



DRAFT Towards Zero Emissions Strategy

2021-2050



Mildura Rural City Council

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Acknowledgement of Country

Council acknowledges the traditional custodians of the land comprising the Mildura Rural City Council area, and those of our neighbouring municipalities. We pay our respects to Elders past and present, and celebrate and respect their continuing culture and connection to the land.



Executive Summary

Council is located approximately 500 kilometres north-west of Melbourne in the Mallee region of Victoria, covering an area of 22,214 square kilometres and supports a population of around 53,000.

Major centres include Mildura, Red Cliffs, Merbein and Ouyen. Major Council assets include offices/service centres in Mildura and Ouyen, depots in Mildura and Red Cliffs, The Mildura Arts Centre and The Alfred Deakin Centre.

Council has been actively involved in reducing emissions since 2007 with the introduction of the Greenhouse Action Plan (2007-2012) and subsequent Energy Management Plans (2012-2017 and 2017-2021). These plans included actions to reduce emissions across the organisation.

Installation of solar photovoltaic (PV) systems on Council buildings, street and facility lighting upgrades and other energy efficiency upgrades have contributed to past emissions reductions and meeting the targets of previous plans.

This strategy defines Council's approach to achieving zero net carbon emissions by no later than 2050 in line with the current Victorian State Government target.

The strategy also outlines Council's emissions boundary and includes an emissions inventory based on emission scopes and priority areas.

The priority areas identified are: fleet, landfill, buildings and facilities, street lighting and scope 3 emissions (water use, air travel and office paper).

A long term strategic direction for each priority area along with actions in a reportable five year action plan provide the framework for meeting the zero net emissions target.

Council will reduce emissions in line with the steps in the Energy Reduction Hierarchy to meet the zero net emissions target.

The steps in order of priority (from most to least preferred) are: avoidance of energy use, energy efficiency, switching to cleaner energy alternatives and purchasing offsets for any unavoidable emissions.

Council considers the 2018-2019 financial year the baseline year for measuring progress of its emissions reduction. This represents the most recent typical year of emissions for Council.

Landfill emissions account for approximately 68 per cent of the emissions inventory. Due to the nature of landfill emissions, any action undertaken now to reduce emissions will not be reflected by a reduction in emissions for a number of years.

Fleet emissions will be reduced by efficient route planning, fleet rationalisation and the introduction of electric and hydrogen vehicles.

Buildings and facilities and street lighting emissions will be reduced through the purchase of 100 per cent renewable electricity, which Council has already committed to.

Emission projections based on some completed and perspective key actions indicate that offsets will be required for unavoidable emissions, primarily from landfill, to meet the zero net emissions target by no later than 2050.

Introduction

Mildura Rural City Council (Council) understands the climate is changing as a result of human activities, particularly burning fossil fuels and land clearing (IPCC, 2007).

Victoria's temperature increased by just over 1°C between 1910 and 2018. This warming is expected to continue with temperatures in the Mallee region expected to show a median increase of 1.3°C by the 2030s, compared to 1986-2005.

As warming continues, we expect more heat extremes in the decades to come. On average between 1981 and 2010, Mildura experienced 7.8 days per year when the temperature exceeded 40°C. By the 2050s under high emissions, or business as usual, this is expected to increase to between 15 and 23 days. Importantly for many people, minimum (usually overnight) temperatures are also expected to increase.

For example, Mildura's daily minimum temperature exceeded 22°C on average 12.4 days per year between 1981 and 2010. Under high emissions, by the 2050s, these hot nights are expected to occur 23 to 37 days per year on average (CSIRO, 2019).

Climate change poses a significant threat to natural systems and human settlements and is already impacting our communities through warmer temperatures, reduced but more intense rainfall, more severe droughts, dust storms, heat waves and bush fires. Climate change is also putting increasing pressure on our assets and services.

Council recognises that Local Government plays an important role in demonstrating strong leadership in climate change mitigation by reducing carbon emissions.

At its Ordinary Meeting of Council in February 2020, Mildura Rural City Council became the 30th local government in Victoria and the 94th in Australia to declare a climate emergency.

Over 8.6 million Australians now live in a municipality that has declared a climate emergency, joining over 800 million citizens from around the world.



Purpose

This strategy defines Council's approach to achieving zero net carbon emissions by no later than 2050 in line with the current Victorian State Government target.

The strategy outlines priority areas to achieve this target by reducing carbon emissions associated with Council's services, operations and infrastructure. Zero emissions for all priority areas, except landfill, will be achieved by 2040, with zero landfill emissions being achieved by 2050.

The strategy includes a detailed five-year Action Plan to reduce carbon emissions, with the progress against these actions to be closely monitored.

While the long-term strategy will be reviewed and remain in place until 2050, a detailed action plan will be developed every five years. This will ensure advances in new technology and best practice for reducing carbon emissions are being implemented.

Scope

This strategy includes actions for the reduction of carbon emissions from sources that Council is responsible for, can directly influence, control and typically measure and report on.

This includes, but is not limited to, carbon emissions from buildings and facilities where Council pays the utility bills, fleet operations and landfill (Council owned).

The strategy also includes some actions for reducing carbon emissions, where the emissions will not be measured, such as procurement of goods, services and works including the use of environmentally conscience consultants and contractors.

The strategy does not include mitigation of emissions produced by the community or community adaptation actions. These will be addressed in a separate community led and owned strategy (currently in development).

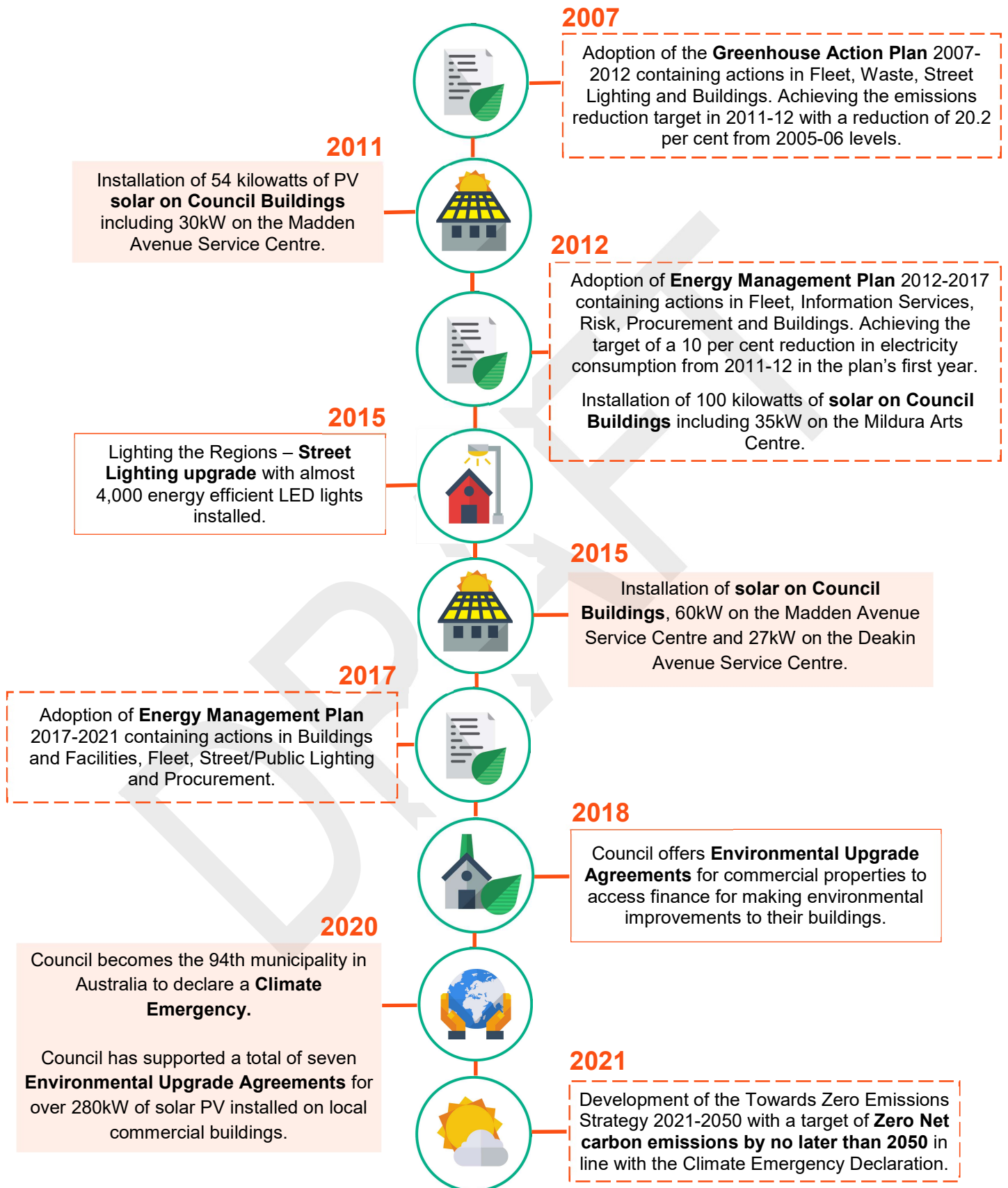
Adaptation to climate change is incorporated into operations, plans and strategies across Council.

