



Point.
Advisory

Initial data analysis

Update to Sustainability Strategy

Prepared for:
City of Port Phillip

31 May 2018

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The findings in this report have been formed on the above basis.

VERSION CONTROL

Version	Date	Author	Project Director
CoPP – Initial data analysis v3.docx	31 May 2018	B McKay	C Brulliard

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1 INTRODUCTION

1.1 Overview

Point Advisory analysed available data for the City of Port Phillip (CoPP) across three key sustainability themes: energy and carbon, water, and climate resilience.

- “Energy and carbon” examined three categories of council (“corporate”) and community emissions: stationary energy, transport, waste, and land use;
- “Water use” considers the city’s ability to conserve water, respond to drought and provide water security;
- “Climate resilience” considers the adverse effects of climate change including heat waves, flooding, sea level rise and extreme weather events.

This report details findings related to energy and carbon, and water use. The purpose of the data review is to:

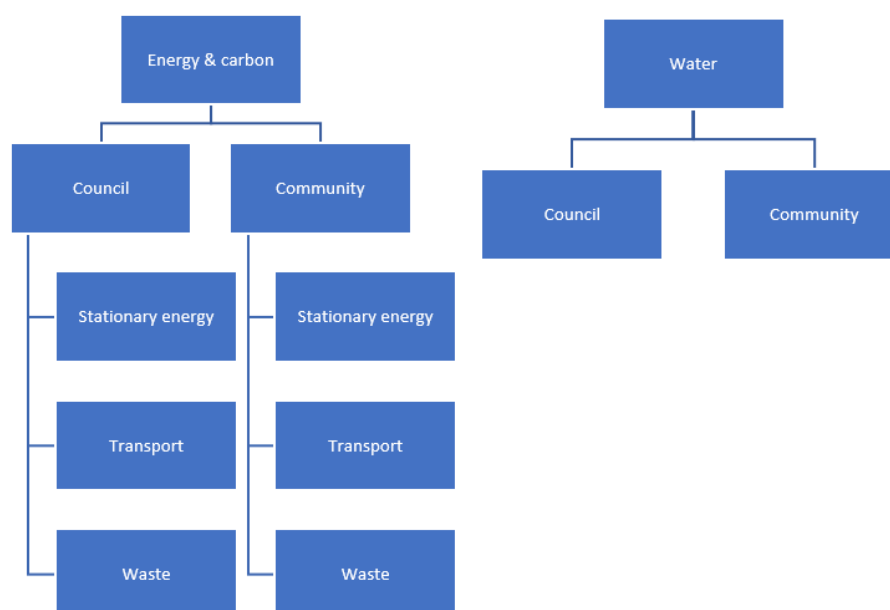
- Identify gaps in data that should be addressed or considered in future, based on observed leading practices;
- Identify opportunities to collect or use data within CoPP or obtain the data from external sources;
- Assess emissions that are material to Council’s carbon footprint against targets that have already been set by the City.

Following the data review, the data analysis – undertaken in conjunction with Hip vs Hype and the CoPP - will aim to:

- Enable practical new targets to be set for the CoPP;
- Plan for new targets to be monitored based on a data strategy.

1.2 Report layout

The report structure is summarised in the diagram below.



Energy and carbon



2 SUMMARY: ENERGY & CARBON

2.1 Background

The City of Port Phillip (CoPP) committed to the ICLEI Compact of Mayors (the Compact) in 2015. The commitments made through the Compact as stated by the CoPP are summarised in Figure 1.

- 3.3 There are a series of requirements Council must address to comply with the Compact:
 - 3.3.1 Submit a greenhouse gas emission inventory.
 - 3.3.2 Register a greenhouse gas emission reduction target within 2 years.
 - 3.3.3 Submit a Climate Action Plan within 3 years.
 - 3.3.4 Report on both the current and future climate hazards that they face within the first year of joining the program.
 - 3.3.5 Conduct a climate change risk and/or vulnerability assessment within two years.
 - 3.3.6 Develop a Climate Adaptation Plan within 3 years.

Figure 1 Extract from City of Port Phillip's commitment 2015 (City of Port Phillip, 2015)

The Compact was collectively launched by the UN, C40 Cities Climate Leadership Group and ICLEI. The Compact refers to two platforms used to report emissions:

- The carbon[®] Climate Registry (cCR);
- The Carbon Disclosure Project.

Step One of the Compact ("*Register commitment*") of the Compact is to "measure community emissions inventory using the GPC (Global Protocol for Community-Scale GHG Emission Inventories) – a consistent and robust standard". Two reporting levels are defined in the GPC that cover a different extent of detail: BASIC and BASIC+ reporting. According to the GPC, "where (the) sources are significant and relevant for a city, the city should aim to report according to BASIC+" (WRI; C40 Cities; ICLEI, 2014). An extract from the GPC showing the sectors to measure is shown in Figure 2.

The GPC is distinct from the GHG Protocol Corporate Standard (2004), that is used to define inventories for corporate emissions (such as for the emissions from the CoPP Council operations). The corporate emissions inventory aligns with the National Carbon Offset Standard (NCOS) for organisations (2004). Similarly, the GPC (for communities) aligns with the *Draft NCOS for Precincts* (2016).

