

Southern Grampians Shire Council

2015-16 Carbon Inventory Report



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Background

This report provides details of Southern Grampians Shire Council's greenhouse gas emissions (carbon inventory) for the financial year 2015-16. Council has been monitoring its emissions since 2008-09.

The use of fossil fuels for energy, land clearing, waste disposal and agriculture have all increased the concentration of greenhouse gases in the atmosphere and contributed to increased global temperatures, ocean acidification and climate change.

The World Resources Institute and the World Business Council for Sustainable Development developed the Greenhouse Gas Protocol which is a system for accounting and reporting on organisations' greenhouse gas emissions. It provides a global, standardized framework for measuring and managing emissions from private and public sector operations.

Many organisations worldwide have adopted the Greenhouse Gas Protocol which categorises emissions into three types:

Scope 1: Direct greenhouse gas emissions – these are emissions generated as a direct result of an organisation's activities and include fuel combustion, fugitive emissions from fuels, industrial processes emissions and waste emissions, which deals with emissions released from the decomposition of organic material in landfill or wastewater handling facilities.

Scope 2: Indirect greenhouse gas emissions - these are activities that

generate electricity, heating, cooling or steam that is consumed by the organisation but that do not form part of the organisation's facility. Scope 2 emissions are mainly created at electricity generators as a result of electricity consumption at another facility.

Scope 3: These are other indirect emissions that are generated as a result of the organisation's activities that are physically produced by another facility or entity.

The units used to measure emissions are tonnes of carbon dioxide equivalent (t CO₂-e). Other gases such as methane and nitrous oxide have a known warming potential that allows conversion to the equivalent amount of carbon dioxide (for example one kg of nitrous oxide has about the same warming potential as 298 kg of CO₂).

This report has been developed using the Emissions and Energy Reporting System (EERS) which is used for all reporting under the National Greenhouse and Energy Reporting Act 2007 (NGER Act).

The National Greenhouse and Energy Reporting Act 2007 provides a national framework for corporations to report greenhouse gas emissions and energy consumption and production. The Act made registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds. Corporations who are below the thresholds may voluntarily report their emissions. Southern Grampians Shire Council does not meet the threshold of 25,000 tonnes per annum