Plans, Strategies, Policies and Guidelines that Support this Strategy

Existing plans, strategies, guidelines and policies that relate to this plan are listed below.

- *Community and Council Plan 2022-2026*
- *Environmental Education Plan 2020-2024*
- *Waste and Resource Recovery Plan*
- *Public Lighting Strategy*
- *Sustainable Water Use Guidelines*
- *Water and Energy Use Guidelines - Buildings and Facilities*
- *Environmental Project Grant Guidelines*
- *Environmental Sustainability Policy (CP041)*
- *Water and Energy Consumption in Council Buildings and Facilities Policy (OP186)*
- *Fleet Management Policy (OP002)*
- *Community Grant Policy (CP071)*
- *Goods Services and Works Policy (CP083)*

Previous Achievements



Decision-making Principles

Council prioritises energy and emission reduction initiatives through an Energy Reduction Hierarchy (see Figure 1 below) and five guiding principles. The hierarchy and the principles are used when deciding on short and long term actions to reduce carbon emissions.

Energy Reduction Hierarchy

The Energy Reduction Hierarchy lists four steps to identify ways to manage and reduce energy consumption and emissions.

The steps, in order of priority (from most to least preferred) are: avoidance of energy use, energy efficiency, switching to cleaner energy alternatives and purchasing offsets for any unavoidable emissions (see Figure 1 for examples and further information).

These steps are particularly useful when making decisions around capital works (infrastructure) initiatives and in the design of new facilities.

Guiding Principles

In addition to the Energy Reduction Hierarchy, Council uses the following principles to guide and prioritise its energy and carbon emission reduction actions. The guiding principles are:

Return on Investment (payback)

Actions with a payback period of 10 years or less (i.e. the period of time over which the investment pays for itself through the project savings) and that have a high level of confidence in the resulting emissions reductions.

Future-proofing

Actions that will be useful or successful in the future if the situation changes. The aim is to minimise negative effects and maximise positive effects to improve resilience.

Co-benefits

Actions that deliver multiple benefits beyond emissions reduction and financial savings, such as social and environmental value (e.g. improved comfort for building occupants).

Leadership by example

Opportunity for showing leadership and innovation to the community by addressing climate change.

Collaboration

Actions that promote working together with Council, partners and the broader community.

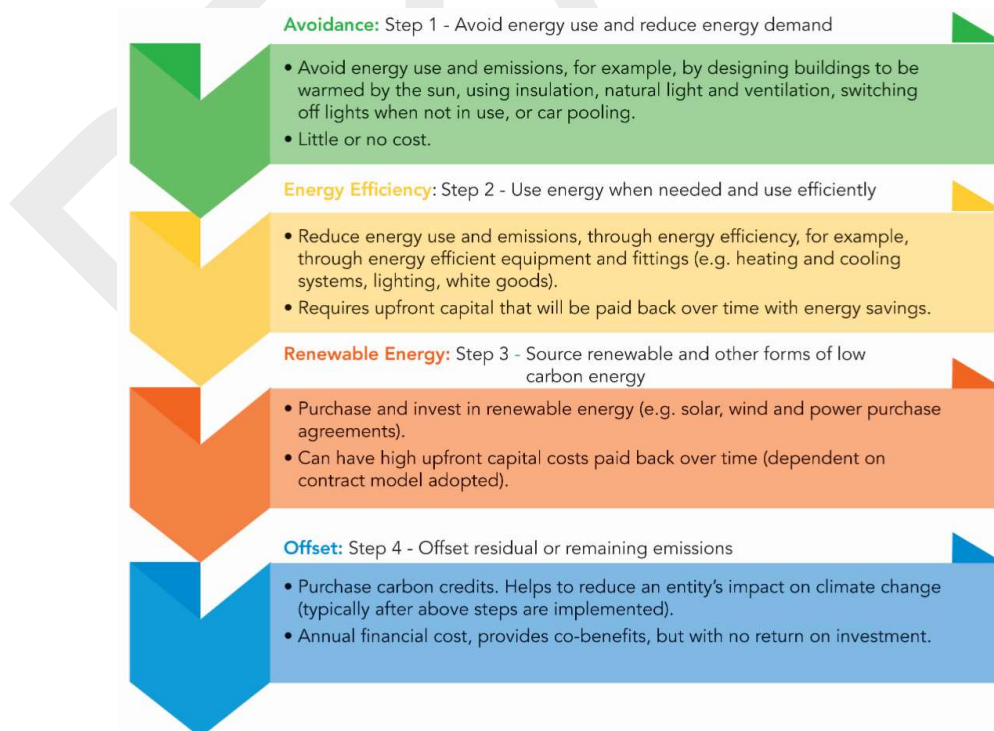


Figure 1: Energy Reduction Hierarchy

Council's Emissions

Emissions Boundary

Council's current carbon emissions inventory boundary includes:

- Emissions from all operations Council can clearly manage, measure and where it has full operational control
- Emissions from facilities that are leased to a third party where Council is responsible for the utility bills, including The Alfred Deakin Centre and pools
- Emissions from the municipal landfill, which is Council owned and operated.

The inventory excludes a number of emission sources based on their materiality to the inventory, the difficulty in calculating accurate emission figures, or where Council has limited influence over reducing such emissions.

Of note, the inventory excludes emissions from:

- Gas and electricity transmission and distribution losses
- Fuel extraction, production and transportation

- Leased buildings and facilities where Council is not responsible for the utility bills
- Closed/decommissioned Council owned landfill sites
- Contractor fuel use (note: this will be investigated for future inclusion)
- Fugitive refrigerant emissions.

Emission Scopes

Council's emissions are categorised into Scopes 1, 2 and 3 as defined under the *National Greenhouse and Energy Reporting (NGER) Act 2007*.

Scope 1 emissions are those that are released to the atmosphere as a direct result of an activity.

Scope 2 emissions are those released to the atmosphere from the indirect consumption of an energy commodity, for example, emissions from the use of electricity produced by the burning of coal in another facility.

Scope 3 emissions are indirect emissions that occur as a consequence of the activities of Council, but from sources not owned or controlled by Council.

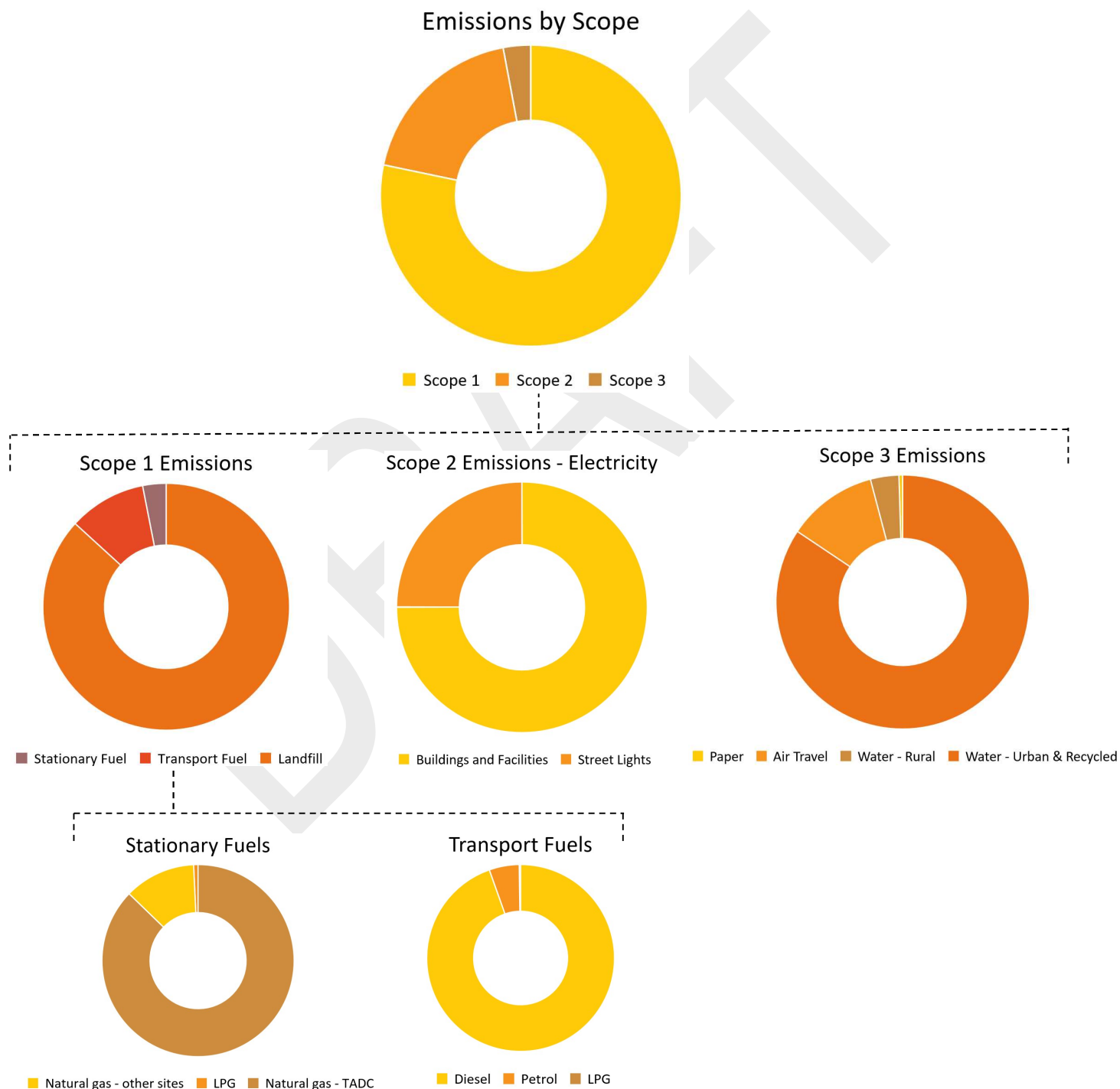


Baseline Emissions by Scope

Council considers the 2018-2019 financial year the baseline year for measuring progress of its emissions reduction. This represents the most recent typical year of emissions for Council. The series of graphs below show the emissions percentages for the baseline year by scope. Due to the relatively high emissions from landfill, Scope 1 emissions are displayed in more specific categories.