Figure 2 Sources and scopes covered by the GPC

Sectors and sub-sectors	Scope 1	Scope 2	Scope 3
STATIONARY ENERGY			
Residential buildings	✓	✓	✓
Commercial and Institutional buildings and facilities	✓	✓	✓
Manufacturing industries and construction	✓	✓	✓
Energy industries	✓	✓	✓
<i>Energy generation supplied to the grid</i>	✓		
Agriculture, forestry, and fishing activities	✓	✓	✓
Non-specified sources	✓	✓	✓
Fugitive emissions from mining, processing, storage, and transportation of coal	✓		
Fugitive emissions from oil and natural gas systems	✓		
TRANSPORTATION			
On-road	✓	✓	✓
Railways	✓	✓	✓
Waterborne navigation	✓	✓	✓
Aviation	✓	✓	✓
Off-road	✓	✓	
WASTE			
Disposal of solid waste generated in the city	✓		✓
<i>Disposal of solid waste generated outside the city</i>	✓		
Biological treatment of waste generated in the city	✓		✓
<i>Biological treatment of waste generated outside the city</i>	✓		
Incineration and open burning of waste generated in the city	✓		✓
<i>Incineration and open burning of waste generated outside the city</i>	✓		
Wastewater generated in the city	✓		✓
<i>Wastewater generated outside the city</i>	✓		
INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU)			
Industrial processes	✓		
Product use	✓		
AGRICULTURE, FORESTRY, AND LAND USE (AFOLU)			
Livestock	✓		
Land	✓		
Other agriculture	✓		
OTHER SCOPE 3			
Other Scope 3			
<div> <div>✓ Sources covered by the GPC</div> <div> <div> <div>✓</div> <div>+</div> </div> <div> <div>✓</div> <div>+</div> </div> <div> <div>✓</div> <div>+</div> </div> </div> <div> <div>Sources required for BASIC reporting</div> <div>Sources required for BASIC+ reporting</div> <div>Sources required for territorial total but not for BASIC/BASIC+ reporting (<i>italics</i>)</div> <div>Non-applicable emissions</div> </div> </div>			

Figure 2: Extract from GPC showing inventory scope for community emissions

2.2 Emissions breakdown

Emissions from the Council and community are summarised in Figure 3. Corporate emissions from the CoPP account for 0.6 % of total estimated emissions within the geographic boundary of the CoPP.

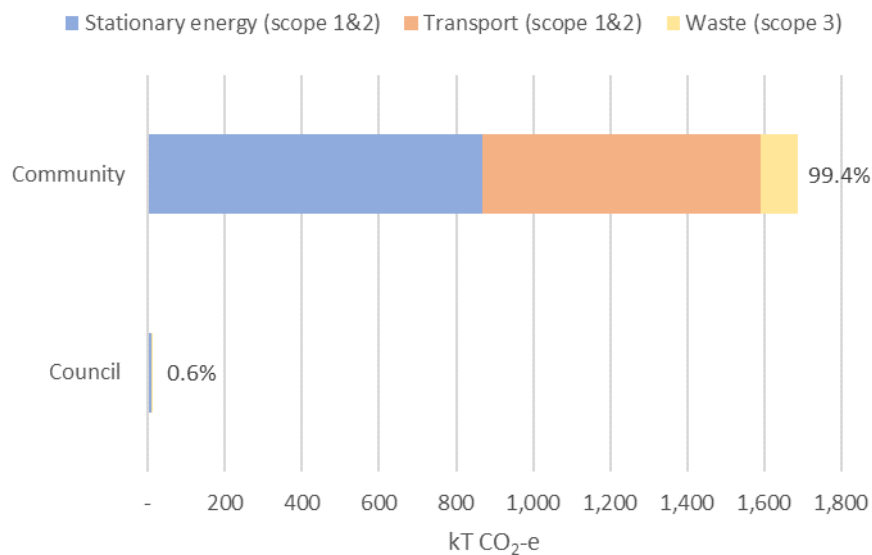


Figure 3: Community emissions compared with Council Corporate emissions

Emissions in Figure 3 were based on data from the sources listed in Table 1.

Table 1 Summary of data sources for emissions inventory

Emissions	Sector	Source	Data accuracy assessment
Community	Stationary energy	Electricity – CitiPower 2017 data by suburb Gas – Multinet 2016/17 data by suburb	High
	Transport	Port Phillip Carbon Footprint Report - Transport (Arup, 2009) (scaled down from a 2006 state inventory using population data)	Low
	Waste	CCAP City Emissions Inventory 2016/17 (Kinesis, 2017)	Moderate
Council	Stationary energy	Electricity & gas use by facility (2016/17) Electricity use of streetlights (2016/17)	High
	Transport	Fuel card data for Council fleet	High
	Waste	Provided by Council (2013 waste audits)	Low

3 COUNCIL EMISSIONS

3.1 Summary

This chapter summarises scope 1 and 2 carbon emissions from Council, with reference to the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (2004).

Council's published inventory is shown in Figure 4, which summarises emissions from assets (electricity and gas), street lights (including watchmen street lights), transport fuels and waste. Electricity and gas emissions include upstream (scope 3) emissions. The full inventory is provided in Appendix 1: Full carbon inventory. The following trends are evident from the figure:

- Council emissions in 2016/17 are dominated by electricity use from buildings and facilities (49%) and street lights (38 %):
 - Emissions from electricity use in facilities has decreased marginally (2.0% per year average) since 2007, due mostly to the decrease in the emissions intensity of the Victorian electricity grid over that time;
 - Emissions from streetlights have decreased by an average of 4.4 % per year since 2007 due to lighting upgrades and the decrease in the emissions intensity of the Victorian electricity grid.
- Natural gas emissions account for just 2 % of Council emissions and have decreased by around 23 % since 2007;
- Transport emissions (scope 1 only) account for 10 % of Council emissions and have increased by 46 % since 2006/07, mostly due to a significant increase in the number of kilometres travelled.

