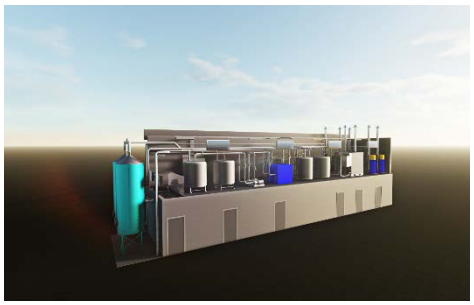
Hepburn
SHIRE COUNCIL

HEPBURN ZERO CO_2

TOWARDS ZERO EMISSIONS ROADMAP



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1 Introduction

Hepburn Shire Council has significantly reduced greenhouse emissions in the 2013 – 2017 period. The Hepburn Shire Council Plan 2017-2021 supports the continued focus by the Hepburn Shire Council in achieving the target of Zero Carbon Emissions over the next 4 years. A key action is to reduce emissions and become a carbon neutral organisation. There are several ways in which this can be achieved, each of which is detailed within this document. The following is referenced from the Council Plan 2017-2021.

Strategic Objective

Sustainable Environment

Key Strategic Activity

8- Respond to Climate Change through the reduction of energy use, emissions and other resource use, and helping the community to adapt to the impacts of increased floods and fires. Undertake fire and flood risk reduction works across Council managed facilities and roads, in collaboration with other agencies and landowners to reduce fire risk to our communities.

Action

8.1- Implement Towards Zero Emissions Roadmap Action Plan including renewable energy generation and reducing Council's consumption.

The Toward Zero Emissions Roadmap outlines a recommended course of action to enable Council to achieve this aim. The projects and initiatives can be categorised into one of the following action types:

Reduce - Generate - Offset

There a number of different ways that Council can reach our target of Zero Emissions. The option presented in this roadmap is a balanced approach that reduces Council's emissions while simultaneously investing in our local economy and reducing the cost of business operations.

2 Council Emissions 2015 – 2016

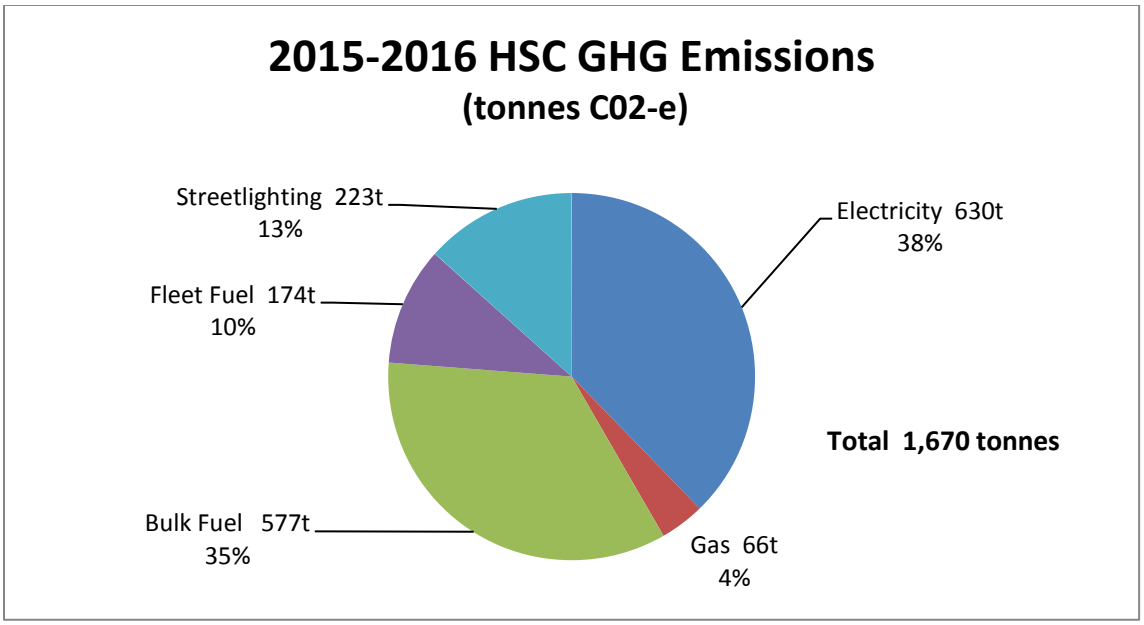

Table 1.1

Total Emission Source	GHG t CO_2-e 2015-16
Total Carbon Footprint – tonnes CO_2-e	1,670
Percentage Change Compared to (2012 -2013)	21%

