Launceston City Council

CoL - Carbon Footprint FY19

July 2020

Definitions and Abbreviations

Term	Definition
ACCUs	Australian Carbon Credit Units
AGEIS	Australian Greenhouse Emissions Information System
CA	Climate Active
CoL	City of Launceston
GHG	Greenhouse Gas
HVAC	Heating, Ventilation and Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram
$kgCO_2$-e	Kilograms of CO_2 equivalent
km	kilometre
kL	kilolitre
kWh	Kilowatt-hour
LED	Light Emitting Diode
LGA	Local Government Area
LGCs	Large-scale Generation Certificates
m^3	cubic metre
MAC	Marginal abatement cost
ML	Megalitre
NABERS	National Australian Built Environment Rating Scheme
NCOS	National Carbon Offset Standard
NGA	National Greenhouse Accounts
NGER	National Greenhouse and Energy Reporting
p.km	Passenger-kilometre
PV	photovoltaics
SMEs	small and medium enterprises
TACCC	transparency, accuracy, completeness, comparability and consistency
t	tonnes
tCO_2-e	Tonnes CO_2 equivalent
T&D	Transmission and Distribution
WBCSD	World Business Council for Sustainable Development
WRI	World Resource Institute

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1. Introduction

1.1 Background

In 2019 the City of Launceston (CoL) committed to reduce its carbon footprint and become carbon neutral by 2025. CoL's focus on sustainability in recent years has been to reduce its environmental impact – notably reducing energy consumption and Greenhouse Gas (GHG) emissions, whilst increasing use of renewable energy. In order to achieve this, CoL has undertaken several energy savings projects (e.g., LED lighting, Solar PV) and also has a composting facility and tree planting program. Historically, CoL has measured its energy and GHG emissions using an in-house approach. To support its move towards its 50% emissions reduction and carbon neutrality targets, CoL has engaged GHD to develop a carbon footprint using an industry standard approach to help inform its choice of emissions baseline and to focus its emission reduction efforts going forward.

1.1.1 Location

The CoL local government area (LGA) covers 1,414 km^2. This inventory refers to CoL's provision of services to constituents within the geographical area shown in Figure 1-1.

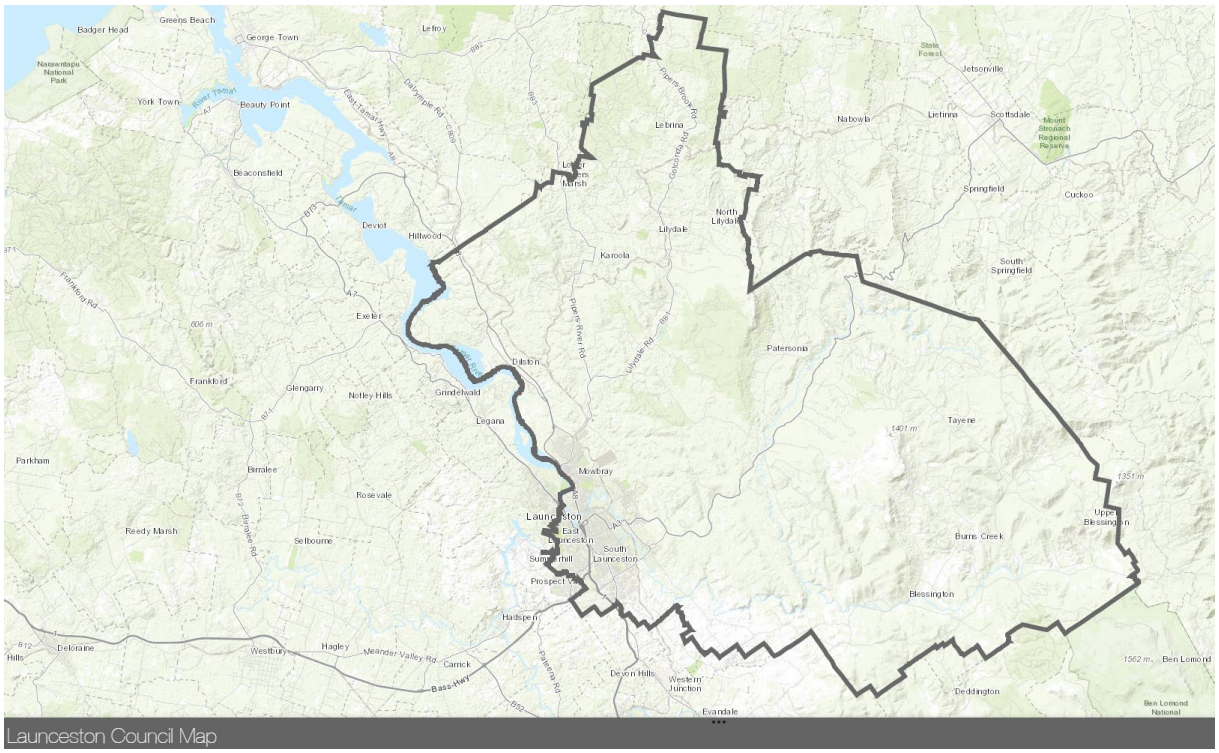

Figure 1-1 Launceston Council Map

1.2 Purpose and scope of this report

The purpose of this report is to summarise the CoL FY19 carbon footprint.