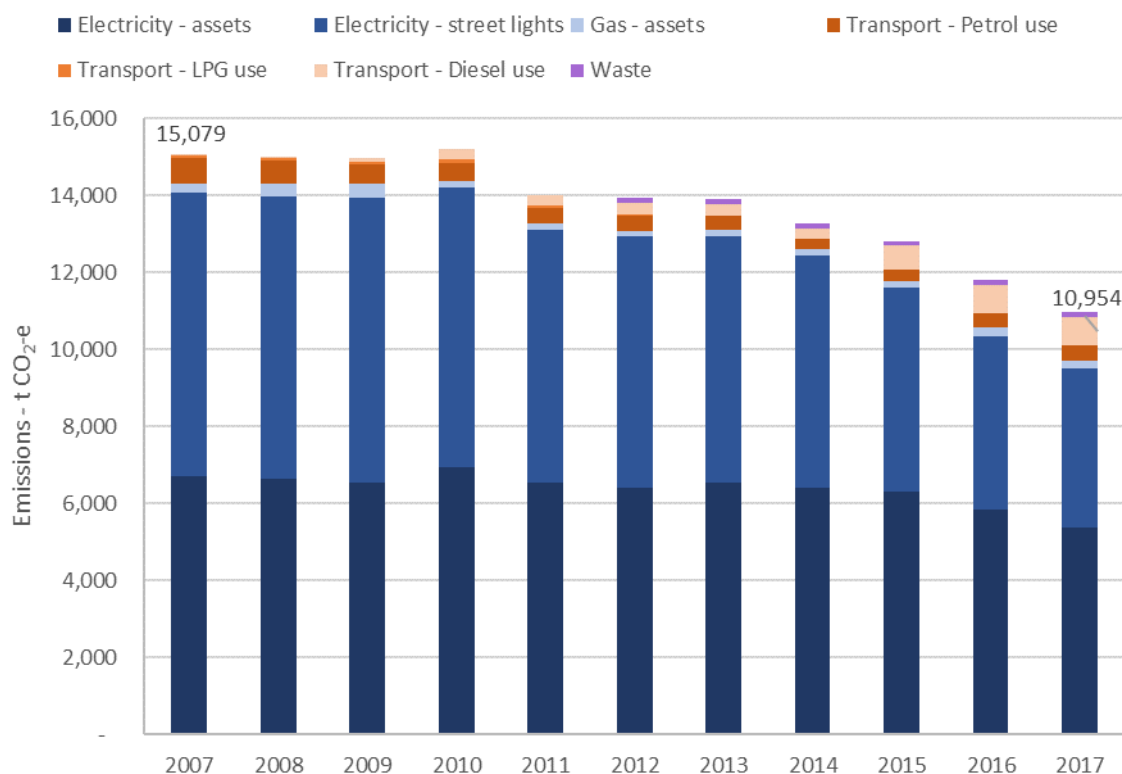


Figure 4: Council emissions inventory by sector - tonnes CO₂-e

3.2 Stationary energy

Stationary energy use comprises electricity and gas consumption from Council facilities and electricity consumption from streetlights. Stationary energy emissions sources relevant for Council are summarised in Table 2.

Table 2 Summary of potential Council stationary energy emissions

Emissions type	Description	Data and indicators
Scope 1	Combustion of natural gas at Council facilities	Invoices by facility over time
	Fuel use – oils and greases	Invoices
	Fugitive emissions – refrigerants	Inventory of assets using refrigerants
	Fuel combustion – stationary energy (diesel, petrol, gas): <i>not applicable</i>	Inventory of assets using fuels, Invoices
Scope 2	Electricity use at Council facilities	Invoices by facility over time
	Council controlled street lights	NMI data (retailer)
		Estimates of electricity use (unmetered street lights) by light type and hours of operation.
Scope 3	Electricity and gas use for leased assets and outsourced activities	Invoices by facility or activity over time
	Third part-controlled street lights	

Of the emissions sources listed Table 2, the following three sources are reported under council stationary energy, due to data availability and based on materiality:

- Electricity use by facility
- Electricity use by street lights
- Gas use by facility.

Facility electricity use

Electricity use among Council facilities (excluding street lights) per reporting year (April to March) is summarised in Figure 5. Electricity use is dominated by the three town halls (that make up 33 % of Council electricity use) and the South Melbourne Market (18 %). Child care facilities, and park and recreational areas make up a further 20 % of electricity use.

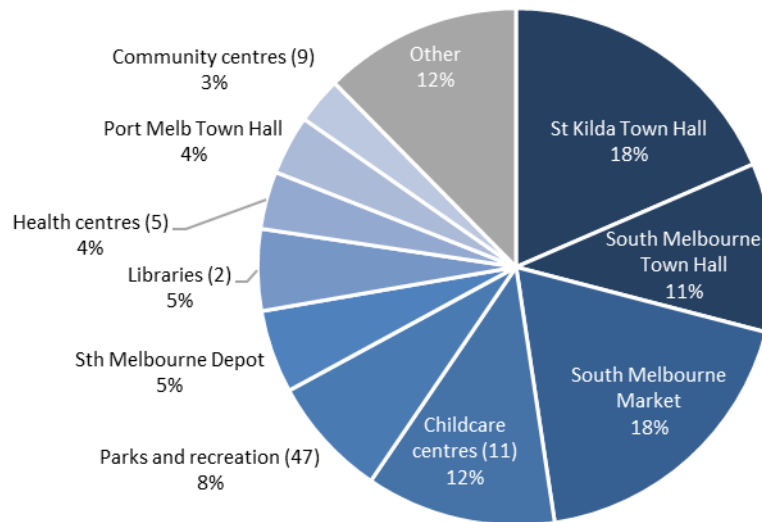


Figure 5: Summary of Council electricity use (April 2016 to May 2017)

Electricity use at the top four facilities in 2016/17 is shown in Figure 6. The following trends are evident from Figure 6:

- Electricity use at St Kilda Town Hall has decreased 40 % since 2012/13;
- Electricity use at the South Melbourne Market, Depot and Town Hall has remained relatively stable since 2007;
- Electricity use for all other Council facilities has increased steadily since 2013/14.