3 The Main Contributors to Our Emissions

Fuel

Table 3.1

	Fleet	Bulk Fuel
Diesel (litres)	7,494	3,260
LPG (litres)	8,638	
ULP (litres)	20,593	
B20 Diesel (litres)	-	21,185
Total (litres)	66,725	204,445
Emissions T CO2-e	174	577

Electricity

Table 3.2

Sites Using >5,000 kWh	Consumption Kwh	GHG T CO2-3	% of total
HSC Public Lighting Daylesford	167,582	197.7	26.1%
The Warehouse, Clunes	63,020	74.4	9.8%
Daylesford Town Hall	61,517	72.6	9.6%
Daylesford Depot	41,192	48.6	6.4%
Daylesford Duke Street Offices	39,174	46.2	6.1%
Queens Park Clunes	37,097	43.8	5.8%
Trentham Pool	20,807	24.6	3.2%
Daylesford Regional Visitor Information Centre	20,655	24.4	3.2%
Creswick Hub	18,603	22.0	2.9%
Creswick Depot	17,810	21.0	2.8%
Clunes Recreation Reserve	14,258	16.8	2.2%
Daylesford Swimming Pool	12,838	15.1	2.0%
Daylesford Library	10,699	12.6	1.7%
Creswick Visitor Information Centre	10,029	11.8	1.6%
Wills Square Daylesford	9,038	10.7	1.4%
Mineral Springs Cres Spa Complex	6,980	8.2	1.1%
Collins Place Clunes	6,589	7.8	1.0%
Calembeen Park Creswick	6,502	7.7	1.0%
Wombat Hill Water Pump Daylesford	5,828	6.9	0.9%
Creswick Town Hall	5,124	6.0	0.8%
Daylesford Senior Citizens	5,073	6.0	0.8%
Totals	**580,415**	**684.9**	**90.5%**

Gas

Table 3.3

Largest GAS Users	Consumption MJ	Tonnes CO2	% of total
Daylesford Town Hall	369,069	20.38	31%
Daylesford Regional Visitor Information Centre	271,961	15.02	23%
Creswick Museum	232,764	12.86	19%
Daylesford Duke Street Offices	117,654	6.50	10%
Daylesford Library	77,517	4.28	6%
Creswick Senior Citizens	58,759	3.25	5%
Top 6 Total	**1,127,724**	**62**	**94%**

4 Greenhouse Gas Emissions Definitions

Greenhouse gas emissions are defined as either direct or indirect emissions from sources associated with Council's operations, as defined in the National Greenhouse and Energy Reporting Act 2007

Direct Emissions: Produced within the organisation through the consumption of fossil fuels or energy or transportation purposes such as natural gas, diesel, petrol or LPG, etc. These are classed as Scope 1 emissions

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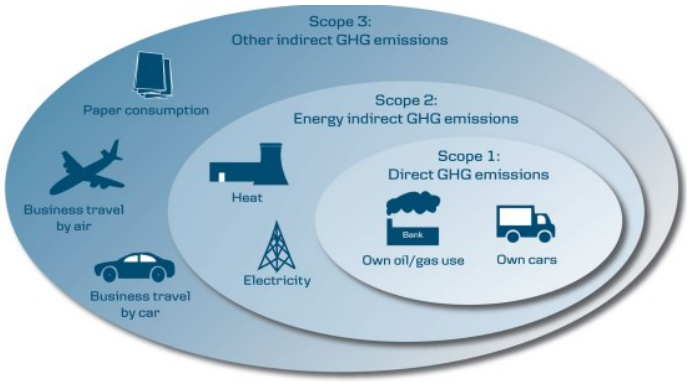
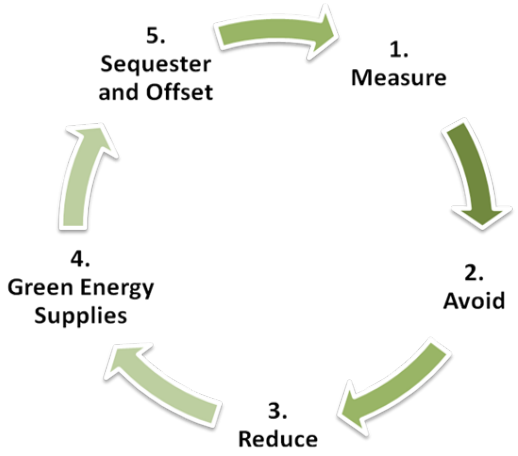