The scope of the project was to confirm a consolidation approach and establish an organisational boundary that defines which GHG should be included in CoL's GHG inventory. The GHG inventory encompasses scope 1, 2 & 3 emissions along with a review of materiality of emission sources, whilst documenting exclusions and other assumptions.

1.3 Assumptions and limitations

Our approach has involved comparability to other municipalities around Australia that are using the Climate Active (formerly National Carbon Offset Standard) approach for reporting their carbon neutrality claims. CoL does not, at this stage, have any plans to seek certification for Climate Active (CA) carbon neutrality.

We have based our approach for compiling this emissions inventory on the “Greenhouse Gas Protocol”, as developed by the World Business Council For Sustainable Development (WBCSD) and World Resources Institute (WRI).

The scope 1 and 2 emission factors are taken from the National Greenhouse and Energy Reporting (NGER) Measurement Determination.

The scope 3 emission factors were taken from National Greenhouse Accounts (NGA) Factors 2018, EPA Victoria’s greenhouse gas inventory management plan, UK government conversion factors for greenhouse gas reporting 2019 and SimaPro lifecycle assessment database.

This report: has been prepared by GHD for Launceston City Council and may only be used and relied on by Launceston City Council for the purpose agreed between GHD and the Launceston City Council as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Launceston City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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2. Carbon Reporting

Carbon accounting is the process of identifying and measuring the amount of GHG, measured in tonnes carbon dioxide equivalents, emitted by an entity. Carbon reporting is the process of reporting on that accounting.

These processes help an organisation manage potential risks and identify risk reduction opportunities. The creation of a GHG inventory enables public carbon reporting and participation in voluntary GHG and mandatory reporting programs, and, where applicable, participation in GHG or 'carbon' markets. Carbon reporting also allows for recognition of early voluntary attempts to mitigate man-made climate change.

The reporting of GHG is typically undertaken by following the Greenhouse Gas (GHG) Protocol as developed by the World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI).

2.1 Consolidation Approach

Before deciding which emission sources should be counted, it is necessary to determine the 'consolidation approach' and then the 'emissions boundary' for the reporting organisation.

The consolidation approach (GHG Protocol) refers to the way that a reporting organisation decides what is in its boundary. This can be done in one of two ways:

- **Equity share approach**, this is determined by who owns what share of the asset. This then leads the various asset owners to report the emissions as part of their inventory on the basis of their respective percentage share of ownership of the asset. For example, if an organisation owns 40% of the asset, it would report 40% of the emissions. This is particularly common in the oil and gas sector where joint ventures lead to different ownership partners reporting the emissions associated with production in relation to their respective equity share.
- **Control approach**, this is defined in two ways – financial and operational control.
  - *Operational contro*l is determined by who has authority at a facility on a day to day basis. This is often demonstrated by the right to set environmental or health and safety policies and procedures at a site. The organisation deemed to have operational control is then responsible for reporting 100% of the emissions.
  - *Financial control* is determined by who has economic control of the asset and therefore has the right to "direct the financial and operating policies with a view to gaining economic benefit from its activities"[1]. This does not necessarily require 50%+ ownership but merely that the relevant party has the control to set the economic direction.

It is valid for organisations to apply different consolidation and boundary approaches for different purposes. For example, when reporting for NGER an organisation is required to take an operational control approach, however for voluntary reporting, it is at the organisation's discretion to choose, and therefore it may choose a financial control approach. The chosen methodology must be consistent within each report and be clearly documented within that report.

[1] GHG Protocol Corporate Accounting Standard, p.17

The control approach that has been used in the development of this inventory is **operational control**. In our experience this is the typical approach taken by other council's carbon inventories.

2.2 The emissions boundary

The reporting boundary for this inventory has been prepared by following the approach of the Australian Government's Climate Active Carbon Neutral Standard for Organisations (Climate Active standard). The Climate Active program is the most commonly used approach for Australian organisations to certify their carbon neutral status, and it is based on the GHG Protocol and NGER Measurement Determination

The emissions inventory we have prepared includes a variety of emissions sources that we have deemed "relevant" and "material" to the City's operations.

2.2.1 Relevance

The Climate Active standard states emissions sources considered to be relevant, whether or not they fall within the reporting organisation's boundary, must be included in the emissions boundary (subject to materiality).

The following emissions sources are deemed to be relevant to all organisations, as demonstrated in Figure 2-1:

- All scope 1 emissions (direct emissions).
- All scope 2 emissions (emissions from the generation of electricity, heat, cooling and steam purchased by the organisation).
- Scope 3 emissions from electricity consumption and fuel use (indirect emissions from the extraction, production and transport of fuel burned at generation, and the indirect emissions attributable to the electricity and gas lost in delivery in the transmission and distribution network).
- Scope 3 emissions from waste, business travel and accommodation, office paper, and water use.

Other Scope 3 emission sources, such as employee commuting, postage and freight, stationary, printing, cleaning services etc., must be assessed for materiality. If deemed immaterial they may be excluded from the inventory taking into account the materiality threshold; further details are given in chapter 2.2.2.