Scope	Emissions (tCO ₂ -e)
Scope 1	26,008
Scope 2	6,234
Scope 3	983
Total	33,225

Table 1: Emissions by Scope



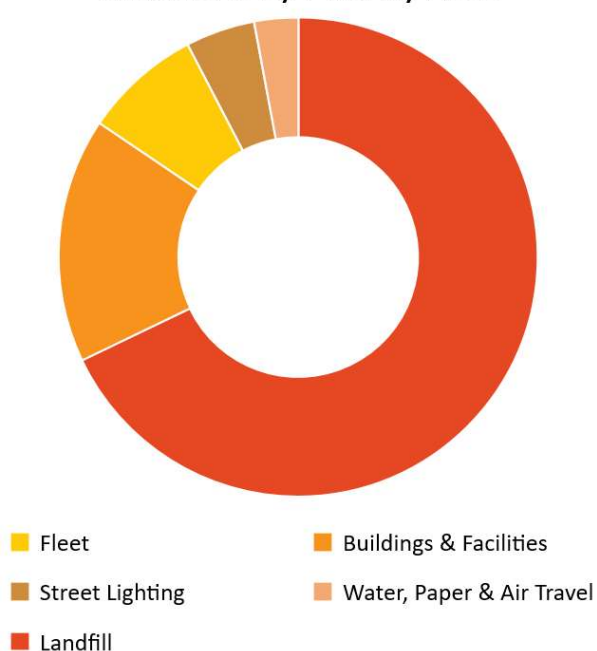
Baseline Emissions by Priority Area

There are four major sources of emissions for which Council has established strategic key directions to reduce over the long term. These are fleet, landfill, buildings and facilities, and street lighting. The emissions figures and percentages for the priority areas included in the inventory are shown in Table 2 and Graph 1. Due to the high emissions from landfill, Graph 2 excludes landfill emissions to demonstrate the comparative contributions of the other priority areas to the emissions inventory.

Priority Area	Emissions (tCO ₂ -e)
Landfill	22,568
Buildings & Facilities	5,481
Fleet	2,638
Street Lighting	1,555
Water Use, Office Paper, Air travel	983
Total	33,225

Table 2: Emissions for priority areas

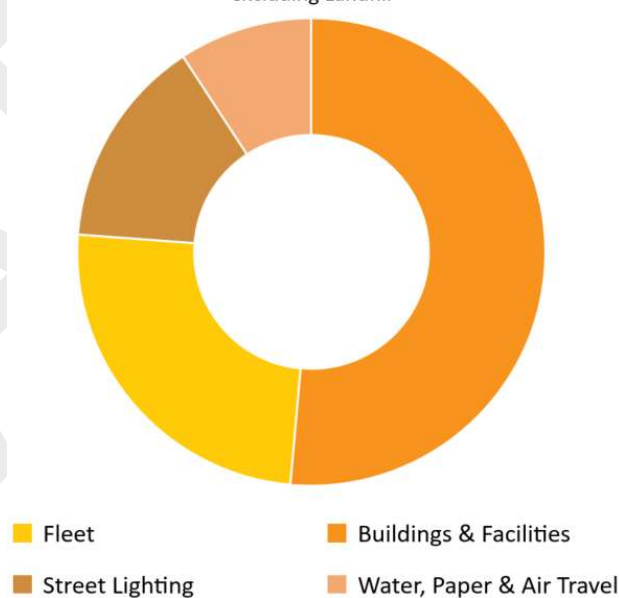
Emissions by Priority Area



Graph 1: Emissions percentages by priority area.

Emissions by Priority Area

excluding Landfill



Graph 2: Emissions percentages by priority area, excluding landfill.

Priority Areas

Landfill

Emissions from landfill, which is Council owned and operated, are categorised as Scope 1 and produced as a result of the decomposition of organic material sent to landfill. Emissions from landfill account for approximately 68 per cent of Council's total emissions inventory.

Emissions are calculated based on theoretical calculations using the National Greenhouse Energy Reporting (NGER) Scheme and do not rely on direct measurement. Waste sent to landfill takes several years to decompose and will contribute to the emissions from the landfill for many years after it is deposited. Emissions from landfill have been reasonably consistent for a number of years.

Strategic Direction

In July 2020 Council introduced a Food Organics and Garden Organics (FOGO) kerbside bin collection service. Diversion of FOGO waste from landfill will have a significant impact on the amount of emissions from landfill into the future. Due to the nature of landfill emissions any reduction in waste to landfill, particularly organic waste, will reduce emissions over time, rather than immediately.

Although Council owns and operates the landfill, it has limited control over the amount of waste produced by the community. The introduction of FOGO is a key component of landfill emissions management that Council does have control over. Other opportunities include awareness and education programs that are imperative for reducing waste to landfill. Reducing the amount of waste produced and increasing diversion of waste from landfill, is key to reducing waste and emissions from landfill.

Promotion and application of circular economy principles whereby waste and pollution is designed out, keeping products and materials in use is an important aspect of reducing waste to landfill into the future (see page 13).

A reduction in waste to landfill does not result in an immediate reduction in emissions. Early implementation of actions is important to reduce waste to landfill and to decrease the amount of emissions requiring offsetting from 2050.

KEY DIRECTION

Implement community awareness/education programs

Increase waste stream diversion rates

Advocate for and apply circular economy principles



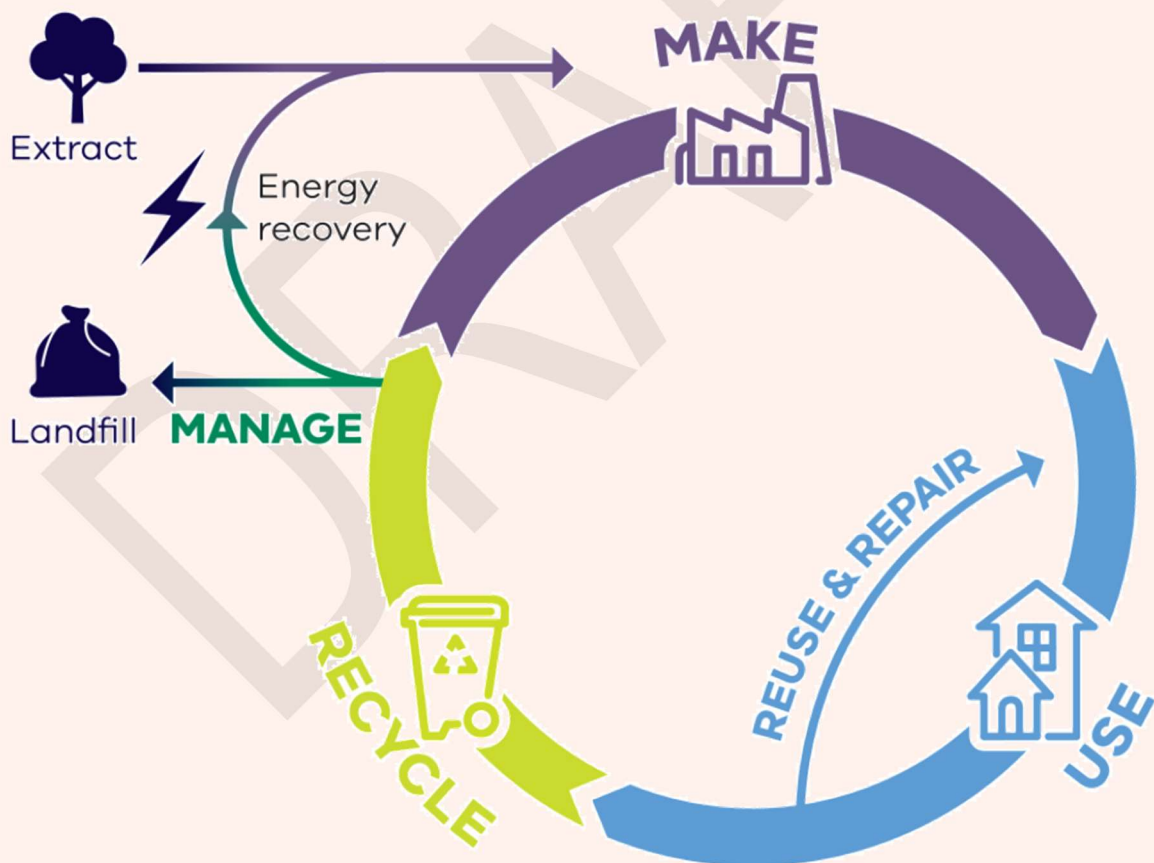
What is the Circular Economy?