Indirect Emissions: These are emissions generated externally as a consequence of Council's activities through the purchase of goods and services. The most important category of indirect emissions is the purchase of electricity which includes street lighting and is classed as a scope 2 emission.

Other indirect emissions relating to Council's operations are classed as Scope 3 and largely include – Upstream electricity consumption, direct waste produced, paper consumption and contractor emissions.

The Energy Hierarchy

1. **Measure** all emissions and evaluate the effectiveness of previous reduction measures
2. **Avoid** using energy at all opportunities and eliminate waste.
3. **Reduce** operational energy consumption what energy needs to be used through efficient technology and behaviour change
4. **Green energy supplies** by switching to low or no emission sources
5. **Sequester and offset** all residual emissions that can't be eliminated through avoiding, reducing and changing energy supplies

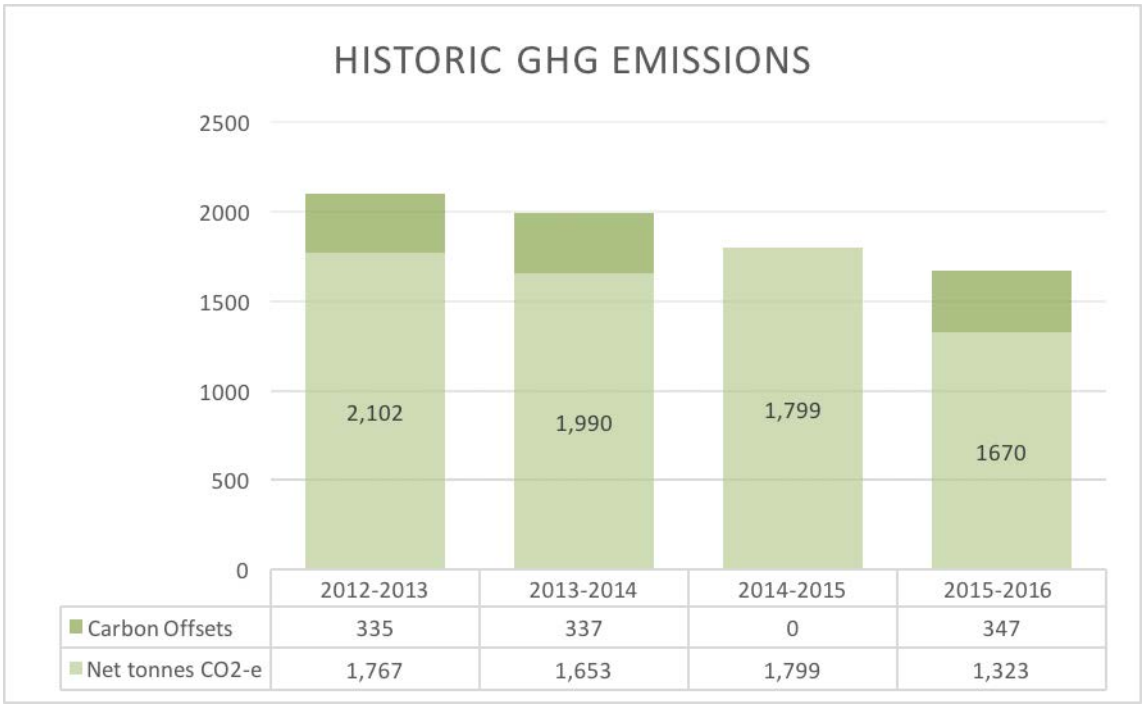


5 HSC Emissions Reduction to Date

Table 5.1

	2012 -2013	2013 -2014	2014 -2015	2015 -2016
tCO_2-e	2,102	1,990	1,799	1,670
% Change	Benchmark	5.3%	14.4%	20.6%
Offsets	335	337	0	347
Net t CO_2-e	1,767	1,653	1,799	1,323

