions from Petrol and Diesel consumption equates to 2.6% of UHCC's corporate emissions. 65% of these emissions come from the diesel consumed in council owned Utes. We recommend investigating fleet vehicle use patterns to optimise fleet usage and identify whether so many Utes are necessary in UHCC's fleet. We would then recommend that council aim to transition the remaining fleet vehicles to electric vehicles (or other fuel or transport alternatives) to reduce fossil fuel use.

4.4 *Implement Sustainable Procurement Policies*

54% of UHCC corporate emissions are generated from Purchased goods and services during the financial year. This includes the council's operational costs and maintenance contracts that are not reported in Scope 1 & 2 emissions. These have been estimated based on average industry data and emissions reported by Motu (2014). We recommend more robust use of sustainable procurement policies and guidelines to select relevant providers and to require larger contract providers to estimate and report their Scope 1 and Scope 2 emissions (at a minimum) and demonstrate their reduction performance.

Additionally, 16% of UHCC's corporate emissions are from Capital goods, with 85% of these indirect Scope 3 emissions coming from the construction of new council buildings. As with the Purchased goods and services, these emissions have been estimated based on average industry data and emissions reported by Motu (2014). We recommend that the council investigate low emissions construction strategies that reduce the use of emissions intensive building materials such as concrete and steel.

4.5 *Community Emissions Reductions*

Apart from the recommendations to reduce corporate emissions above, UHCC may also consider running campaigns to the Upper Hutt community in the aim of influencing behaviour. UHCC would indirectly benefit from reducing the community water use, waste sent to landfill and wastewater. Reduction in these streams would likely help the council reduce its own corporate emissions through reduced Scope 1 and 2 emissions. Additionally, UHCC may wish to join the other city councils in New Zealand in setting a community-based emissions target. This would involve a city-wide (regional) GHG emissions inventory be compiled in order to have a baseline to which an emissions reduction goal may be set against. If UHCC wanted to do this, Carbon EMS can help complete such an inventory on the council's behalf.

4.6 *Emission reduction targets*

Several city councils have recently set emission reduction or carbon neutral targets. Partly this is driven through participation in the Global Covenant of Mayors for Climate and Energy as well as a response to the central governments indication to move to a net zero or low carbon economy in the second half of this century.

Christchurch City Council have recently set a new target to reduce its CO₂ emissions to net zero by 2030, while Dunedin City has set a city-wide target (i.e. not just council operations) to reduce its CO₂ emissions to net zero by 2050.

Auckland Council is currently revisiting its low carbon action plan and emission reduction target (i.e. CO₂e). At this point the council has set the following targets:

- 10%-20% by 2020 (based on 1990 emission levels)
- 40% by 2040 (based on 1990 emission levels)
- 50% by 2050 (based on 1990 emission levels).

Wellington City Council has set the following targets be adopted for the citywide emissions reductions plan. The base year for the city is 2000/01:

- 2020: 10% reduction from 2001 levels
- 2030: 40% reduction from 2001 levels
- 2040: 65% reduction from 2001 levels
- 2050: 80% reduction from 2001 levels.

WCC have set a council wide (corporate) emission reduction target of 80% reduction by 2050.

We recommend that UHCC set both a council wide (corporate) and city wide (regional) GHG emissions reduction target.

5.0 Discussion

5.1 *Landfill emissions and liabilities*

Although Silverstream Landfill receives the community waste and recycling collected by UHCC, it is wholly operated and managed by Hutt City Council. Therefore, because UHCC is not seen to have operational control over the landfill it does not get included in UHCC's emissions inventory when using the operational control approach. We used the MfE (2019) emissions factors to provide an emissions estimate for this waste.

However, Hutt City Council, being that the landfill falls under their organisational boundary, have used the first-order-decay model. This approach estimates the total (including future) emission generated from waste sent to landfill during the reporting period. The IPCC encourages the use of the first-order-decay model and most agree it produces more accurate results. Although, depending on the assumptions included in the model, the results can vary significantly. Because these emissions are not within UHCC's organisational boundary, we decided to keep things simple with an estimate using the MfE factors. However, if the council wanted to work with Hutt City Council and other councils who send waste to Silverstream Landfill it may be best to all use the results of Hutt City Council's first-order-decay analysis to estimate the total emissions from the community waste.

6.0 References

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DEFRA (2019) - Department for Environment, Food and Rural Affairs. 2019. Greenhouse gas reporting: conversion factors 2019. United Kingdom.

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7.0 Glossary

Carbon Dioxide Equivalent (CO₂e)	A standard unit for measuring carbon footprints. The impact of each different GHG is expressed in terms of the global warming potential (GWP) of one unit of CO ₂ . Standard ratios are used to convert gases into equivalent amounts of CO ₂ ; these are based on each gas's GWP.
Carbon Footprint	A measure of the amount of GHGs emitted by an organisation. Typically expressed in terms of CO ₂ e, and for a 12-month reporting period.
Emission Factor	A metric that converts a specific emission source - such as a litre of diesel - into terms of CO ₂ or CO ₂ e.
Global Warming Potential	A measure of a gas's ability to cause radiative forcing in the atmosphere (or global warming) relative to the ability of CO ₂ . For example, sulphur hexafluoride has 23,900 times the GWP of CO ₂ , thus is 23,900 times more potent at contributing to global warming than CO ₂ .
Greenhouse Gas	Greenhouse gases are gases that influence the way in which the Earth's atmosphere traps heat. Increasing levels of GHGs in the atmosphere are causing the phenomenon of climate change.
Greenhouse Gas Protocol	This standard provides guidance for companies preparing a GHG emissions inventory. It defines three scopes (or operational boundaries) for accounting and reporting purposes (explained below).
Scope 1 Emissions	Direct greenhouse gas emissions that occur from sources owned or controlled by UHCC, such as emissions from the combustion of diesel in the vehicle fleet.
Scope 2 Emissions	Emissions associated with the purchase of electricity that is consumed by UHCC.
Scope 3 Emissions	An optional reporting category that covers all other indirect emissions. These emissions are a consequence of UHCC's activities but occur from sources it does not own or control. Examples include the embodied carbon in materials and air and taxi travel.

Appendix A Data quality

Data Quality

The table below describes the data quality indicators used in the above sections. Explanations of these terms are provided below.

Data management	Data collection		
	Measured	Derived	Estimated
Robust	M1	D1	E1
Satisfactory	M2	D2	E2
Questionable	M3	D3	E3

Measured = Data directly provided by a service provider, contractor or directly obtained from a monitoring device. For example, electricity invoices, contractor receipts, emissions monitoring equipment, incident reports, consultant reports etc.

Derived = Data obtained from calculations, mass balances, use of physical/chemical properties, use of coefficients and emission factors etc., for example converting cubic meters of waste into tonnes.

Estimated = Usually, where there is no other available method for obtaining the data. Such data could be prorated on previous results, use of precedents or historical data, or even a calculated guess.

Robust = Evidence of sound, mature and correct reporting system, where room for error is negligible. Examples would include use of spreadsheets, databases and on-line reporting.

Satisfactory = Examples would include manual, but structured keeping of records, files and results. Some potential for error or loss of data.

Questionable = No logical or structured approach to data or record keeping. High potential for error &/or loss of data. Data may appear to differ from those initially reported.