The circular economy transforms our linear economy mindset - take, use and throw away - and fosters innovation and productivity by treating waste as a resource.

In a circular economy, resource use is minimised and waste and pollution are avoided with good design and efficient practices:

- Products are designed so that they are durable and can be readily repaired, reused and recycled at the end of their lives.
- Business models encourage intense and efficient product use, like sharing products between multiple users, or supplying a product as a service that includes maintenance, repair and disposal.

This reduces environmental impacts, while maintaining or increasing the value people obtain from goods and services; ultimately bringing jobs and growth to local and regional economies.



Source: Recycling Victoria: A new economy, The State of Victoria Department of Environment, Land, Water and Planning, 2020.

Fleet

Emissions from Council's fleet are categorised as Scope 1 - Transport Fuels - a result primarily of diesel and petrol use with a small volume of LPG. Emissions from fleet account for approximately 25 per cent of Council's emissions inventory, excluding landfill, with diesel use accounting for approximately 95 per cent of all fleet emissions.

Council's fleet includes passenger vehicles, utility and commercial vehicles, heavy trucks, light trucks, waste compaction units, loaders, graders, mowers, trailers and miscellaneous equipment.

Strategic Direction

Opportunities identified to improve fleet efficiency and reduce emissions through behavioural change include car-pooling, use of video and teleconferencing and driver education.

The implementation of efficient route planning will ensure kerbside waste collection, and other routine operations including road condition inspections, street sweeping and street tree watering are undertaken in the most efficient way.

An organisational approach to ensuring Council's fleet is as efficient as possible including the rationalisation of Council's fleet and transition to electric and hydrogen vehicles is a priority.

Council has committed to the transition to electric vehicles, with the first Council electric vehicle chargers installed at the Madden and Deakin Avenue Service Centres in early 2021. The transition of passenger and utility and commercial vehicles to electric is a priority over the next 10 years.

Council will continually assess the potential for the transition to electric and hydrogen vehicles for heavy fleet, with some Victorian Councils already utilising hydrogen fuelled trucks. The transition will occur as technology advances and options become available and more accessible. It is anticipated that Council will achieve a zero net emissions fleet by 2040.

KEY DIRECTION

Encourage car-pooling, cycling and walking

Encourage video and teleconferencing

Educate staff on efficient driving techniques

Regularly review and rationalise Council's fleet

Efficient route planning and implementation

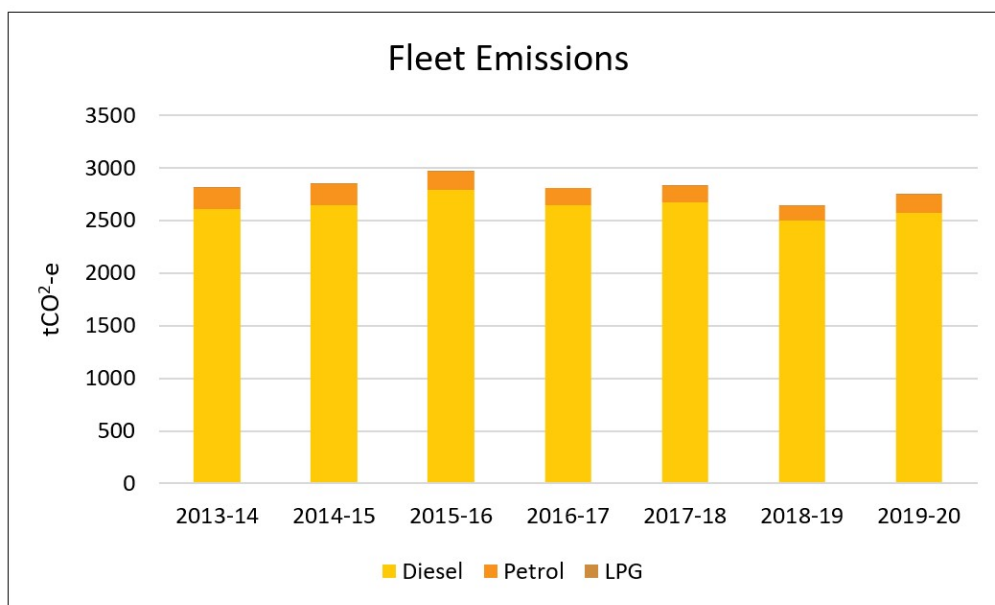
Transition to electric passenger vehicles

Transition to electric and hydrogen heavy fleet and equipment



Historical Emissions

Emissions from fleet have been reasonably consistent from year to year falling between 2,963 tCO₂-e (2015-16) and 2,638 tCO₂-e (2018-19). A reduction in emissions from petrol seen from 2014-15 to 2018-19 can be attributed to a reduction in the number of petrol vehicles and the introduction of hybrid vehicles to Council's fleet. The COVID 19 Pandemic resulted in a Council direction of one person per vehicle. This resulted in increased fleet vehicles being required and potentially higher fuel consumption for the 2019-20 and 2020-21 years.



Graph 3: Historical fleet emissions by fuel type.

Baseline Emissions

Details of Council's passenger and utility and commercial vehicles are provided in Table 3. Passenger, utility and commercial vehicles account for approximately 21 per cent of fleet emissions.

Engine and Fuel type	No. of Vehicles	Usage (L)	Km Travelled	Average Fuel Use L/100km	Emissions (tCO ₂ -e)
Passenger Vehicles					
4CYL - Diesel	9	13,526	170,622	7.93	36.61
4CYL - Hybrid	15	9,864	151,106	6.53	22.81
4CYL - Petrol	29	33,129	369,555	8.96	76.61
6CYL - Petrol	7	13,051	120,112	10.87	30.18
Utility & Commercial Vehicles					
4CYL - Diesel	83	141,749	1,358,582	10.43	385.80
6CYL - Petrol	1	1,724	16,063	10.85	3.99

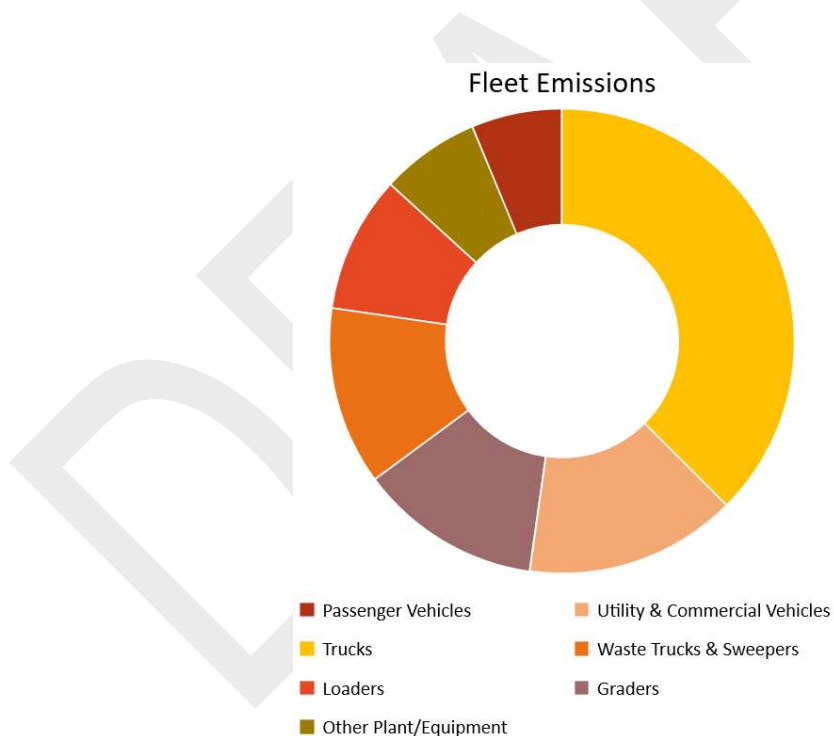
Table 3: Details of passenger, utility and commercial vehicles.

Details of Council's trucks, plant and equipment are provided in Table 4. The operation of trucks, plant and equipment accounts for approximately 79 per cent of Council's total fleet emissions.

Plant/Equipment and Fuel Type	No. of Vehicles	Usage (L)	Emissions (tCO ² -e)
Trucks - Diesel	52	363,125	988.31
Waste Trucks & Sweepers - Diesel	8	120,189	327.12
Loaders - Diesel	13	91,977	250.65
Graders - Diesel	7	122,465	333.31
Other Plant/Equipment (including Tractors, Rollers, ATV's, Mowers and Trailers) - Diesel	35	63,974	174.12
Mowers & Trailers - Petrol	3	1,075	2.49
Trailers & Loaders - LPG	2	3,818	6.38

Table 4: Details of trucks, plant and equipment.