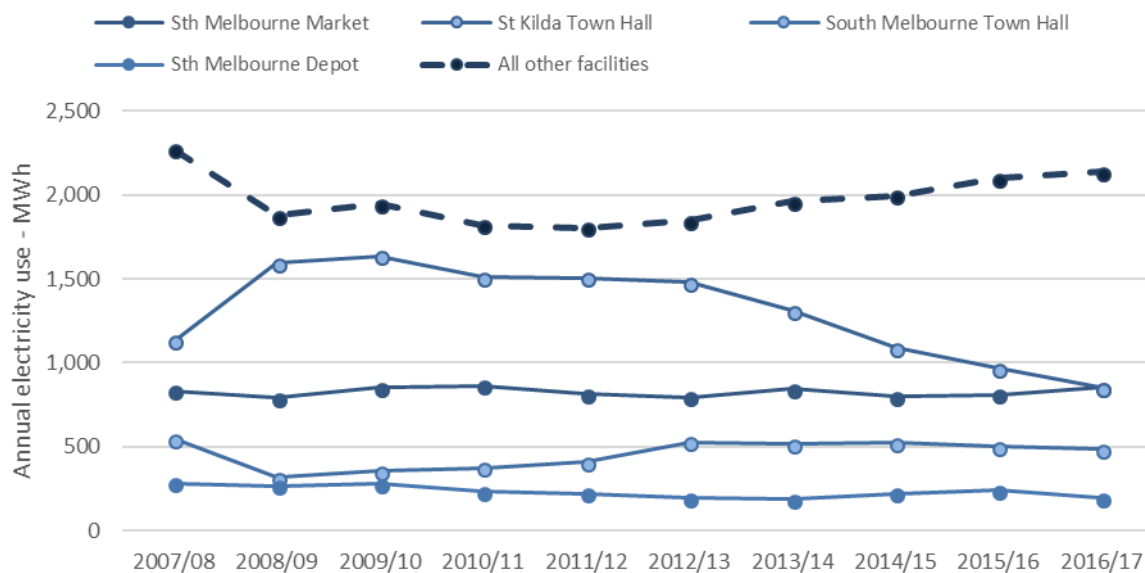


Figure 6: Electricity profile of major facilities since 2007/08

Street light electricity use

Street lights contribute to around one third of council emissions and almost half of total electricity use. Street light fittings have been upgraded in an ongoing process since 2009, as shown in Figure 7. Street lights have also decreased in numbers since 2009.

The dominant street lighting in 2017 is:

- 3,121 CFL T5 28 W lights
- 1,393 Sodium 150 W lights
- 535 CFL T5 48 W lights

LED lights are the most efficient, with 18 W LEDs approved by Powercor and CitiPower for public lighting in 2014. Basic LED streetlights emit a lot of blue light and new technologies are developing for even higher efficiency LED lights with better colour renditions (for example, Phosphor-Converted Amber LED street lamps have a wattage of 0.9 W) (NAOA, 2015).

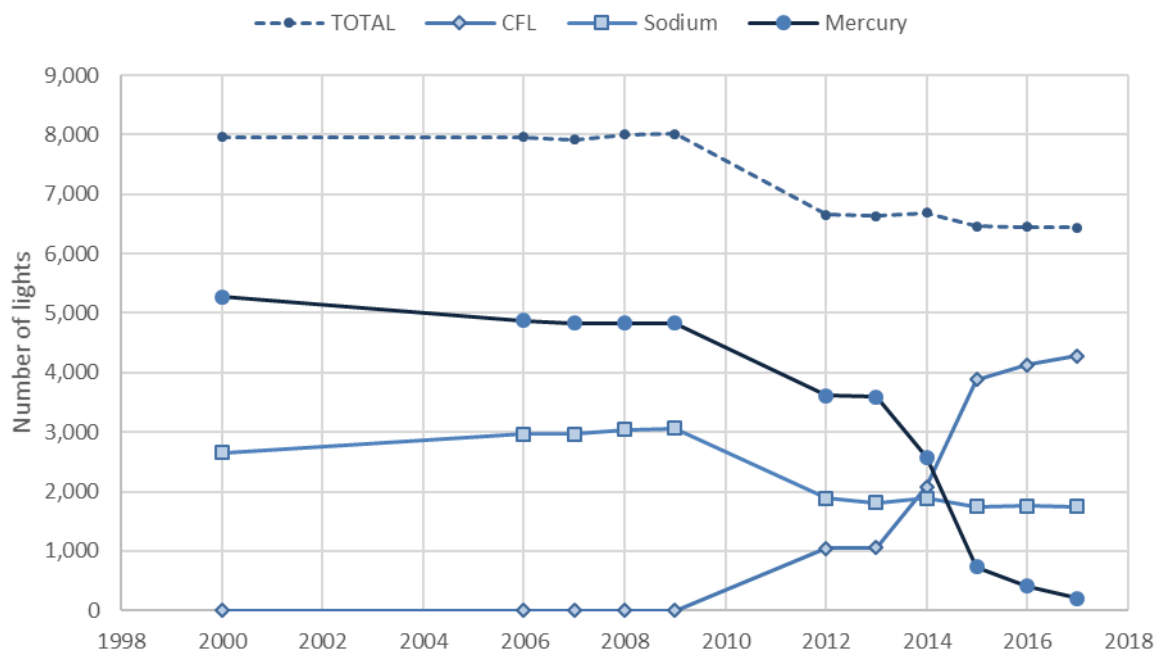


Figure 7: Major street light types in CoPP

Gas use

The following trends are evident from gas used in summarised Figure 8:

- South Melbourne Town Hall (20 %) and St Kilda library (15 %) consume the most natural gas;
- Natural gas use has remained relatively constant at the facilities shown in the figure.

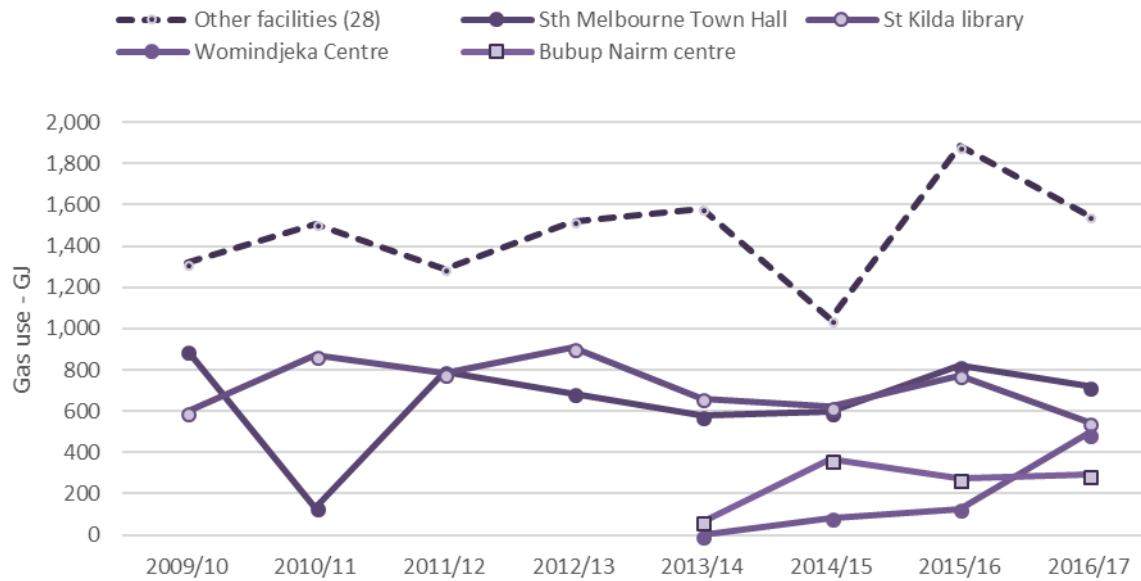


Figure 8: Gas use by facility

Renewable energy

No information on renewable energy generation or capacity on CoPP assets was provided. However, the following information was publicly available:

- CoPP installed 172 kW on St Kilda Town Hall in 2016 (expected to reduce energy by 234 MWh per year);
- South Melbourne Market currently has a 34-kW system (expected to reduce energy demand by 48.6 MWh per year);

3.3 Transport

Transport emissions relevant for Council are summarised in Table 3.