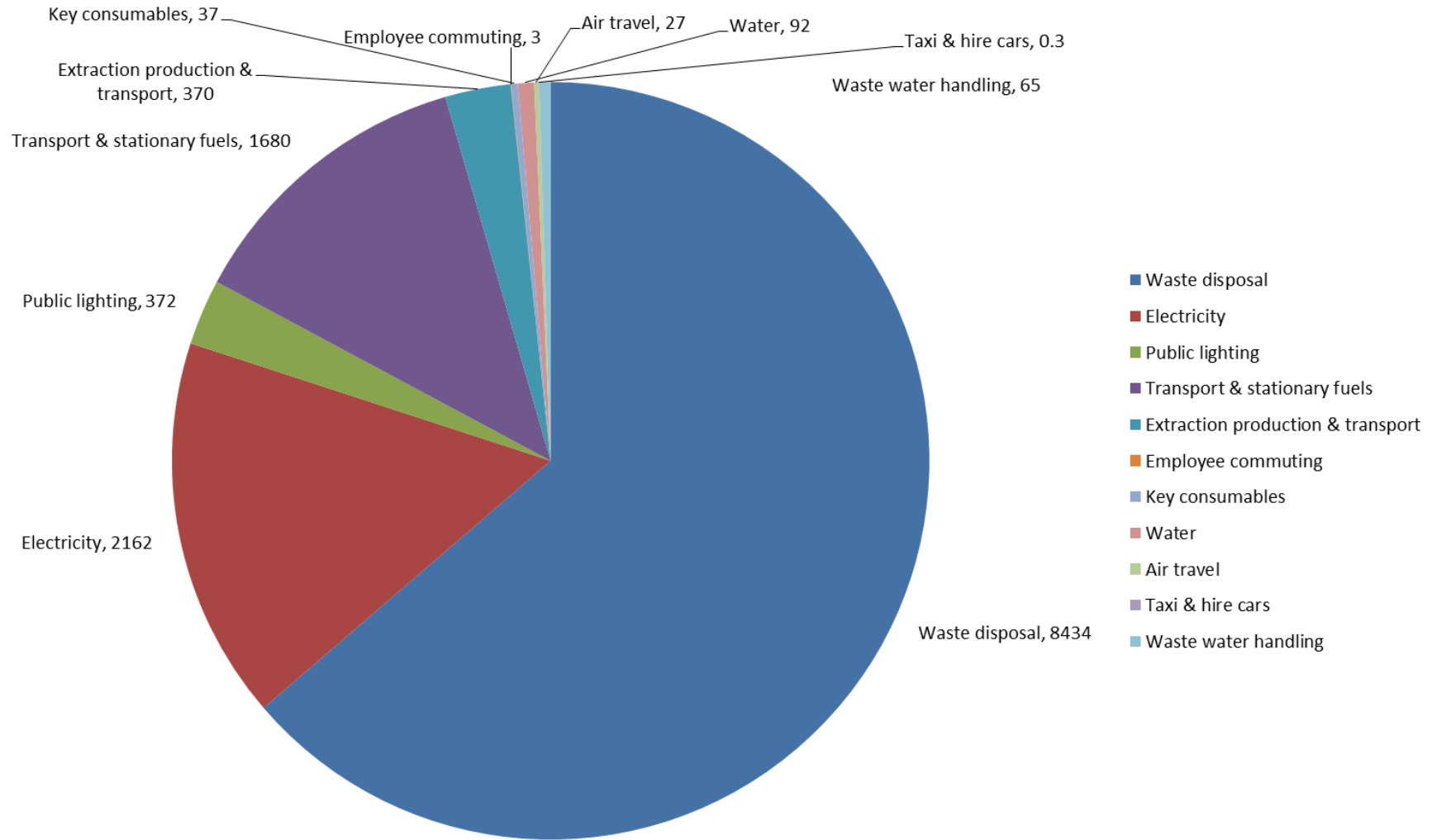
CO₂-equivalent for reporting and does not report its emissions data, but records the information for its own management and monitoring purposes.

For Southern Grampians Shire Council Scope 1 emissions are from waste disposal (landfill operations), wastewater handling, transport fuels and stationary fuels. Scope 2 emissions are from the use of electricity from the grid. It would exclude any Green Power procured if Council procured any which it currently doesn't. Scope 3 emissions are from public lighting, employees commuting in vehicles not owned or operated by Council, air travel, hire cars or taxis, water and wastewater, key consumables (amenities paper and printer paper) and emissions from the extraction, production and transport of fuels and electricity.

Carbon Inventory – Council Operations 2015-16 – Total emissions

2015-16		Units	Units consumed	tonnes CO ₂ -e	
Scope 1	Waste disposal	tonnes	5,708.1	8,434	
	Wastewater handling (saleyards)	No. animals	1,037,421	65	
	Transport & Stationary Fuels	Diesel	GJ	19,082.4	1,326
		ULP	GJ	1,838.2	123
		Reticulated gas	GJ	4,415.7	228
		LPG	GJ	62.5	4
		E10	GJ	151.7	0.30
Scope 2	Electricity	kWh	2,129,455.4	2162	
Scope 3	Public lighting			372	
	Extraction, production and transport			370	
	Employee commuting			3	
	Water			92	
	Key consumables			37	
	Air travel			27	
	Taxis and hire cars			0.03	
Total				13,242	

Council's Greenhouse gas emissions 2015-16 (tonnes CO2-e)



Scope 1 emissions

2015-16		Units	Units consumed	tonnes CO ₂ -e
Waste disposal		tonnes	5,708.1	8,434
Wastewater handling (saleyards)		# animals	1037,421	65
Transport & Stationary Fuels	Diesel	GJ	19,082.4	1,326
	ULP	GJ	1,838.2	123
	Reticulated gas	GJ	4,415.7	228
	LPG	GJ	62.5	3.8
	E10	GJ	151.7	0.30
Total Scope 1 Emissions				10,180

Council's Scope 1 emissions are those created directly by Council's activities.