Emissions percentages by fleet type are shown in Graph 4.



Graph 4: Profile of baseline year emissions percentages by fleet type.

Buildings & Facilities

Emissions from Council's buildings and facilities are categorised as Scope 1 - stationary fuels - a result of LPG and natural gas use and Scope 2 - electricity - a result of coal powered electricity use. Emissions from buildings and facilities accounts for approximately 52 per cent of Council's emissions inventory, excluding landfill.

Strategic Direction

Energy audits and energy efficiency works are undertaken regularly to reduce energy consumption and this will remain a priority into the future. Works include upgrades to lighting, heating, ventilation and air conditioning systems, hot water systems and the installation of solar PV systems.

The purchase of 100 per cent renewable electricity for unavoidable energy use is a priority for Council and will enable the mitigation of emissions for all electricity use. This will have a significant impact on emissions from buildings and facilities reducing emissions by approximately 85 per cent, from 5,480 tCO₂-e to 801 tCO₂-e (baseline year figures), with emissions remaining from gas consumption only.

An important strategic direction for energy use in buildings and facilities is the transition away from using gas. This includes not commissioning any new gas connections and transitioning existing gas use to electricity. This is a key component of being able to mitigate emissions, which can be achieved when electricity is the sole energy source, by using 100 per cent renewable electricity.

An emerging opportunity to reduce grid electricity use and emissions is Virtual Energy Networks (VENs). A VEN would enable Council to distribute excess solar energy produced on Council buildings and facilities with solar PV to Council buildings and facilities with no solar PV. Hobsons Bay City Council in Victoria is a local government leading the way with VENs.

KEY DIRECTION

Encourage efficient use of energy in line with the Water & Energy Use Policy

Energy efficiency audits and upgrades

No new gas connections and transition existing connections to electricity

Installation of solar PV and battery storage systems

Purchase 100% renewable electricity

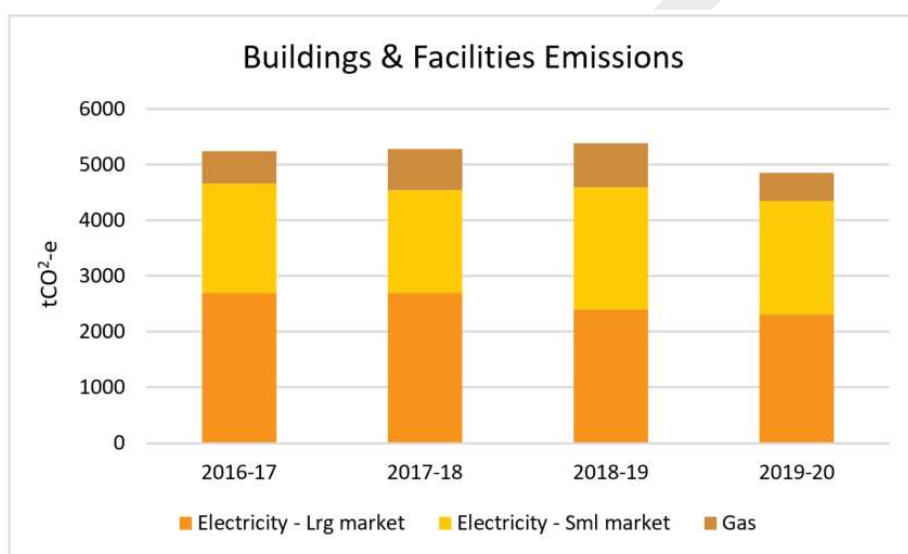
Explore virtual energy networks



Historical Emissions

Electricity consumed by Council's buildings and facilities can be broken up into our five highest consuming sites, known as large-market sites, and all other sites, known as small-market sites. The five large-market sites - The Alfred Deakin Centre, Madden Avenue Service Centre, Deakin Avenue Service Centre, the Mildura Arts Centre and the Red Cliffs Depot, account for approximately 52 per cent of Council's building and facility electricity emissions. The Mildura South Sporting Precinct, which is currently under construction, will be an additional large-market, gas consumption site.

Graph 5 shows the emissions from electricity and gas consumption in Council's buildings and facilities. Reducing grid electricity use at large-market sites has been a priority and hence there has been a reduction in recent years. Upgrades to more efficient gas boilers at The Alfred Deakin Centre and a shutdown period due to the COVID-19 pandemic in 2019-20, has resulted in a reduction in emissions from gas use.



Graph 5: Emissions from building and facilities.

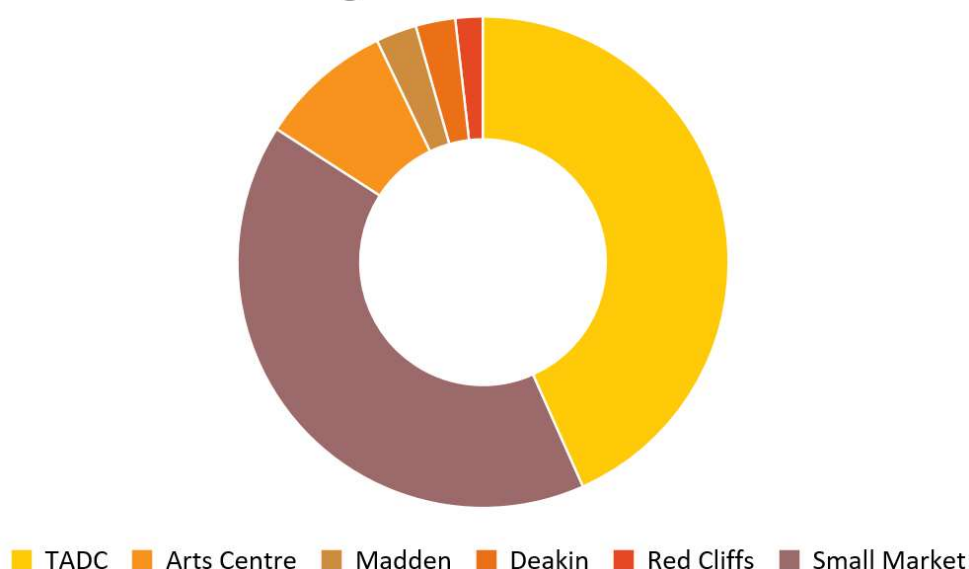
Baseline Emissions

Table 5 and Graph 6 show emissions from electricity and gas use at our five large-market sites and small-market sites. Our highest emissions site is The Alfred Deakin Centre (TADC) with significant emissions from both electricity and gas use. This site is managed by a third party with Council responsible for the payment of utilities. Council and the site manager work closely together to maintain/improve efficiencies and minimise emissions.

Site	Electricity Emissions (tCO ₂ -e)	Gas Emissions (tCO ₂ -e)	Total Emissions (tCO ₂ -e)
The Alfred Deakin Centre (TADC)	1,706	699	2,405
Mildura Arts Centre	421	67	488
Madden Office	149	0	149
Deakin Office	145	0	145
Red Cliffs Depot	99	2	101
Small Market (all other) sites	2,238	26	2,264

Table 5: Electricity and gas emissions from Council sites.

Building & Facilities Emissions



Graph 6: Emissions percentages from electricity and gas use for specific sites.

* Red Cliffs emissions from 2019-20 due to faulty electricity meter in 2018-19

Street Lighting

Emissions from Council's street lighting are categorised as Scope 2 - electricity - a result of coal powered electricity use. Street lighting accounts for approximately 14 per cent of Council's total emissions inventory, excluding landfill.

Strategic Direction

Under the *Lighting the Regions* project Council upgraded almost 4,000 residential street lights to energy efficient LEDs. It is a priority to upgrade the remaining major and residential street lights, including the Department of Transport cost shared lights, to energy efficient LEDs.

Council's Public Lighting Strategy sets the framework for the operation, replacement and development of public and street lighting including lighting of recreation facilities, high profile public spaces and street lights. The Public Lighting Strategy specifies energy efficiency as a key criteria for all lighting replacements, upgrades and installations.

The purchase of 100 per cent renewable electricity for unavoidable energy use is a priority for Council and will enable the mitigation of emissions for all electricity use.

KEY DIRECTION

Upgrade inefficient street and public lighting to energy efficient LEDs

Ensure all lighting operation, replacement and development is in accordance with Council's Public Lighting Strategy

Purchase 100% renewable electricity

Implement smart lighting technologies



Water Use, Air Travel & Office Paper (Scope 3 Emissions)

Emissions from Council's water use, air travel and office paper are categorised as Scope 3 emissions – indirect emissions that occur as a consequence of the activities of Council, but from sources not owned or controlled by Council.

These Scope 3 emissions account for approximately 9 per cent of Council's emissions inventory, excluding landfill.

Water use accounts for approximately 88 per cent of the Scope 3 emissions included in the emission inventory. Council is committed to sustainable water use and recognises that it is a limited, valued natural resource in our semi-arid climate. Water use is monitored and reported as per the *Sustainable Water Use at Mildura Rural City Council* document.