Table 3 Summary of potential Council transport emissions

Emissions type	Description	Data and indicators
Scope 1	Fuel combustion of Council fleet and pool vehicles	Fuel cards VKTs tracked by vehicle
Scope 2	Electricity consumption of electric vehicles (none)	n/a
Scope 3	Emissions associated with staff mode of travel to and from work	Staff surveys
	Business travel – accommodation, flights, rental cars, taxis	Receipts List of suppliers, number & type of trips
	Employee business travel	Fuel records from waste transport vehicles
	Transport of purchased materials & goods	
	Transport of waste	

3.3.1 Measured and reported

Council keeps records of fuel purchases for all CoPP vehicles. Yearly fuel use over time (for the reporting year April to March) is shown below in Figure 9.

When using fuel consumption to estimate emissions, the following should be noted:

- Emissions factors for petrol, diesel and LPG combustion do not change significantly from year to year;
- Vehicles efficiency has increased by an average of 2-3% per year since 2006 (Department of Infrastructure and Regional Development, 2016). As such, vehicle kilometres travelled over this time would increase for the same fuel use.

The following trends are evident from Figure 9:

- Diesel use has increased by more than double since 2006/07, as LPG vehicles were phased out (see below);
- Petrol consumption has increased steadily also since 2012/13;
- LPG use was phased out in all vehicles, decreasing to 0 in 2014/15.

189 vehicle registrations were noted in the Council vehicle fleet inventory, with more than half of these cars being diesel. Out of the sub-category of pool and operations vehicles, more than 90 % were diesel.

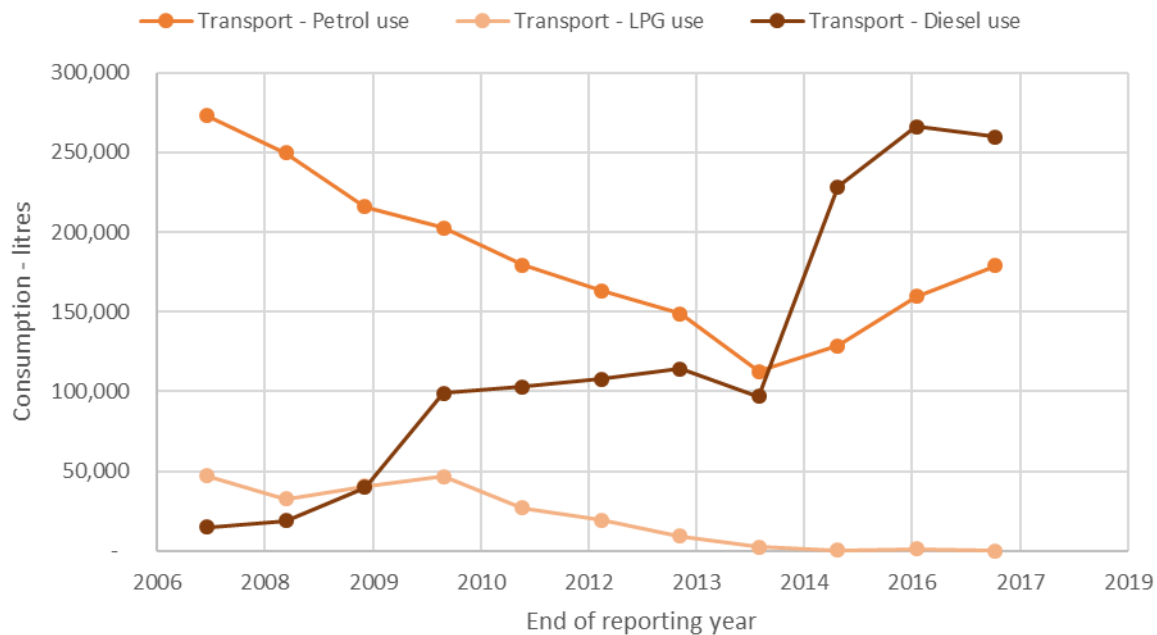


Figure 9: Fuel consumption of Council fleet vehicles

3.3.2 Additional data and indicators

Additional data can be provided or measured to assist with setting targets and reducing emissions within transport.

Data not provided:

- Vehicle kilometres travelled per vehicle per year;
- Make and model of each car, and resulting fuel efficiency (European emissions standards rating or average litres per 100 km)

3.4 Waste (Scope 3)

CoPP does not own or operate a landfill or transfer station facility, hence all waste-related emissions can be considered as Scope 3.

Waste audits conducted on 12 facilities in 2013 led to the following estimates (latest data available):

- 42,872 kg of landfill waste per site across the 12 sites per year;
- GHG emissions equal to 62,077 kg CO₂-e per year;
- A recycling rate of 38 %.

At all other sites, Council estimated (in 2017) a further 49,530 kg of waste, resulting in a total of 92.4 tonnes of estimated waste going to landfill overall. This translates to 129 tonnes CO₂-e.

Waste generated at each facility has not been measured since 2013 and thus no trends could be analysed.

3.5 Other Scope 3

In addition to the above, other sources of scope 3 emissions should be considered to align CoPP's inventory with NCOS rules. This may include (*list not exhaustive*):

- Construction materials and services
- Hired vehicles and equipment
- Information and Communication Technology (ICT) Applications and services
- Energy extraction, production, and transportation
- Professional services
- Horticulture services

4 COMMUNITY EMISSIONS

4.1 Summary

Emissions from stationary energy, transport, and waste were estimated and are shown by percentage in Figure 10. Further details are provided in *Appendix 1: Full carbon inventory*. Multiple inventories have been compiled for community emissions and these are compared in *Appendix 2: Previous carbon inventories*.