The largest source of Scope 1 emissions is waste, because Council operates the Hamilton landfill which was the source of 8,434 tonnes CO₂-e. This was an increase of 47% or 2,693 t CO₂-e from FY 2010-11. The increase is due to the additional waste that has been put into the landfill since FY 2010-11. The Hamilton landfill receives municipal, commercial and demolition waste from across the Shire, from Council owned transfer stations and also from commercial waste collection contractors.

Waste emissions are created by the breakdown of organic matter to methane in the anaerobic environment of the landfill. Methane is a greenhouse gas with warming potential of 21-25 times that of carbon dioxide. The emissions are calculated by entering the waste tonnages received in the reporting year and all previous years into the NGER Solid Waste Calculator. Emissions are estimates based on the composition of the waste material and include legacy emissions from previous years' waste.

The amount of waste received annually by the Hamilton Landfill has been in decline since 2008 (10,950 tonnes received in 2008, compared to 5,708 tonnes in 2016) so if this trend continues, over time the emissions from waste will decrease. Council's ongoing activities in waste diversion, investigation of organic processing techniques and expansion of the recycling kerbside service are all contributing to a long-term decrease in emissions from waste.

Transport and stationary fuels

Fuel type	Litres	MJ/L	GJ	kg CO ₂ -e /GJ for CO ₂	t CO ₂ -e	kg CO ₂ -e/GJ for N ₂ O	N ₂ O	kg CO ₂ -e/GJ for CH ₄	CH ₄	Total t CO ₂ -e
Diesel	494362	39	19082	69.2	1321	0.1	1.9	0.2	3.8	1,326
ULP	53596	34	1833	66.7	122	0.2	0.4	0.2	0.4	123
Unleaded E10	151.72	33	5	60.0	0.3	0.2	0.0	0.2	0.0	0.3
Natural gas	4,415,726 (MJ)		4416	51.4	227	0.1	0.4	0.03	0.13247	227
LPG	2431		62	60.2	4	0.2	0.0	0.2	0.01249	3.8
Total										1,680

The other large source of Scope 1 emissions was from transport and stationary fuels – this is the liquid fuel (petrol, E10 and diesel) used in the Council transport vehicle fleet, and the stationary fuels (diesel, LPG and natural gas) used for road construction vehicles, pumps, mowers and heating. Total emissions from combined transport and stationary fuels were 1,680 t CO₂-e, a 7.5% increase from 1,563.7 t CO₂-e in 2010-11.

Diesel is purchased through the Shellcard or Motorpass system for passenger vehicles and is also purchased as a bulk fuel for stationary and transport use. It was not possible to separate bulk diesel used in some depot-based passenger vehicles from that used in plant so since it is all Scope 1 it has been aggregated for this report. Council introduced a sustainable motor vehicle policy in 2011 which first limited the fuel consumption of transport vehicles in the Council fleet to 9.5 litres/100 km and has since been reduced to 8.0 litres/100 km.

The increased use of natural gas contributed to the increase in emissions – in 2010-11 Council's facilities used 2,855 GJ of natural gas, compared to 4,416 GJ in 2015-16. All facilities showed similar consumption except the outdoor pool in Hamilton which used 11.8 GJ in 2010-11 and 1630 GJ in 2015-16.

The other source of Scope 1 emissions was wastewater handling at the Hamilton Livestock Exchange which created 64 t CO₂-e. These emissions arise from the breakdown of organic material and the emissions are estimated based on the number of livestock that passed through the yards and the estimated average COD (chemical oxygen demand) value of 1,640 mg/L.

Scope 2 emissions

Scope 2 emissions are those which are created by the electricity generator as a result of Council's electricity use.

In 2015-16 Council used 1,817,121 kWh of electricity which created 2,162 t CO₂-e of emissions. This was a decrease of 33% since the last carbon inventory

in 2010-11. Council has carried out many energy efficiency projects in the intervening years, such as replacing many fluorescent tubes and metal halide high bay lights with LED which have reduced overall demand for electricity.