This document identifies the plans, strategies, guidelines and policies in place relating to sustainable water use, including those required to meet requirements under *Victoria's Permanent Water Saving Rules*, and sets a target for future water use. Key areas identified for consideration for sustainable water use are: irrigation, stormwater, buildings and facilities, and aquatic facilities.

Further information and water consumption data can be found in Council's annual *Environmental Sustainability Report*.

Air travel for staff, Councillors, contractors and consultants accounts for approximately 12 per cent of the Scope 3 emissions included in the emissions inventory. Due to the COVID-19 pandemic there has been a necessary transition to using telephone and video conferencing technology for training, conferences and the like, that would have previously required air travel. A continuation of the use of this technology, in a 'COVID normal' environment and the purchase of carbon offsets at the time of booking, is a priority for eliminating emissions from air travel.

Office paper has a negligible contribution to the emission inventory, however it has been included due to the relative ease of negating all emissions. There are also other sustainability considerations when choosing which office paper to purchase, including pulp source and origin. Ensuring all office paper is carbon neutral and sustainably sourced is a priority for Council.

KEY DIRECTION

Ensure the efficient use of water in line with Sustainable Water Use at MRCC document

Encourage video and teleconferencing to reduce air travel

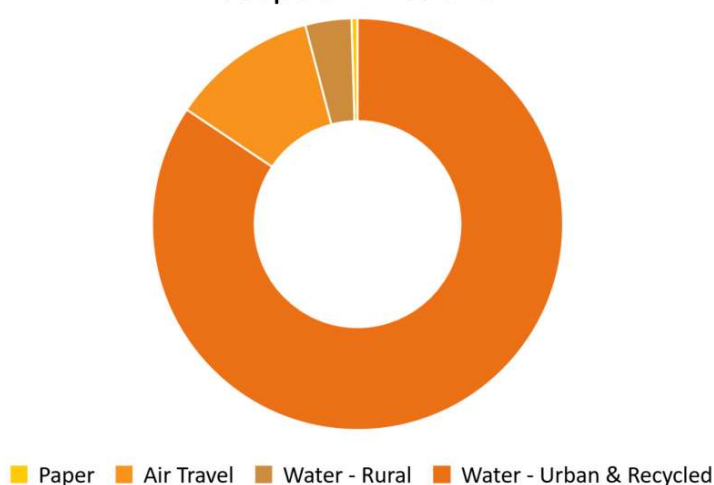
Purchase of carbon offsets for all air travel at the time of booking

Switch to 100% carbon neutral and sustainably sourced office paper

Scope 3 area	Emissions (tCO ₂ -e)
Water Use - Urban & Recycled	829
Water Use - Rural	36
Air Travel	113
Office Paper	5

Table 6: Scope 3 emissions.

Scope 3 Emissions

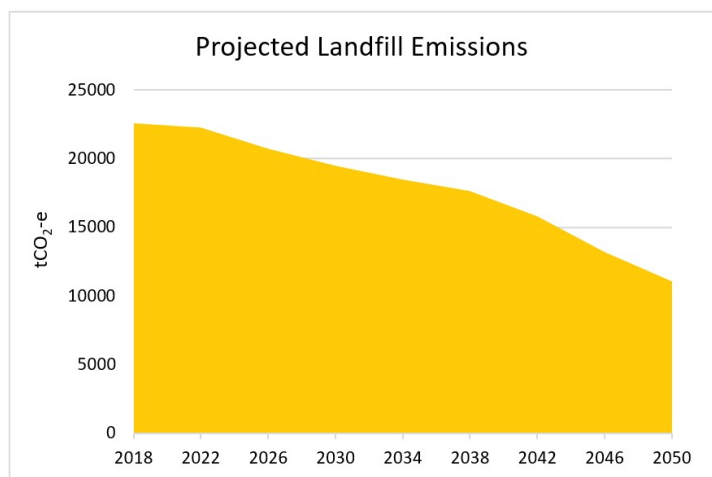


Graph 7: Scope 3 emissions percentages.

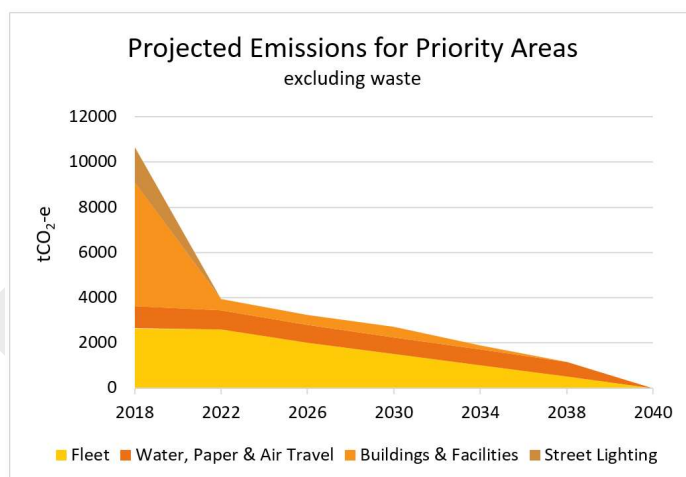
Emissions Projections

Emissions projections based on the strategic direction for each priority area have been estimated to give an indication of the reduction in emissions from the baseline year to 2050 for landfill and 2040 for all other areas. It is expected that any unavoidable emissions will be offset to achieve the zero net target. The emissions projections have been estimated at

four year intervals based on potential emissions reductions for the priority areas. Graph 8 shows projected emissions from the baseline year to 2050 for landfill, while Graph 9 shows other priority areas to 2040. Table 7 shows projected emission figures, completed and potential key actions, from the baseline year, for priority areas likely to contribute to projected emissions reduction at four year intervals.



Graph 8: Projected emissions for landfill.



Graph 9: Projected emissions for priority areas.

Year	Landfill Emissions (tCO ₂ -e)	Other Priority Area Emissions (tCO ₂ -e)	Key Actions
2022	22,246	3,940	<ul style="list-style-type: none"> The Alfred Deakin Centre boiler upgrade (complete). Introduction of kerbside food organics and garden organics (FOGO) waste collection service (complete). Purchase of 100% renewable electricity for all Council buildings, facilities and public/street lighting. Purchase of 100% carbon neutral and sustainably sourced office paper. Significant reduction in air travel, initially due to COVID-19 pandemic, and purchase of carbon offsets for all air travel at the time of booking. Introduction of electric vehicles (x4) into Council's fleet.
2026	20,700	3,250	<ul style="list-style-type: none"> Transition of passenger/utility/commercial fleet to electric vehicles. Transition from gas at some small gas use sites. Upgrade to Mildura Arts Centre gas powered boiler to electric heat pump. Begin the transition of heavy vehicles/equipment to electric and hydrogen powered.
2030	19,457	2,700	<ul style="list-style-type: none"> Complete the transition of passenger/utility/commercial fleet to electric and continue transition of heavy vehicles/equipment to electric and hydrogen powered. Transition from gas at all buildings and facilities including The Alfred Deakin Centre and the Mildura South Regional Sporting Precinct.
2034	18,457	1,900	<ul style="list-style-type: none"> Transition of heavy vehicles/equipment to electric and hydrogen powered.
2038	17,652	1,158	<ul style="list-style-type: none"> Transition of heavy vehicles/equipment to electric and hydrogen powered.

2040	17,310	0	<ul style="list-style-type: none"> Complete the transition of heavy vehicles/equipment to electric and hydrogen powered. Water authorities achieving zero net emissions target, thus Council water use will be zero emissions. Closure of Mildura Landfill, ceasing landfilling in municipality.
2042	15,799	0	<ul style="list-style-type: none"> No landfilling. Zero emissions from all other priority areas.
2046	13,186	0	<ul style="list-style-type: none"> No landfilling. Zero emissions from all other priority areas.
2050	11,033	0	<ul style="list-style-type: none"> No landfilling. Zero emissions from all other priority areas.

Table 7: Projected emission figures and some completed and potential key actions.

Offsets

Council is committed to implementing the steps of the Energy Reduction Hierarchy: (1) avoidance of energy use, (2) energy efficiency, (3) switching to cleaner energy alternatives and (4) purchasing offsets for any unavoidable emissions. This approach will help ensure actions are carried out to reduce emissions before unavoidable emissions will be offset from 2050 for landfill and 2040 for all other priority areas.

The identification of suitable offsets will be determined by following the guidance provided by the *National Carbon Offset Standard* (NCOS). One carbon offset unit is equal to one tonne of CO₂ equivalents of emissions avoided or removed from the atmosphere. The cost of one carbon offset is dependent on the project that generated it and also the market supply and demand for offsets at the time of purchasing. Council's preference is for investment in ethical Australian accredited carbon offsets with not for profit companies such as Greenfleet Australia, who establish self-sustaining multi-species forests in Australia. Current corporate offset through Greenfleet are priced at \$15/tCO₂-e.

Table 8 shows the estimated emissions from landfill from 2050 and the estimated cost of offsetting these emissions (assuming current offset costs) and noting that this may not be representative of future offset costs.