Graph 5.1


HISTORIC GHG EMISSIONS
2500
2000
1500
1000
500
0
2,102
1,990
1,799
1670
2012-2013
2013-2014
2014-2015
2015-2016
Carbon Offsets
335
337
0
347
Net tonnes CO2-e
1,767
1,653
1,799
1,323

Reduction Measures Undertaken

Since 2012 Council has taken a number of active measures to reduce overall greenhouse gas emissions. Some of these are detailed below:

Table 5.3

Action	Period	Estimated GHG Reduction
Daylesford Town Hall draft proofing	2013/14	6t
Place Daylesford Depot heavy vehicle fleet on biodiesel	2014/15	28t
Upgrade Council and shared 80W street lights to LEDs	2014/16	245t
Install PV solar systems on 6 Council operated sites	2015/16	160 t

6 Toward Zero 2017-21

Hepburn Shire Council has made substantial progress towards becoming carbon neutral over the preceding four years. In order to achieve carbon neutrality, Hepburn Shire Council must reset the emissions benchmark and form a plan that will further reduce emissions to zero over the coming four years.

This approach results in a new benchmark of:

1,670 tonnes

Council emissions across most emission sectors have reduced over the past four years, with the exception of heavy vehicle fuel consumption.

In working to become a carbon neutral organisation, there are some trends that need to be considered. These include:

Heavy Vehicle & Fleet Emissions

This increased fuel consumption reflects the additional road works and maintenance undertaken by Council during 2015 – 2016.

Previously, some of this work was undertaken by external contractors, who's fuel emissions are not included in Councils recorded emissions. It is expected the heavy vehicle fuel consumption will continue to rise by approximately 60% or 110,000 litres of diesel in the future due to increased construction and maintenance activity to be undertaken by Council. This equates to an increase in greenhouse emissions of around **300** tonnes annually. Although, increasing our carbon emissions, the benefit of increased productivity and plant utilisation takes priority due to the net benefit to our community.

The Rex

The purchase of the Rex building in Daylesford together with the change in use of the Daylesford Town Hall will have an impact on the energy requirements for Council. These facilities will consolidate Council operations currently occupied at Duke St, Daylesford Library, the Daylesford Visitor Information Centre and Daylesford Town Hall itself. The new larger facility at the REX building will also incorporate a multipurpose theatre and retail space.

The increased energy requirements for The Rex will be significantly off-set by the rationalisation of council building assets, however until more definitive data can be

established and the future of all Council buildings finalised, the impact of The Rex is not factored into the current calculations. As with other parts of this roadmap, it is important to regularly review this document and make changes as required based on the most up to date information.

7 Achieving Zero Emissions

There are several avenues Hepburn Shire Council could consider in becoming carbon neutral;

Option 1- Offset all emissions via third party schemes.

Option 2- Invest in a medium scale generation project/s.

Option 3- Invest in reducing emissions, electrical generation and offsetting.

Option 1

Council could decide to offset all of its activities through a third-party provider such as Hepburn Wind, Green Fleet or alternative offshore carbon trading scheme. The below table demonstrates this option.

Table 7.1

Carbon Offsetting Organisation	How offsetting is achieved	$/tonne	Offset %	offset tonnes	Total Cost
Hepburn Wind	Community Windfarm in Daylesford	82.5*	50%	835	$68,888
Green Fleet Australia	Establishment of self-sustaining, multi-species forests in Australia.	15*	40%	668	$10,020
Low Cost Offshore Options	Project in Thailand and SE Asia	12*	10%	167	$2,004
Totals				1670	$80,912

**Cost of offsets will vary depending on market conditions.*

Alternatively, offsets could be purchased in varying proportions. The following tables provides some examples of 100% offset in each category.