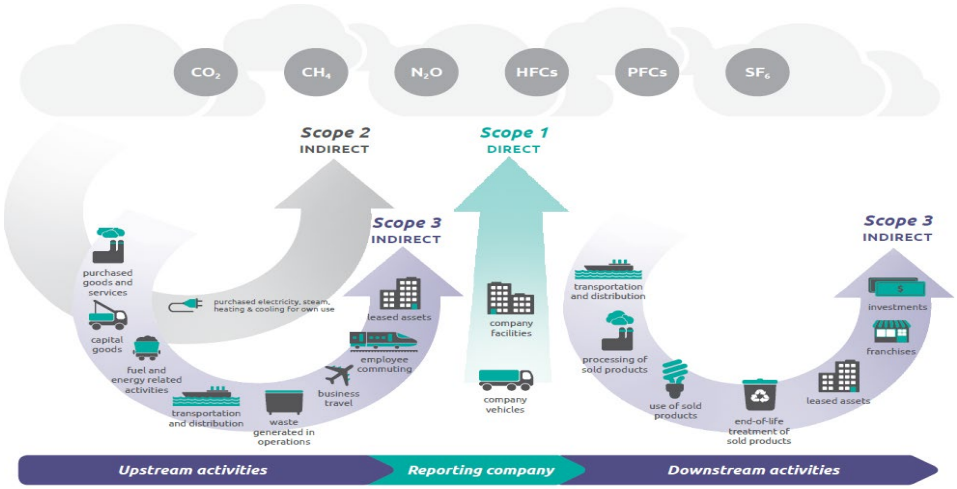

Figure 2-1 Scope 1, 2 and 3 emissions: GHG Protocol

Relevance test for Scope 3 emissions

The Climate Active standard determines that all Scope 1 and 2 emissions are relevant, whereas a Scope 3 emissions source is relevant when any two of the following conditions are met.

- "the scope 3 emissions from a particular source are likely to be significant relative to the organisation's scope 1 and scope 2 emissions;
- the scope 3 emissions from a particular source contribute to the organisation's greenhouse gas risk exposure;
- the scope 3 emissions from a particular source are deemed relevant by key stakeholders;
- the responsible entity has the potential to influence the reduction of scope 3 emissions from a particular source;
- the scope 3 emissions are from outsourced activities that were previously undertaken within the organisation's boundary or from outsourced activities that are typically undertaken within the boundary for comparable organisations"[2].

Conversely, some Scope 3 emissions sources have been excluded, based on guidance from Section 2.3.1 of the National Carbon Offset Standard, exclusions are allowed on the basis that:

- Emissions are likely to be negligible (relative to other Scope 3 emissions);
- Determining emissions is not currently possible given available technology;
- Determining emissions will be very costly relative to their likely significance;
- There is insufficient data for the specific source

2.2.2 Materiality

Different standards stipulate different definitions and thresholds for materiality. An organisation can determine materiality themselves, but if reporting under a specific scheme then materiality is determined by the scheme's requirements and standards.

Under Climate Active, an emissions source that constitutes 1% or more of the total carbon account is material. For an emissions inventory of the City of Launceston's size the materiality threshold is therefore about 500 tCO_2-e per annum.

If a relevant emissions source is estimated to be material, it must be included within the emissions boundary, unless justification can be provided to demonstrate that such quantification would not be technically feasible, practicable or cost effective relative to its significance.

Emissions sources that are relevant but estimated to constitute less than the materiality threshold towards the total carbon account can be excluded from the emissions boundary.

Under Climate Active standards, when applying the 1% materiality threshold, the total amount of emissions to be excluded must not exceed 5% of the total carbon account.

Responsible entities are encouraged to include, measure and report as many emissions sources as possible, regardless of an emissions source's materiality. Data for emissions sources that are deemed as immaterial may still be included in the carbon account. The following methods can be used if primary data cannot be sourced:

- taking an initial measurement as a basis for projecting emissions for future years of that source; or

[2] Page 15, Climate Active Carbon Neutral Standard for Organisations

- estimating and projecting an emissions source (e.g. using input-output analysis tools or approximation through extrapolation).

Where a relevant emissions source is estimated to be material, but accurate data is not yet available, a data management plan should be developed to outline how more rigorous quantification can be achieved within a reasonable timeframe. This could include setting in place appropriate data collection processes and negotiating with stakeholders who have access to accurate data.

2.3 Exclusions

Table 2-1 Exclusion Emissions

Emission	Scope	Justification for exclusion
Emissions for postage/ courier services and food/ beverage services	3	Data for these items is insufficient for accurate reporting purposes, and based on the information that is available, it is estimated with confidence that these items represent less than 1% of total emissions.
Employee commuting	3	The data available for FY19 was incomplete and hence emissions could not be calculated for this activity. It has been estimated that these emissions are possibly immaterial, however this needs to be investigated in future inventories. To allow for reporting, we recommend the City improve their data collection procedures. This may include a thorough survey of staff's mode of transport to work and distances travelled.
Upstream transportation & distribution	3	There was insufficient data to calculate emissions from this category for FY19. Purchased goods and services and capital goods can become a material source of emissions if the council undertakes capital works that require a significant amount of steel and cement. Based on GHD experience, capital projects of $10m and over use significant quantities of cement and steel which results in emissions, which could trip the materiality threshold and hence should be included in that year's carbon inventory.
Taxi Travel	3	There was no data supplied in order to calculate the emissions associated with Taxi Travel.
Freight	3	There was no data supplied in order to calculate the emissions associated with Freight Travel.