Purchasing offsets is expected to be a sizeable expense, to be considered in relation to landfill emissions reduction options. Investment in waste reduction measures now, such as the FOGO kerbside collection, significantly reduce future emissions requiring offset from 2050.

Year	Landfill Emissions (tCO ₂ -e)	Cost of offsets for Landfill Emissions
2050	11,533	\$172,995
2051	11,033	\$165,495
2052	10,557	\$158,355
Total	33,123	\$529,968

Table 8: Estimated offset cost for the first three years of zero net emissions *assuming price of \$15 per tCO₂-e for Australian carbon offsets.

Monitoring, Reporting and Evaluation

Reporting on the *Towards Zero Emissions Strategy* Action Plan will be completed quarterly via Council's Action Plan reporting process.

Council's buildings and facilities energy consumption and emissions will be reported to the Energy Management Team and Strategic Management Team quarterly.

The Annual *Environmental Sustainability Report* will provide the community with an overall picture of how Council is progressing toward the zero net emissions target. Currently, this document provides an annual assessment of Council's performance in a range of environmental sustainability areas, including energy, fleet, water, biodiversity, waste and community engagement.

Five Year Action Plan (2021-2025)

Key Priority Area	Action	Budget	Responsibility	Timeframe
Fleet	Formation of a Fleet Emissions Reduction Working Group.	Operational	Community Futures	2021-2022
	Update the <i>Fleet and Plant Management Policy</i> to reflect the transition to electric and hydrogen vehicles and plant.	Operational	Fleet Management Committee	2021-2022
	Deliver awareness sessions to drivers of heavy vehicles to promote energy efficient driving practices.	Operational	Financial Services	Annually
	Complete the implementation of the fleet management system across Councils relevant fleet.	Operational	Financial Services	2021-2023
	Implement the fleet booking system for passenger vehicles where practical, undertake an audit and prepare a report on fleet utilisation to inform rationalisation opportunities across the organisation.	Operational	Financial Services	Annually
	Review existing fleet utilisation and implement fleet rationalisation for Parks and Waste Services.	Operational	Parks and Waste Services	Annually
	Review existing fleet utilisation and implement fleet rationalisation for Works and Engineering Services.	Operational	Works and Engineering Services	Annually
	Review existing fleet utilisation and implement fleet rationalisation for office based vehicle fleet.	Operational	Fleet Management Committee	Annually
	Utilise efficient route planning software to optimise routine fleet operations for Parks and Waste Services.	Operational	Parks and Waste Services	2021-2022
	Utilise efficient route planning software to optimise routine fleet operations for Works and Engineering Services.	Operational	Works and Engineering Services	2021-2022

	Undertake a basic feasibility study including availability and cost for electric and hydrogen powered vehicles/equipment to inform decision making for fleet purchases.	Operational	Community Futures	Annually
	Continue to install charging stations to support the transition to electric fleet vehicles.	Capital – Electric Vehicle Charging Stations	Community Futures	Annually
	Work with other government and non-government organisations to explore the potential for an electric vehicle fleet bulk-buy to increase the availability and uptake of electric vehicles.	Operational	Community Futures with support from Financial Services	2021-2022
	Investigate the inclusion of contractor fuel use reporting for inclusion in Councils emissions inventory.	Operational	Financial Services	2021-2022
Landfill	Implement community awareness/education programs to reduce waste to landfill in line with the Waste and Resource Recovery Plan.	Operational	Parks and Waste Services	Annually
	Continue to deliver and provide community education for the FOGO bin system.	Operational	Parks and Waste Services	Annually
	Investigate options for landfill gas capture, with the aim to reduce emissions.	Operational	Park and Waste Services	2024-2025
Building & Facilities	Undertake a feasibility study on transitioning all Council sites currently using gas (natural gas and LPG) to be powered by 100% renewable electricity only.	Capital – include in 'Energy Reduction Initiatives, Audits & Works'	Community Futures	2022-2023
	Develop a strategic plan to transition Council's buildings and facilities currently using gas to be powered by 100% renewable electricity only.	Capital – include in 'Energy Reduction Initiatives, Audits & Works'	Community Futures with support from Asset Services	2022-2023
	Undertake energy efficiency audits, energy efficiency upgrades and renewable energy and battery storage installations.	Capital – Energy Reduction Initiatives, Audits & Works (\$150,000+)	Community Futures with support from Asset Services	Annually
	Develop a <i>Solar & Battery Systems Priority Report</i> to prioritise solar PV and battery storage installations at council owned buildings and facilities.	Operational	Community Futures	2021-2022
	Review and promote the <i>Water & Energy Use Policy and Guidelines</i> .	Operational	Community Futures	2021-2022

	Implement the <i>Water and Energy Use Guidelines</i> (Buildings and Facilities) for all new builds, refurbishment and retrofits.	Operational	Asset Services	Annually
	Investigate the opportunity of a Virtual Energy Network (VEN) to utilise excess solar generated on Council's buildings and facilities.	Operational	Community Futures	2021-2022
	Undertake a feasibility study on implementing solar carports at Council's large-market electricity sites to further reduce grid electricity demand and urban heat island impacts.	Capital – Solar Carports Feasibility Study	Community Futures	2022-2023
	Major refurbishments and new constructions to be designed and constructed to high Ecologically Sustainable Design (ESD) principles.	Capital	Asset Services	Annually
Street & Public Lighting	Upgrade the remaining inefficient street lighting to energy efficient LEDs.	Capital – Major Road Lighting Upgrade External Funding	Community Futures	2021-2022
	Upgrade inefficient public and recreation lighting to energy efficient LEDs.	Capital	Works and Engineering Services with support from Leisure and Cultural Services	Annually
	Investigate and integrate smart lighting technologies on Council's lighting assets as appropriate.	Capital	Works and Engineering Services with support from Leisure and Cultural Services	Annually
Scope 3 Emissions - Water Use, Office Paper and Air Travel	Amend travel request forms to include availability of online training to encourage the use of teleconference and video conference facilities as alternatives to air and vehicle travel.	Operational	Corporate Administration	2021-2022
	Purchase carbon offsets for all Council flights at the time of booking.	Operational	Corporate Administration	2021-2022 Ongoing
	Ensure all office paper is NCOS carbon neutral certified and sustainably sourced – 100% post-consumer (true recycled) and Australian made.	Operational	Information Services	2021-2022
	Implement 'follow me' printing.	Operational	Information Services	2021-2022

Other	Purchase of 100% renewable electricity for all of Council's buildings, facilities and street/public lighting.	Operational	Community Futures	2021-2022
	Report progress towards achieving the zero net emissions target in the Annual Environmental Sustainability Report.	Operational	Community Futures	Annually
	Update <i>Procurement of Goods, Services and Works Policy</i> to include more specific information and criteria relating to carbon emissions.	Operational	Financial Services	2021-2022
	Include investment in financial institutions that do not currently and/or planning to support the fossil fuel industry, in update of Council's <i>Investment Policy</i> and report on environmentally friendly investments in the monthly management report.	Operational	Financial Services	2021-2022
	Investigate/trial the use of a data management platform to efficiently monitor and report on consumption and emissions for Council's emissions inventory.	Operational	Community Futures	2021-2022
	Report Council's energy consumption and emissions to the Energy Management Team and Strategic Management Team following each quarter.	Operational	Community Futures	Quarterly
	Proactively engage with staff about energy consumption and efficiency and encourage behavioural change through education and training.	Operational	Community Futures	2021-2025
	Continue membership of Central Victorian Greenhouse Alliance (CVGA) and involvement in CVGA led projects, working groups and advocacy campaigns.	Operational	Community Futures	2021-2025
	Investigate feasibility of vehicle to building and vehicle to grid charger technology.	Operational	Community Futures	2024-2025

Appendix 1

The table below details the source of the activity data, the calculation method, assumptions, emissions factors and references for the emissions inventory in this strategy. The factors and specific references in the table are applicable for the baseline year (2018-19). Where multiple years of data are displayed each year's emissions factors are used/calculated based on the corresponding year.