Carbon Offsetting Organisation	How offsetting is achieved	$/tonne	Offset %	offset tonnes	Total Cost
Hepburn Wind	Community Windfarm in Daylesford	82.5	100%	1670	$137,775
Green Fleet Australia	Establishment of self-sustaining, multi-species forests in Australia.	15	100%	1670	$25,050
Low Cost Offshore Options	Project in Thailand and SE Asia	12	100%	1670	$20,040

Option 2

Council could decide to invest in a medium scale solar project. This could be a partnership between Hepburn Shire Council & Hepburn Wind (for example). For Hepburn Shire Council to offset 1,670 tonnes by solar, a system of 1,800 kW in size would be needed. Some assumptions around the investment are in the below table, however this option would require further feasibility.

Table7.2

1,800 kw Solar Project	
Capital Cost	
Costs per kW of PV panels	1,150
Cost of 1,800 kW system	**$2,070,000**
Annual Revenue	
Feed-in tariff assuming 0.04/kwh	105,120.00
Assume 20% operational costs	21,024.00
Net Profit	**$84,096.00**

Option 3

The third option is the one most aligned to the HSC council plan and corporate values. It is centred around the organisation being as efficient as possible with investment in sustainable infrastructure.

With strategic investment in projects and initiatives, it is the proposed that HSC will:

- Reduce emissions
- Generate clean energy
- Offset the balance

8 Proposed Council Actions

The below tables are a summary of the projects and initiatives that make up the investment associated with option 3.

Summary of Targets

Table 8.1

2017 Benchmark emissions	1,670
Reduction Activities	132.7
Generation Activities	906
Offsetting Activities	640
Net Carbon Footprint of HSC	**--8.7**

Summary of Finances

Table 8.2

Summary of Roadmap Finances	*assumes all projects implemented*
Capital Investment in projects	$1,305,000
Revenue /Savings	
Revenue from Solar generation activities	$695,026
Savings from Co-gen Turbine Electricity	$435,971
Savings from Building Upgrades	$72,425
Saving in Bulk Fuel	$36,578
Saving in fleet car fuel	$33,722
Total Revenue /Savings	**$1,273,722**

Note: The above table assumes all projects are implemented from Year 1 and is the total revenue/ savings for a period of 12 years. It is meant as a guide only.

Reduce

table 8.2

What	How	When	Capital Cost	Annual Saving		Annual Savings/*Revenue*	Project Life (years)	Annual tonnes co2	$/tonne co2
HVAC systems upgrades, lighting sensors, insulation, time of use and temperature control systems	Undertake energy audit in those buildings contributing large portion of emissions. Implement findings to achieve reduction	2017	100,000	30,000	kW	*5,400*	12	40	$ 96
25 Kw Solar system at Daylesford depot	Determine where the additional panels will fit and decide whether it is to be an expansion of the existing PV system or a second system	2018	30,000	27,375	kW	4,928	12	23.75	$ (67)
Replace 3x HSC pool cars electric vehicles	HSC has a total of 6 pool cars. Half of these cars could be electric and charged via HSC solar powered sites	2019	30,000	4,320	litres	6,480	5	10.2	$ 5
Reduce fuel usage in heavy machinery	Conduct driver training on how drive and operate in the most efficient manner. Develop machinery purchase and use policy that ensure the correct machine size is procured and used.	2017	10,000	12,072	litres	18,108	2	35	$ (353)
20 kW Solar at swimming pools	10kw of Solar at Trentham & Clunes swimming pools	2018	25,000	21,900	kW	3,093	12	24	$ (21)

Generate

Table 8.4

What	How	When	Capital Cost	Annual Generation		Annual Savings/*Revenue*	Asset Life (years)	Annual tonnes co2	$/tonne co2
500 Kw Solar	Identify HSC assets that have capacity for larger scale solar systems and install solar with the intention of feeding into grid. Alternative could be to partner with Hepburn Wind on their community solar farm project.	2020	600,000	547,500	kW	43,800	12	475	$ 29
Co-generation turbine set. Daylesford HUB	Utilise the natural gas available to generate the electrical and part of the heating needs of the Hepburn Hub.	2019	250,000	252,000	kW	37,628	12	230	$ (45.60)
Co-generation turbine set. Site #2	Identify a site that has relatively high requirements for both electricity and heat.	2020	250,000	144,000	kW	15,487	12	201	$ 39.51

$

Note: $/tonne has been worked out on a Net Present Value basis assuming a 5% cost of capital and 2% inflation to discount the future cash flows for the life of the project

Offset

Table 8.5

Who	How	When	Annual Budget	$/tonne co2	Annual tonnes co2
Hepburn Wind	Community Windfarm in Daylesford	2020	$16,500	$ 82.50*	200
Greenfleet Australia	Establishment of self-sustaining, multi-species forests in Australia.	2020	$6,600	$ 15.00*	440

**Cost of offsets will vary depending on market conditions.*

9 Carbon Offsetting and Sequestration

The Waste to Energy Implementation Strategy has the potential to generate renewable energy which would otherwise be drawn from the grid. Council would have the opportunity to retire some of the renewable energy certificates generated thereby offsetting Council's own emissions.