3. Greenhouse Gas Emissions Inventory

The CoL GHG inventory includes emissions that are categorised as Scope 1, 2 and 3 emissions. All of the emissions below are considered within the operational control of CoL. Figure 3-1 below outlines some of the examples of what is included in the GHG inventory.

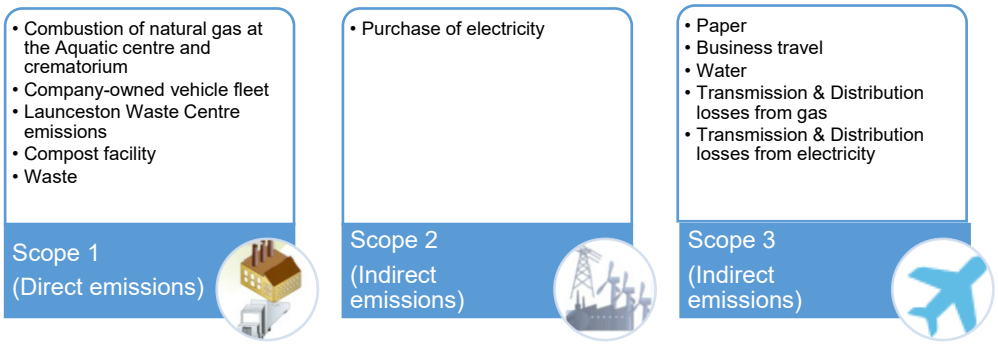

Figure 3-1 CoL emissions by Scope

3.1 Overall Emissions

Based on the data provided, our estimate of CoL's total operational GHG emissions in FY19, is **59,378 tCO_2 -e.** Scope 1 accounts for 96.5% of total emissions; this can largely be attributed to Remount Waste Centre that CoL owns and operates. The landfill emissions account for over 92% of Scope 1 emissions, and almost 90% of CoL's total emissions. These Scope 1 emissions represent about 7% of Tasmania's greenhouse gas emissions (Tasmanian Government, 2017). Scope 2 and 3 emissions each account for 1.6% and 1.7% of CoL's total respectively. The relative contributions of each scope are demonstrated in Figure 3-2 below.

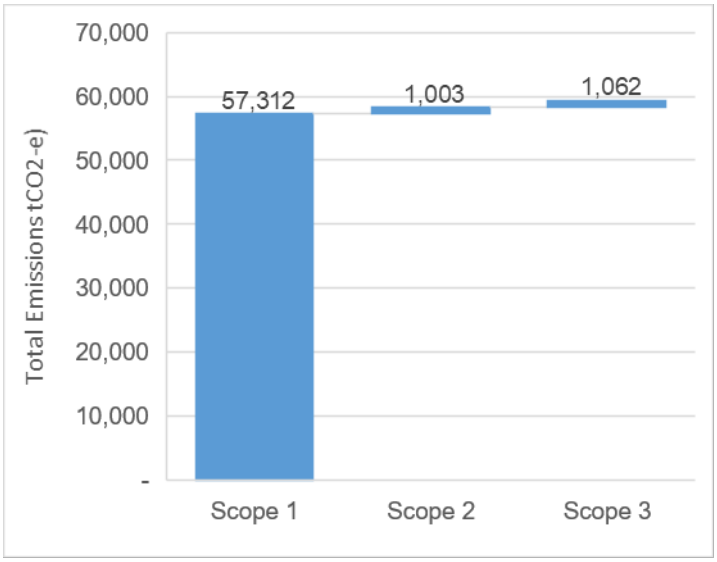

Figure 3-2 CoL's total emissions broken down by scope

The City's full inventory, sorted by scope of emission source is presented in Table 3-1 below. Each activity's contribution to CoL's total emissions can be observed. As previously mentioned,

the landfill gas emissions from the Launceston Waste Centre are the largest source of GHG emissions. Gas consumption was the second highest source of emissions within CoL's inventory, representing 5.9% of the total.

Table 3-1 Summary of CoL emissions

Emission Source	Activity data	GHG emissions (tCO_2-e)	% of Total Emissions
Launceston Waste Centre	111,423 t	52,954	89%
Gas consumption: Launceston Aquatic	694,383 m^3	1,406	2.4%
Gas consumption: all other facilities	748,075 m^3	1,515	2.6%
Fuel consumption	489 kL	1,315	2.2%
Compost facility	2,538 t	122	0.2%
Scope 1 total		57,312	96.5%
Electricity consumption: Launceston Aquatic	1,140,209 kWh	171	0.3%
Electricity consumption: Main Grandstand York Park	650,475 kWh	98	0.2%
Electricity consumption: Victoria Museum	646,421 kWh	97	0.2%
Electricity consumption: QV Museum	633,373 kWh	95	0.2%
Electricity consumption: Town Hall	499,672 kWh	75	0.1%
All other electricity consumption	3,118,223 kWh	467	0.8%
Scope 2 total		1,003	1.7%
T&D losses - gas	1,442,457 m^3	605	1.0%
Water	325,458 ML	177	0.3%
T&D losses - electricity	6,688,373 kWh	134	0.2%
Business travel - flights	249,086 p.km	63	0.1%
Business travel - accommodation	574 nights	26	0.04%
Office Paper	8,452 reams	57	0.1%
Scope 3 total		1,062	1.8%
Total Emissions		**59,378**	**100.0%**

Table 3-2 presents CoL's most emission intensive facilities. The waste centre was the largest contributor to emissions due to scope 1 landfill gas emissions. Of the many facilities that are owned and operated by the City of Launceston, the Launceston Aquatic Centre was the largest consumer of energy, and the second highest emitter of GHG, representing 2.7% of CoL's total carbon inventory.