Scope 1 Emissions																																	
Transport Fuels																																	
Activity data	Fuel consumption from fuel cards and Council officer fuel data entry (for fuel taken from bulk fuel).																																
Calculation Method	Z = (Q x W x EF) / 1000 Where: Z = Scope 1 emissions (tCO ₂ -e) for transport fuel use Q = volume of fuel use (kL) W = energy content factor for fuel type (GJ/kL) EF = Emissions factor for fuel type (kg CO ₂ -e/GJ)																																
Assumptions	All Council vehicles are post 2004, the National Greenhouse Accounts Factors for 'post-2004 vehicles' were used.																																
Factors	Energy content and Emissions Factors (EF) for baseline year (2018-19): <table><tr><th rowspan="2">Fuel</th><th rowspan="2">Energy content factor (GJ/kL)</th><th colspan="4">Emission factor (kg CO₂-e/GJ)</th></tr><tr><th>CO₂</th><th>CH₄</th><th>N₂O</th><th>Total</th></tr><tr><td>Petrol</td><td>34.2</td><td>67.4</td><td>0.02</td><td>0.2</td><td>67.62</td></tr><tr><td>Diesel</td><td>38.6</td><td>69.9</td><td>0.01</td><td>0.6</td><td>70.51</td></tr><tr><td>LPG</td><td>26.2</td><td>60.2</td><td>0.4</td><td>0.3</td><td>60.90</td></tr></table>					Fuel	Energy content factor (GJ/kL)	Emission factor (kg CO ₂ -e/GJ)				CO ₂	CH ₄	N ₂ O	Total	Petrol	34.2	67.4	0.02	0.2	67.62	Diesel	38.6	69.9	0.01	0.6	70.51	LPG	26.2	60.2	0.4	0.3	60.90
Fuel	Energy content factor (GJ/kL)	Emission factor (kg CO ₂ -e/GJ)																															
		CO ₂	CH ₄	N ₂ O	Total																												
Petrol	34.2	67.4	0.02	0.2	67.62																												
Diesel	38.6	69.9	0.01	0.6	70.51																												
LPG	26.2	60.2	0.4	0.3	60.90																												
Reference	Department of Industry, Science, Energy & Resources, National Greenhouse Accounts (NGA) Factors August 2019 Table 4, pg 19.																																
Stationary Fuels																																	
Activity data	Gas consumption from retailers: Natural Gas – Origin Energy, LPG – Elgas.																																
Calculation Method	Natural Gas Z = (Q x EF) / 1000 Where: Z = Scope 1 emissions (tCO ₂ -e) for natural gas use Q = natural gas use (GJ) EF = Emissions factor for natural gas (kg CO ₂ -e/GJ) Liquid Petroleum Gas (LPG) Z = (Q x W x EF) / 1000 Where: Z = Scope 1 emissions (tCO ₂ -e) for LPG use Q = volume of fuel use (kL) W = energy content factor for fuel type (GJ/kL) EF = Emissions factor for LPG (kg CO ₂ -e/GJ)																																
Assumptions	Activity data includes gas where Council is responsible for payment of the bill. Excludes Council owned assets where a third party is responsible for the payment of the bill.																																

Factors	Energy content and Emissions Factors (EF) for baseline year (2018-19):					
	Fuel	Energy content factor (GJ/kL)	Emission factor (kg CO ₂ -e/GJ)			
			CO ₂	CH ₄	N ₂ O	Total
	Natural Gas	N/A	51.4	0.1	0.03	51.53
LPG	25.7	60.2	0.2	0.2	60.60	
Reference	Department of Industry, Science, Energy & Resources, National Greenhouse Accounts (NGA) Factors August 2019 Table 2, p. 12 & Table 3, p. 14.					
Landfill						
Activity data	Waste data from the Mildura Landfill weigh bridge includes total waste deposited at Mildura Landfill only. Ouyen Landfill and rural transfer station waste that is not deposited at Mildura Landfill is excluded due to the lack of accurate data.					
Calculation Method	National Greenhouse and Energy Reporting (NGER) Solid Waste Calculator 2019-20.					
Assumptions	<p>Waste mix is as per NGER Solid Waste Calculator 2019-20 estimated (default) percentages. No separate waste stream reporting data has been used in the calculation of landfill emissions.</p> <p>The emissions generated by the NGER Solid Waste Calculator are an estimate only, intended to be used for guidance purposes and to assist entities in their reporting requirements.</p> <p>Municipal waste mix assumed percentages with food organic and garden organic kerbside collection:</p> <p>Food - 35% (default) reduced to 10%</p> <p>Paper and cardboard - 13% (default) reduced to 5%</p> <p>Garden and park - 16.5% (default) reduced to 5%</p>					
Factors	All emissions factors used are included in the NGER Solid Waste Calculator 2019-20.					
Reference	National Greenhouse and Energy Reporting Solid Waste Calculator 2019-20					
Scope 2 Emissions						
Purchased Grid Electricity Use						
Activity data	Electricity consumption data from retailer (ERM Power)					
Calculation Method	<p>$Z = (Q \times EF) / 1000$</p> <p>Where:</p> <p>Z = scope 2 emissions (tCO₂-e) for electricity use</p> <p>Q = electricity use (kWh)</p> <p>EF = Emissions Factor (kgCO₂-e/kWh)</p>					
Assumptions	Activity data includes purchased electricity for which Council is responsible for payment of the bill. Excludes Council owned assets where a third party is responsible for the payment of the bill.					
Factors	<p>Emissions Factors (EF) for baseline year (2018-19) = 1.02 (kgCO₂-e/kWh)</p> <p>as per EF for Victorian electricity generation in National Greenhouse Accounts (NGA) Factors, August 2019</p>					
Reference	Department of Industry, Science, Energy & Resources, National Greenhouse Accounts (NGA) Factors August 2019 Table 5, p. 19.					
Scope 3 Emissions						
Water Use						
Activity data	Urban, rural and recycled water consumption data from Lower Murray Water excludes Grampians Wimmera Mallee (GWM) Water consumption.					
Calculation Method	<p>$Z = Q \times (EF / 1000)$</p> <p>Where:</p> <p>Z = scope 3 emissions (tCO₂-e) for water use</p> <p>Q = total quantity of water consumed (kL)</p>					

	EF = emission factor for water consumption (kgCO ₂ -e)
Assumptions	<p>Emission factors (EF) calculated from Lower Murray Water Annual Report</p> $EF = Q / X$ <p>Where:</p> <p>EF = emission factor for water consumption (tCO₂-e)</p> <p>Q = Total water supplied in (kL) (by water authority)</p> <p>X = Total Greenhouse Gas emissions (tCO₂-e) (for the supply of the water)</p> <p>Recycled water has the same emissions factor as urban water.</p>
Factors	<p>Emissions Factors (EF) for baseline year (2018-19):</p> <p>Urban & Recycled water EF = 20,509,000 / 20,128 = 0.000981423 tCO₂-e/kL</p> <p>Rural water EF = 608,927,000 / 25,569 = 0.000419903 tCO₂-e/kL</p>
Reference	<p>Environment Protection Authority Victoria, Greenhouse gas (GHG) inventory and management plan 2018-19, Publication 1797, November 2019.</p> <p>Lower Murray Water Annual Report 2018-19 - CO₂ emissions pg 31, rural water Appendix 4, Urban water Appendix 5.</p>
Air Travel	
Activity data	Travel transaction records provided by Council's internal Corporate Services Department and Council's travel agent.
Calculation Method	$Z = (Q \times EF) / 1000$ <p>Where:</p> <p>Z = scope 3 emissions (tCO₂-e) for air travel</p> <p>Q = total distance travelled (passenger.km)</p> <p>EF = emission factor for haul & class type, including the effect of radiative forcing (kgCO₂-e/passenger.km).</p>
Assumptions	<p>Where flight details were not available, assumptions were made for flight data based on the travel location.</p> <p>Haul types are based on the following distances as guided by the United Kingdom (UK) Department for Environment, Food & Rural Affairs (DEFRA):</p> <ul style="list-style-type: none"> • Domestic: 0-500km • Short-haul = 501-3,700km • Long-haul > 3,700km.
Factors	<p>Emissions Factors (EF) (kgCO₂-e/passenger.km) for baseline year (2018-19):</p> <p>Domestic economy = 0.29832, domestic business class = 0.29832;</p> <p>Short-haul economy class = 0.1597, short-haul business class = 0.23955;</p> <p>Long-haul economy class = 0.16279 and long-haul business class = 0.47208.</p>
Reference	<p>Environment Protection Authority Victoria, Greenhouse gas (GHG) inventory and management plan 2018-19, Publication 1797, November 2019.</p> <p>UK Department for Environment, Food & Rural Affairs conversion factors (Business – air tab)</p>
Office Paper	
Activity data	Reams and type of paper purchased as recorded by Council's Information Systems branch. Where exact quantity purchased for a year is unknown an estimation based on number of reams ordered and frequency (monthly, quarterly etc.) is used.
Calculation Method	$Z = (Q \times EF) / 1000$ <p>Where:</p> <p>Z = scope 3 emissions (tCO₂-e) for paper use</p> <p>Q = weight of paper used</p> <p>EF = emission factor for paper type (kg CO₂/kg)</p>
Assumptions	1 ream of A4 paper = 500 sheets and weighs 2.5 kg. 1 A3 sheet = 2 A4 sheets.

	<p>Very little data is available from paper producers on the greenhouse gas impacts of their operations. The emission factor provided by the Environment Protection Authority (EPA) Victoria relies extensively on Australian Plantation Products and Paper Industry Council (APPPIC) data from 2006. Assumptions obtained from this source include the following:</p> <ul style="list-style-type: none"> • 40 per cent of paper is imported into Australia. • 20 per cent of pulp is imported into Australia. • Half of the energy input to the paper industry is from fossil fuels. <p>Alternative impacts of paper disposal when not recycled, such as landfill impacts, are also not included.</p>
Factors	Emission Factor (EF) for Domestic Recycled paper = 1.52 kg CO ₂ /kg
Reference	Environment Protection Authority (EPA) Victoria, Greenhouse gas emissions factors for office copy paper , Publication 1374.1, October 2013.