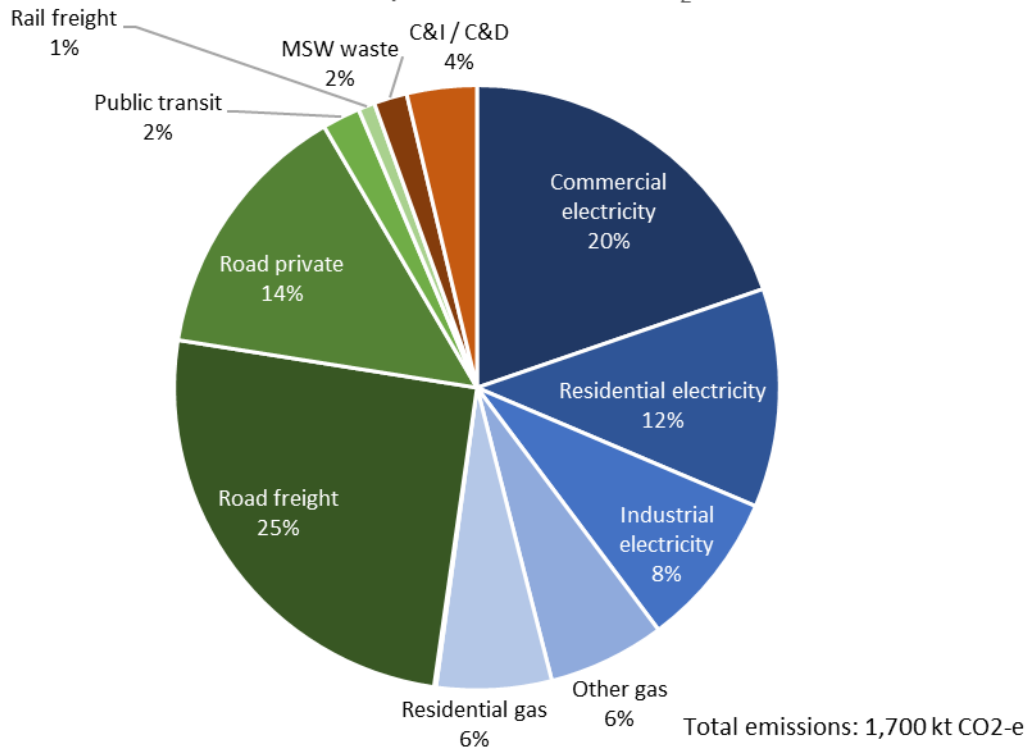


Figure 10: Breakdown of emissions in CoPP (community) – 2016 only (2016/17 split not available)*

*sources: Electricity and gas: data provided by utilities for 2016; Transport: emissions scaled in line with population growth using Arup (2009) estimates; waste emissions from Kinesis (2017) estimate

Community emissions were estimated based on the data sources given in Table 4.

Table 4 Community emissions data sources

Sector	Sub-sector	Data source	Data gaps
Stationary energy	Domestic electricity	CitiPower data: 2016/17 electricity use by suburb	2017 is an incomplete year
	Commercial electricity		
	Industrial electricity		
	Domestic gas	Multinet: 2016 gas use by suburb	No data for 2017
	C&I gas		

Sector	Sub-sector	Data source	Data gaps
Transport	Road freight	ARUP (2009) – ABS 2006 Census data, vehicle registration data in CoPP;	Census data is 11 years old and is likely to be outdated and inaccurate
	Road other		
	Public transport	Kinesis (2016) – 2009/13 VISTA data, 2016 ABS Census data, Profile ID data (jobs)	VISTA data is 8 years old and is likely to be outdated and inaccurate
	Rail freight		
Waste	MSW	Council data (reported)	MSW – No gaps
	C&I	Kinesis waste generation data (estimated using Profile ID data and non-residential waste data	C&I/C&D - No specific data for CoPP region. Waste generation based on municipal data from Sustainability Victoria
	C&D		

4.2 Stationary energy

Stationary energy comprises electricity and gas consumption from all community facilities and buildings. Stationary energy emissions relevant for the community are summarised in Table 2.

Table 5: Summary of community stationary energy emissions

Emissions type	Description	Data and indicators
Scope 1	Combustion of natural gas: Residential buildings, commercial and industrial buildings, energy industries	Natural gas use by postcode from utility
Scope 2	Electricity use: Residential buildings, commercial and industrial buildings, energy industries	Electricity use by postcode from utility
Scope 3	Fugitive emissions from industrial processes	Considered negligible – no data/indicator required

4.2.1 Measured and reported

The following material sources of emissions for community stationary energy have been analysed below:

- Electricity use;
- Gas use; and
- Renewable energy generation.

Electricity

Electricity consumption data was provided by CitiPower and is summarised by calendar year for residential, commercial, and industrial uses. This data is summarised in Figure 11. The following trends are evident from Figure 11:

- Commercial electricity use dominates total electricity use and has declined by an average of 5 % per year;
- Residential electricity and industrial electricity use has remained relatively constant from year to year (for the suburbs where information was available).