Table 3-2 Top four emissions intensive assets.

Facility	Scope 1 Emissions (tCO_2-e)	Scope 2 Emissions (tCO_2-e)	Total (tCO_2-e)	% of Total Emissions
Launceston Waste Centre	52,929	4	52,936	89%
Launceston Aquatic Centre	1,406	171	1,577	2.7%
QV Museum	176	95	271	0.5%
Carr Villa Crematorium	38	5	43	0.1%

3.2 Scope 1 Emissions

City of Launceston's Scope 1 carbon inventory is summarised in Table 3-3. CoL's activity for FY19 has been converted to energy and GHG emission equivalents using relevant emission factors. The biggest source of emissions was gases produced and emitted at the landfill, representing 92% of the Scope 1 inventory. The Waste Centre also represents 90% of CoL's total emissions.

Table 3-3 CoL Scope 1 carbon inventory

Scope 1 Emission Source	Activity data	Energy Consumed (GJ)	Scope 1 GHG emissions (tCO_2-e)	% of Scope 1 Total
Launceston Waste Centre	111,423 t	n/a	52,929	92%
Gas consumption: Launceston Aquatic Utilities	694,383 m^3	27,289	1,406	2.5%
Transport fuel: diesel	451 kL	17,422	1,228	2.1%
Gas consumption: QV Museum	86,664 m^3	3,406	175	0.3%
Compost facility	1,789 t	n/a	122	0.2%
Transport fuel: petrol	36 kL	1,231	83	0.1%
Gas consumption: Carr Villa crematorium	18,537 m^3	729	38	0.1%
Gas consumption: All other facilities	642,873 m^3	25,265	1,302	2.3%
Stationary fuels: petrol	2 kL	51	4	0.01%
Total Scope 1 Emissions			**57,287**	**100.0%**

A total of 1,442,457 m^3 of gas was consumed by facilities owned and operated by the City of Launceston. This represents 2,921.2 tonnes of CO_2-e or 4.9% of the scope 1 emissions and 5.9% of overall emissions when the Scope 3 upstream and downstream elements of gas production and distribution are included, making gas consumption the second highest contributor of emissions, after landfill gas. Launceston Aquatic facilities is the largest consumer of gas, accounting for 48.1% of total gas consumption.

Combustion of fuels such as petrol and diesel contributed a minor 2.3% to Scope 1 emissions, emitting a total of 1,315 tCO_2-e. The contribution of each activity towards the scope 1 total is displayed in Figure 3-3.

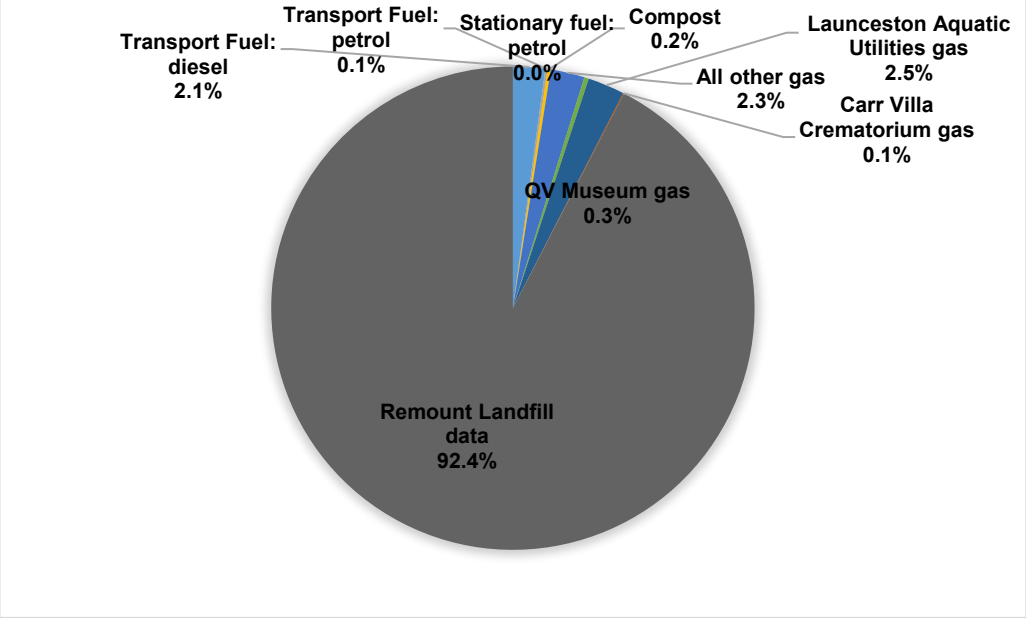

Figure 3-3 CoL's Scope 1 Emissions

3.3 Scope 2 Emissions

Table 3-4 summarises the Scope 2 GHG emissions of CoL's inventory. All Scope 2 emissions arose as a result of purchasing electricity from the grid for buildings, parks, and street lighting. Electricity consumption has been broken down by facility in the table below.