Council can alternatively offset carbon emissions through:

- Purchase of accredited carbon offsets
- Purchase of accredited afforestation offset schemes to counter transport fuel emissions
- Purchasing green power
- Purchasing international accredited carbon credits

Council will seek cost effective carbon offsetting opportunities with a preference to target locally sourced mitigation measures. Should Australian based carbon offset schemes be deemed cost effective, the order of priority in sourcing the carbon offsets will come from:

Hepburn Shire -> Central Highland -> Victoria -> Australia

Should international accredited carbon offsets be more cost effective than Australian sourced offsets, then Council may elect to include international based offsets as a proportion of offsets acquired.

10 Sustainability Reserve

Council will establish a Sustainability Reserve to capture the financial dividends from recognised projects within the Towards Zero Roadmap. 100% of the quantifiable financial savings will be earmarked for future sustainability projects. The financial saving will accrue for a maximum of a five-year period.

Projects suitable for funding from the sustainability reserve will be assessed through the annual budget process.

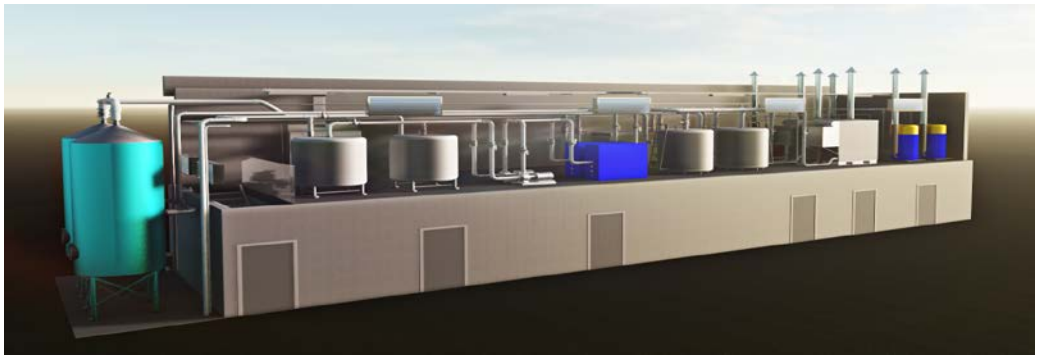
Example 1.

1. 25kw Solar installation at the Daylesford Depot
    a. Capital Cost = $30,000
    b. Annual Savings @ $0.17c per kwh = $ 4,928
    c. 5 year accumulated savings = $24,640

The Sustainability Reserve in this example would have increased by $24,640 as a result this project.

11 Waste to Energy Implementation Strategy

Under the initial phase of the Waste to Energy Implementation Strategy, the renewable power generated is estimated to reduce greenhouse gas emissions by 700 tonnes annually compared to power drawn from the grid. Council would have the opportunity not to relinquish the renewable energy certificates generated, thereby offsetting Councils own emissions.



The implementation of this project is dependent on securing significant government funding. In the initial phase of this strategy, 2,000 tonnes of organic waste will be processed to generate methane gas, which will be used to drive mirco-turbines located

at a transfer station. The turbines will generate electricity, which will be supplied into the power grid subject to a connection agreement being in place.

Ultimately the aim is to inject methane from the waste to energy process directly into the gas network and relocate the turbines to the re furbished Hepburn Hub facility. The turbines would draw the equivalent 'renewable' gas from the network behind the meter to meet the power and heating needs of this facility. In this event Council's emissions will be directly reduced accordingly.