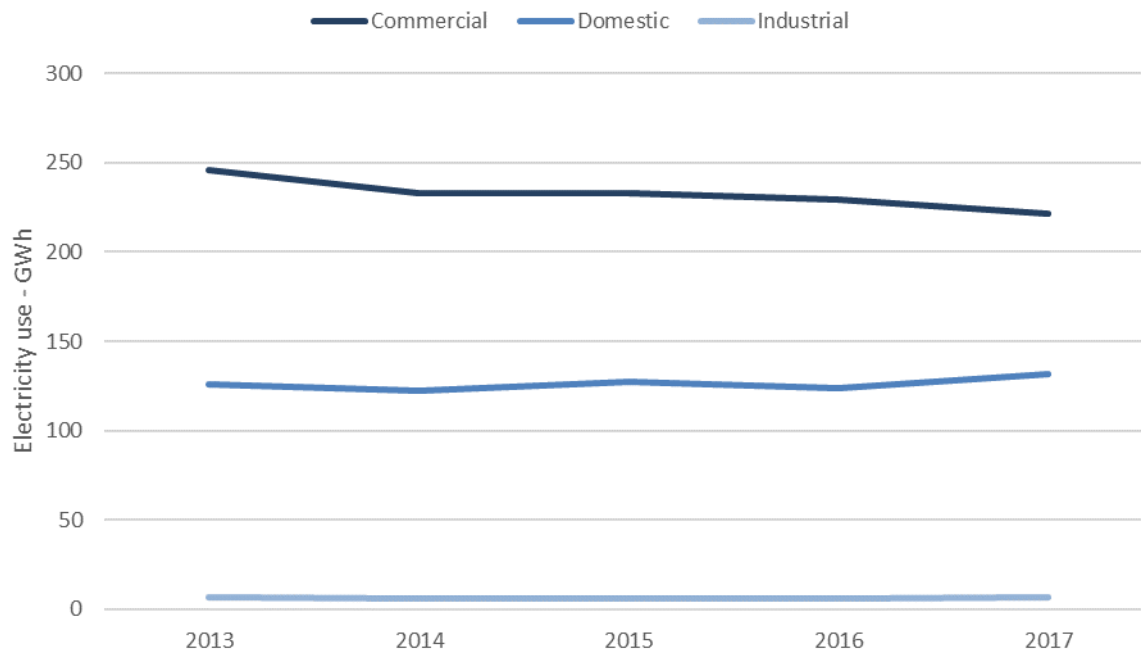


Figure 11 Community electricity use (source: CitiPower, 2017)

Electricity use per resident is shown in Figure 12 (data was missing for Albert & Middle Park and Windsor).

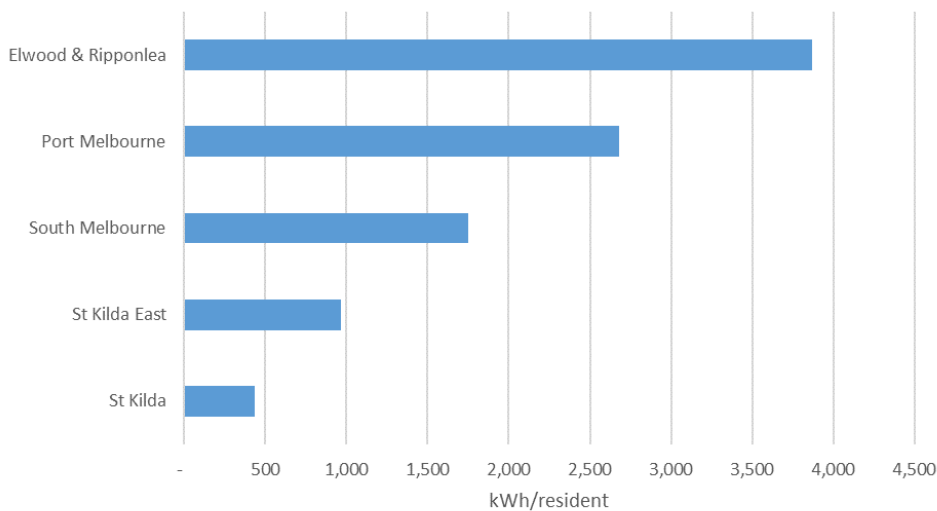


Figure 12: Electricity use by resident

Gas

Gas use in the CoPP is shown in Figure 13. While commercial and industrial gas use dropped from 2015 to 2016, gas use has remained relatively consistent since 2012 for commercial, industrial, and residential gas use. Yearly variations in residential gas use might be explained by the severity of winters.

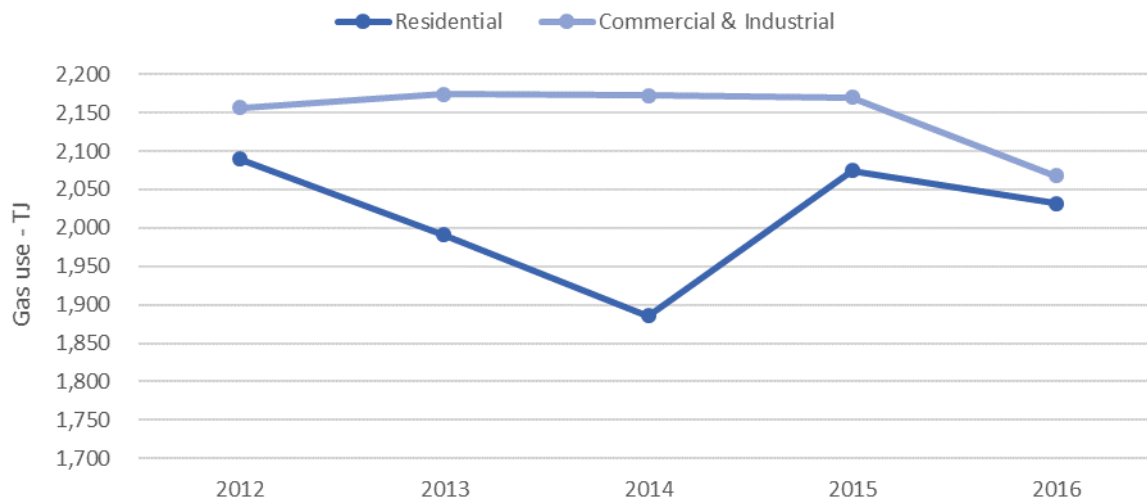


Figure 13: Community gas use in CoPP

Gas use per resident for the 2016/17 year is shown in Figure 14.