Table 3-4 CoL Scope 2 carbon inventory

Facility	Activity data (MWh)	Energy Consumed (GJ)	Scope 2 GHG emissions (tCO_2-e)	% of Total Scope 2 emissions
Launceston Aquatic	1,140.2	4,105	171.0	17.0%
Main Grandstand York Park	650.5	2,342	97.6	9.7%
Victoria Museum	646.4	2,327	97.0	9.7%
QV Museum	633.4	2,280	95.0	9.5%
Town Hall	499.7	1,799	75.0	7.5%
Albert Hall	342.2	1,232	51.3	5.1%
Waste Transfer Station	342.2	1,232	51.3	5.1%

Facility	Activity data (MWh)	Energy Consumed (GJ)	Scope 2 GHG emissions (tCO_2-e)	% of Total Scope 2 emissions
Nth Sub Scoreboard	268.0	965	40.2	4.0%
Old Powerhouse Compressor	241.3	869	36.2	3.6%
Paterson St	174.0	626	26.1	2.6%
All other electricity	1,750.6	6,302	262.6	26.2%
Total Scope 2 Emissions			**1,003.3**	**100.0%**

Figure 3-4 presents the contribution of each facility to the total of Scope 2 emissions. Launceston Aquatic Centre produced the most emissions due to electricity consumption, contributing almost double the amount of any of the other facilities. This is likely due to the energy intensive nature of the equipment needed in aquatic centres, such as extensive HVAC systems to regulate temperature and humidity of the large indoor spaces, and pool-water heating systems.

The museums and the main grandstand also represent a significant proportion of scope 2 emissions, contributing almost 10% each towards the scope 2 total.

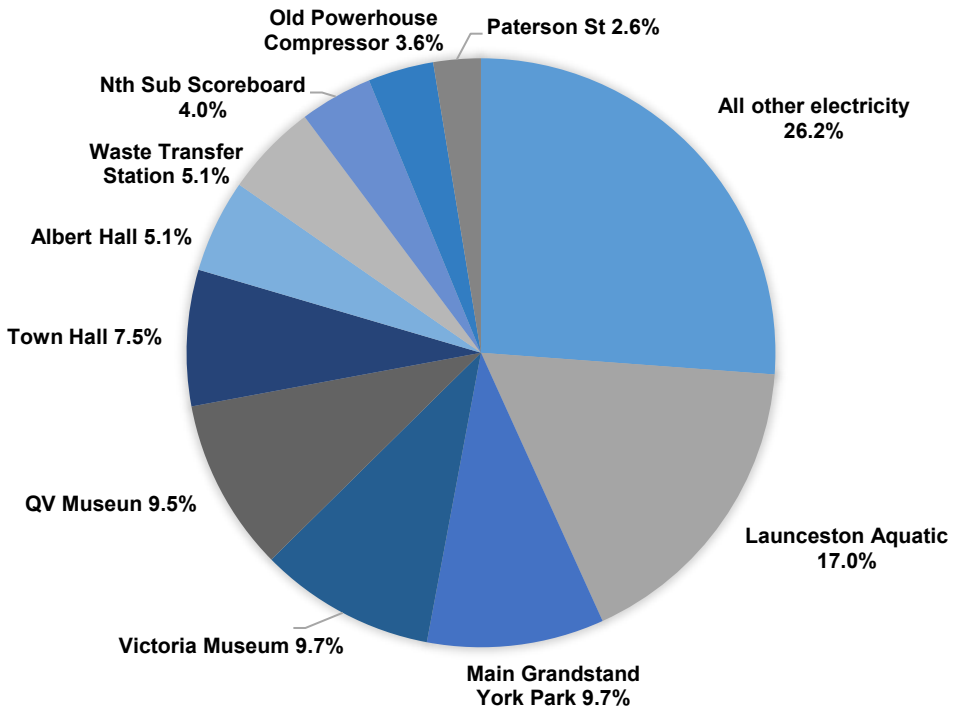

Figure 3-4 CoL's Scope 2 Emissions

It is of interest to note that despite large amounts of energy being consumed, the resulting emissions are relatively insignificant. Electricity consumption, including transmission and distribution losses, represents only 1.8% of CoL's total carbon inventory. This is due to the low emissions factor associated with Tasmanian grid electricity. If the same amount of 6,688 MWh of electricity was consumed in NSW, it would result in over five times as many tonnes of CO_2-e. A comparison of state and national emissions factors can be seen in Table 3-5.

Tasmania has the lowest electricity emissions factor in the country due to the high mix of renewable energy in their grid. Around 80% of their electricity is derived from hydroelectricity, and wind generated energy accounts for 10%, leaving only 10% of Tasmanian electricity to be generated by non-renewable sources (Tasmanian Government, 2017). This is unlike other states such as NSW where renewable energy only contributes 19% of electricity generation (Department of Industry, Science, Energy and Resources, 2018).