Council's Detailed Carbon Footprint 2015-2016

Table 10.1

Scope 1 Emission Source	GHG t CO_2-e 2015-16
Natural Gas	61.6
Transport Fleet (petrol)	51
Transport Fleet (Autogas - LPG)	15
Transport Fleet (Diesel)	109
Transport (Bio-Diesel)	N/A
Heavy Vehicles / Machinery (Diesel)	531.3
Heavy Vehicles / Machinery (Bio-Diesel)	46.2
Fugitive Emissions	Not measured
Oils & Lubricants	Not measured
Scope 1 Total	**814.1**

Table 10.2

Scope 2 Emission Source	GHG t CO_2-e 2015-16
Electricity	558.6
Electricity – Street lighting	223
Scope 2 Total	781.6

Table 10.3

Scope 2 Emission Source	GHG t CO_2-e 2015-16
Electricity transmission and distribution losses	71
Vehicle fleet (Petrol extraction & distribution losses)	Inc. in scope 1
Vehicle fleet (Autogas - LPG extraction & distribution losses)	Inc. in scope 1

Vehicle fleet (Diesel extraction & distribution losses)	Inc. in scope 1
Natural Gas	4.7
Transport Fuels – Major Contractors	Not measured
Stationary Fuels – Major Contractors	Not measured
Council produced waste to landfill	Not Measured
Paper	Not Measured
Water – Transmission	Not Measured
Business Travel - Flights	N/A
Business Travel - Taxis	N/A
Business Travel – Public Transport	N/A
Business Travel – Rental Cars & Buses	N/A
Scope 3 Totals	75.7

12 Council Greenhouse Gas Emissions Organisational & Operations Boundary

Municipal Waste - Greenhouse Gas Emissions

Council will monitor the amount of municipal waste sent to landfill to determine the resultant greenhouse gas emissions. These emissions fall outside Council's organisational and operational boundaries. Monitoring will provide added impetus to reduce waste sent to landfall and investigate greenhouse gas emissions offsetting arrangements

Table 12.1

2015-2016	Tonnes of Waste	Tonnes C02- e emissions
Municipal Waste	To Be Confirmed	To Be Confirmed

Operational Control

Council will apply the operational control test (as defined under NGER) to the sites that are owned and operated by Council. Sites that are under Council's operational control are determined by the ability to set:

- Operating policies
- Health and safety policies
- Environmental policies

Sites Council leases to Others

Council has a number of buildings where the entire building is leased to a third party.

Using the same operational control test and based on details contained within the lease agreements, Council does not have operational control of these sites and so does not include the emissions within its boundary.

In some cases, despite not having operational control, Council continues to pay some of the electricity or gas bills for these sites managed by local community groups.

Emission Boundaries

The emissions boundary for the organisation is based on national and international standards to ensure alignment with the National Carbon Offset Standard (NCOS). This

includes both the National Greenhouse and Energy Reporting Act 2007 (NGER Act), and the GHG Protocol's Corporate Accounting and Reporting Standard 2004 that addresses the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol.

Council included emission sources in its organisational boundary, based on two key determining factors:

1. That the emissions would not have otherwise occurred if the Hepburn Shire Council as an organisation did not exist (ie operational control); and
2. That Council had confidence that the emissions were able to be measured completely and accurately

Exclusions

There are some exclusions from Council's emissions inventory. Some of these fall within Councils organisational boundary but have been excluded from quantification in line with Section 4.2.3 of the National Carbon Offset Standard (NCOS), due to one (or more) of the following:

- The emissions are likely to be negligible (relative to other scope 3 emissions)
- Determining the emissions will be very costly relative to their likely significance
- There is insufficient data

These exclusions are:

1. Purchased goods (including Capital goods) and services
2. Employee Commuting (except those commuting in a fleet vehicle)
3. Business travel of employees (including Air Flights, Public Transport and Taxis, Rental Cars and Buses
4. Goods Sold, including transportation, distribution, processing, their use and their end of life treatment
5. Contractor Fuel Use
6. Downstream leased assets - where that party has operational and financial control such as some community buildings
7. Investments
8. Other scope 3 emissions are outside Council's organisational boundary and as such not included in this inventory. These include:
9. Municipal waste – all waste generated by the broader community, with the exception of the corporate waste Council produces.
10. Community emissions (emissions emitted within the Hepburn Shire but outside of Council's operational control)