Electricity

Location		Total kwh	GHG emissions (t CO ₂ -e)
HILAC	Hamilton	686,285	817
Business Centre, Art Gallery & Library	Hamilton	345,059	411
Works Depot	Hamilton	125,315	149
Market Place - Shire Office & Council Chamber	Hamilton	66,200	79
Saleyards - South Boundary Rd	Hamilton	53,797	64
Saleyards – Port Fairy Rd	Hamilton	39,445	47
Swimming Pool & Rec Reserve	Hamilton	27,557	33
Showground/Sheep Pavilion End	Hamilton	26,738	32
Showground - Main Switchboard	Hamilton	24,877	30
Melville Oval - Pavilion	Hamilton	22,536	27
Swimming Pool	Coleraine	22,382	27
Works Depot	Coleraine	20,636	25
Pump - Hensley Park Rd	Hamilton	19,815	24
Botanical Gardens Pump	Hamilton	18,535	22
Tourist Information Centre	Dunkeld	14,174	17
Ansett Museum	Hamilton	11,985	14
Swimming Pool	Penshurst	11,423	14
Caravan Park	Penshurst	10,601	13
Other 76 AGL sites		171,557	204
28 Origin sites		98,204	117
Total		1,817,121	2,162

All electricity used by Council, apart from what is generated on site by solar PV, is from the grid and Council does not purchase any accredited Green Power.

The emissions intensity of grid electricity varies from year to year, depending on the mix of fossil fuel-fired and renewable generation. In 2015-16 the emissions intensity of the grid in Victoria was 1.09 kg CO₂-e per kWh, the highest in Australia. In Tasmania for the same period it was 0.12 and in South Australia it was 0.53 kg CO₂-e per kWh, indicating how important it is to increase the proportion of renewable electricity in the grid as a means of reducing overall emissions.

Scope 3 emissions

Scope 3 emissions are those that are generated as a result of the organisation's activities which are physically produced by another facility or entity. For Southern Grampians Shire Council these include:

- Public lighting
- Employee commuting
- Water and waste water

- Domestic and international flights
- Key consumables
- Taxis

Emissions from public lighting are those generated by Powercor through the provision of street lighting and they are calculated from the number and wattage of street lights in the Shire and the number of hours the lights are on.

Emissions from employee commuting, air travel and taxis were estimated by surveying staff about their use of taxis, flights, etc in the course of their work and their mode of transport to work. Key consumables are printer paper and amenities paper (hand towel and toilet paper).

Emissions from water and waste water are those created from the energy used by the water authority in providing reticulated water and treating waste water and are derived from the volume of water used from the Wannon Water supply which was 67,657 kilolitres in 2015-16.

Also included in Scope 3 are the emissions resulting from the extraction, production and transport of electricity.

2015-16	tonnes CO ₂ -e
Public lighting	372
Extraction, production and transport - electricity	379
Employee commuting	3.1
Water	92
Key consumables	37
Air travel	27
Taxis and hire cars	0.03
Total Scope 3 emissions	910

Comparison to 2010-11

Council's total emissions in 2015-16 were 13,242 tonnes CO₂-e. By comparison, in 2010-11 the total emissions were 12,326 tonnes CO₂-e, so there was an increase of around 7.4 % in that five year period.

The increase was mainly due to an increase in emissions from waste in the Hamilton landfill which increased

47% or 2,693 t CO₂-e from FY 2010-11 due to the additional waste received by the landfill.

This increase was partially offset by a substantial decrease in emissions from electricity; from the energy efficiency projects that Council has undertaken in the last five years and also from on-site renewable generation.

Greenhouse gas emissions 2010-11 compared to 2015-16 (tonnes CO₂-e)

Source	FY10-11	FY15-16	% change
Waste disposal	5,742	8,434	47
Electricity	3,215	2,162	-33
Public lighting	981	372	-62
Transport & stationary fuels	1,564	1,680	7
Extraction production & transport	588	370	-37
Employee commuting	154	3	-98
Key consumables	8	37	351
Water	11	92	776
Air travel	6	27	322
Taxi & hire cars	0.7	0.3	-57
Waste water handling	57	65	14
Total	12,327	13,242	7

Greenhouse gas emissions change 2010/11 to 2015/16