Table 3-5 Scope 2 Emission Factors of Grid Electricity

Region	Scope 2 Emissions Factor ($kgCO_2$-e) / kWh
Tasmania	0.15
New South Wales	0.81
Victoria	1.02
National	0.79

3.4 Scope 3 Emissions

Scope 3 emissions are those attributed to third party activities. The most significant source of scope 3 emissions is losses through transmission and distribution (T&D) of energy; electricity and gas. These losses represent 70% of the scope 3 inventory.

88.2 tCO_2-e were emitted from business travel by City of Launceston employees, contributing 8.3% in total to scope 3 emissions. CoL's full scope 3 inventory is presented in Table 3-6.

Table 3-6 CoL Scope 3 carbon inventory

Scope 3 Emission Source	Activity Data	Scope 3 GHG emissions (tCO_2-e)	% of Total Scope 3 emissions
T&D losses from gas	799,584 m^3	604.9	56.9%
Water	325,458 kL	177.4	16.7%
T&D losses from electricity	6,688,373 kWh	133.8	12.6%
Business travel - air	249,086 p.km	62.5	5.9%
Office Paper	8,155 reams A4 297 reams A3	58.0	5.5%
Business travel – hotel stays	574 nights	25.8	2.4%
Total Scope 3 Emissions		**1,062.3**	**100.0%**

The City's water use was the second highest contributor to scope 3 emissions, representing 16.7% of this inventory. Emissions from water use arise from the energy needed to deliver the water through the plumbing system, and to treat it after use before disposal or reuse. Each activity's contribution to the total scope 3 inventory is demonstrated in Figure 3-5 below.

Employee commuting was excluded from the FY19 inventory due to incompleteness of data. As explained in Table 2-1, whilst it is estimated that commuting emissions are relatively insignificant, CoL should look to investigate this by collecting data and including this item in their next inventory.

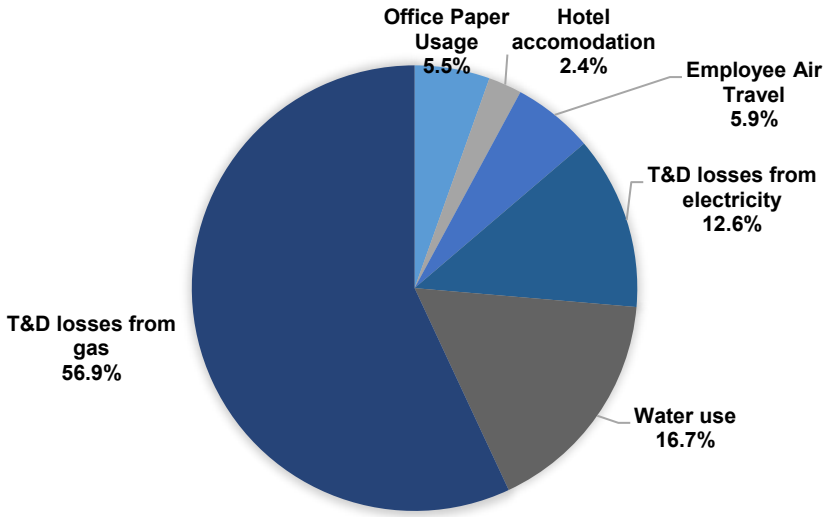

Figure 3-5 CoL's Scope 3 Emissions

4. Recommendations

The main aim of the GHG inventory is to reduce anthropogenic GHGE. To ensure that emission reductions occur, there are a few next steps after the initial inventory has been identified.

4.1 Repeat GHG inventory every year and register for NGER reporting

Every year the GHG inventory including the solid waste calculator should be updated to reflect changes in GHG emissions of the organisation. Updating the inventory will help to keep up to date on the reporting obligations.

It is also considered *good practice* that organisations improve the quality (transparency, accuracy, completeness, comparability and consistency (TACCC)) of GHG inventories on a continuous basis. There should be improvement on a regular basis to provide increasingly useful information on trends in the council's emissions to ensure that CoL is meeting its targets. To this end, it is also worth considering that CoL's emissions for the Remount landfill alone put it over the NGER reporting threshold. As a result we would recommend CoL consider registering with the Clean Energy Regulator to report its emissions in line with the NGER Act, although we note that due to previous advice on the NGER legislation's application to councils CoL has chosen not to register. GHD would advise that, based on our experience, annual reporting often forces the adoption of better practice data collection and emissions reporting, which in turn would provide better grounds for making claims about carbon neutrality in the future.

In addition this process will enable CoL to stay up to date with changes in the science of GHG reporting. For instance in July 2020, the CER adopted a change in the Global Warming Potential (GWP) of methane, as noted in the most recent Intergovernmental Panel on Climate Change (IPCC) report on the science of climate change. This change will result in one tonne of methane being worth 12% more in tonnes of Carbon Dioxide equivalent (t CO_2-e) – therefore meaning that when CoL update their carbon footprint for FY21 in July 2021, the emissions will be 12% higher for the same volumes of waste in FY20. This will also increase the number of carbon offsets that CoL will need to buy to become carbon neutral by 12% – unless significant emission reduction activities are undertaken.

4.2 Reduce landfill emissions

The Launceston Waste Centre represents 90% of CoL's total emissions, thus it should be the focus of emission reductions efforts. One of the reasons the landfill is the dominant source of emissions is because landfills produce gases such as methane which are up to 25 times more potent than carbon dioxide. By tracking annual emissions from the landfill through the solid waste calculator, an emissions reduction plan can be prepared and implemented for an effective and sustainable decrease. Increasing the volume of gas captured and sent to flaring or combusting for electricity generation is a commonly used strategy to decrease landfill emissions. A waste management plan may be able to increase sorting of waste types and recycling and also assist in reducing the overall amount of waste disposed.

4.3 Energy Efficiency measures

Energy efficiency measures can be introduced to use less energy while achieving the same outcomes. Becoming more energy efficient can help reduce the energy bills, reduce GHG emissions. There are different energy efficiency programs such as the National Australian Built Environment Rating Scheme (NABERS), Green Star and other smaller programs that assess buildings onsite to enhance their energy performance. The NABERS program is relevant for

commercial offices, thus the Council may want to consider seeking a voluntary NABERS rating for their administrative buildings to track their energy efficiency.

Increasing energy efficiency reduces scope 1 and 2 emissions if both gas and electrical energy is reduced. Due to Tasmania's low grid electricity emissions factor, reducing gas consumption is more effective in reducing emissions than reducing electricity consumption; gas emits 51.4 kg CO_2-e for every GJ that is consumed whilst Tasmanian grid electricity emits 41.7 kg CO_2-e per GJ.

Gas consumption currently represents 5.9% of CoL's total carbon inventory. The Launceston Aquatic Centre is currently the most energy intensive facility. Installing heat pumps powered by solar PV is one strategy that could assist in reducing energy consumption. Furthermore specifying highly efficient electrical equipment will reduce the City's energy demand when new capital works are being undertaken.

4.4 Renewable Energy

Renewable energy is a step that requires an initial cost but in the long run, it pays itself off (a marginal abatement cost curve, described below, is one way of comparing the cost and rates of return on investment on emission reduction initiatives like renewable energy installation). Generating and self-consuming renewable energy can reduce scope 2 emissions from using grid electricity. Furthermore, generating energy onsite will also minimise transmission and distribution losses which currently comprise 70% of scope 3 emissions.

Solar is one of the most common forms of renewable energy that Australians have adopted, and Council has adopted this technology at multiple locations so far, however it is likely that more options are available. Other renewable energy technologies that the CoL could implement include wind generated energy and bioenergy.

There is no difference between utilising various renewable energy technologies to reduce GHG emissions, however geographical and political factors can influence how effective the approaches are. For example, in Tasmania hydro power is much more accessible than in other parts of Australia, and thus a more convenient choice for CoL regarding renewable sources of electricity.

4.5 Carbon credit purchases schemes

Carbon credits are generated by emission reduction projects that reduce, remove, or capture emissions from the atmosphere. Typically they involve some form of scheme administrator accrediting projects and then issuing credits for each tonne CO_2-e abated. The emission reduction project developers then can sell these credits to third party organisation to offset emissions from their organisation that they have not been able to stop.

There are multiple types of carbon credit. One example, are Australian Carbon Credit Units (ACCUs). ACCUs represent 1 tonne of CO_2-e abatement registered under the government's Emissions Reduction Fund there are over 30 different types of emission reduction project that can generate ACCUs from landfill gas destruction, to tree planting and land management to energy efficiency. The spot price of an ACCU, as of October 2019, was $16.10 each (CER, 2019).

It would be a sensible option for CoL to start thinking about the potential options it has for carbon credit procurement and the different types of carbon credit they may wish to invest in to support its carbon reduction targets if pure emissions reduction does not meet the needs of the 50% reduction and carbon neutral targets.

4.6 Emissions reduction plan and marginal abatement cost curve

To support the achievement of carbon neutrality by 2050 and a 50% reduction in emissions by 2030, it would be prudent of CoL to start developing an emission reduction plan, in which identified emission reduction initiatives are outlined. When organisations are considering how to reduce their emissions one of the common ways they choose to compare the relative merits of one emission reduction project against another is through plotting them on a Marginal Abatement Cost (MAC) curve. MAC curves generally show the net cost (often shown in averaged annual NPV), in dollars per tonne CO_2-e, associated with the emissions reductions achievable by different projects at a given point in time.

Projects specific to decreasing landfill emissions such as those that increase the gas capture rate increase the amount of abatement associated with the project, thus making it more economically feasible to implement as there is a lower $/t$CO_2$-e value.

Investments targeted at reducing operational energy consumption, and the associated GHG emissions, can be an effective way of reducing operational costs and making businesses less vulnerable to future energy price increases. However, it is not always easy for small and medium enterprises (SMEs) to decide which energy efficiency measures to implement, and in which order. Some measures may be obvious, quick and inexpensive to implement but do not deliver considerable energy or carbon savings and others may require significant investment but deliver excellent longer term energy savings. Additionally some may deliver modest savings but are aligned strategically with competencies that a company wants to develop or demonstrate to the market.

An emissions reduction plan, potentially incorporating a MAC curve, should be developed and can propose to implement a mix of these strategies, but the decision making process needs to be systematic and informed to ensure funds and efforts are focused on the right areas and the decisions that are made are defensible.

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