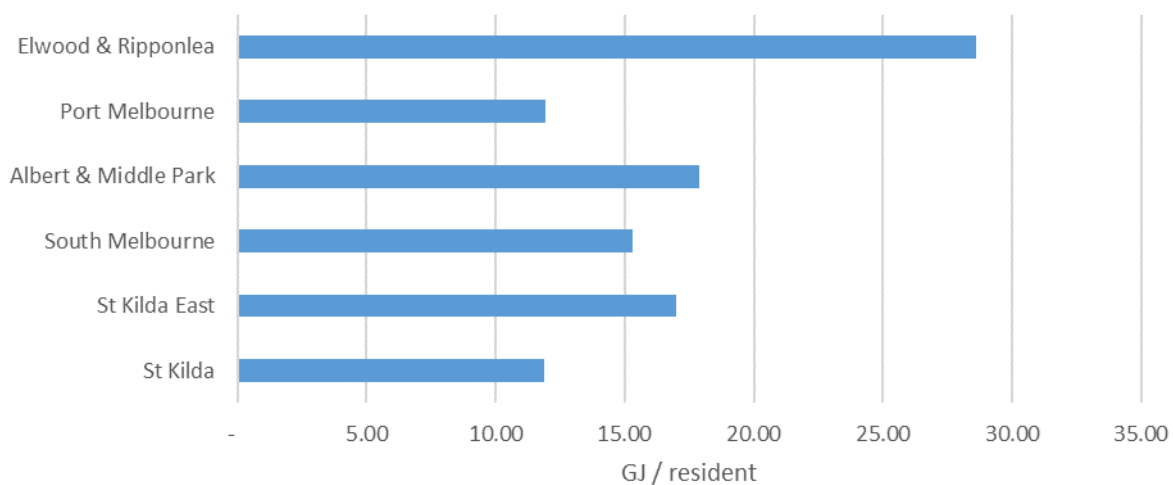


Figure 14: Gas use by resident

Renewables

This section summarises renewable energy data for solar PV systems, solar hot water systems and air source heat pumps.

Installed solar PV in the CoPP is summarised in Figure 15. The following trends are evident from the data:

- Port Melbourne had the highest growth rate of solar, increasing by an average of 49 kW/month, followed by Ripponlea (41 kW/month), Elwood (37 kW/month) and Albert & Middle Park (36 kW/month);
- St Kilda Rd Melbourne (10 kW/month) and South Melbourne (24 kW/month) had the lowest growth rate;
- Port Melbourne has the highest installed capacity of solar at 977 kW, followed by Ripponlea (828 kW), Albert & Middle Park (738 kW), and Elwood (737 kW).

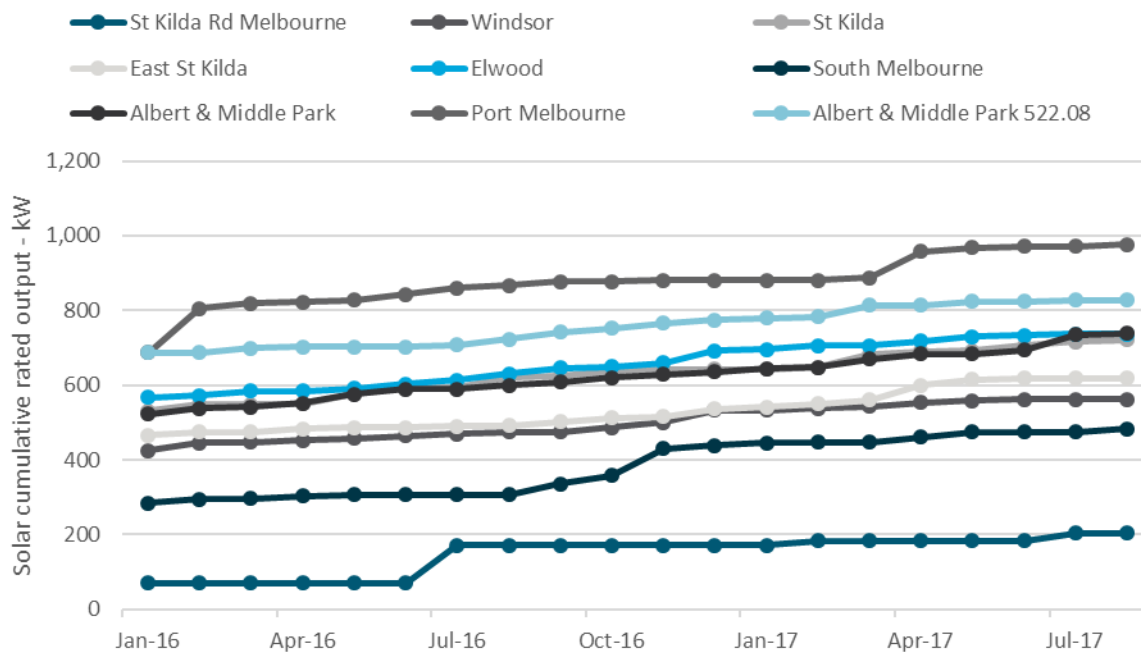


Figure 15: Installed solar capacity (cumulative) by suburb

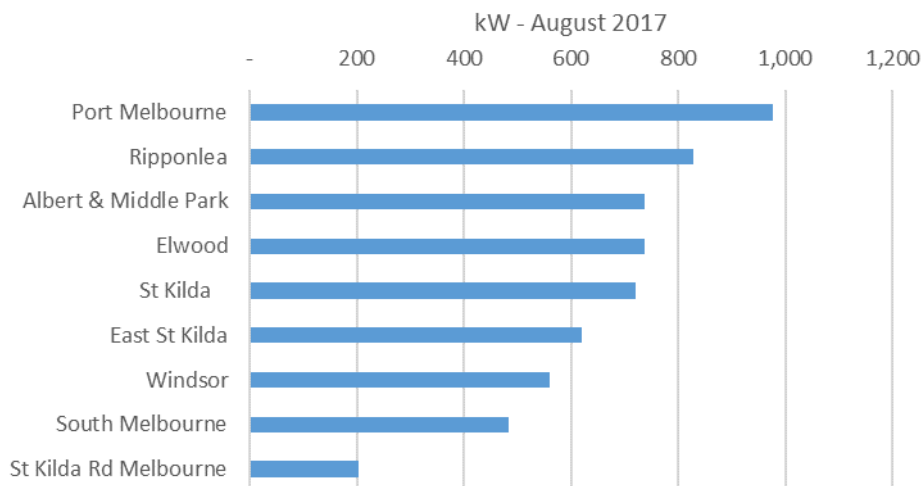


Figure 16: Installed capacity per suburb

Solar hot water installations and air-source heat pump installations are shown in Figure 17 and Figure 18. The following trends were evident from the figures:

- East St Kilda has the highest uptake of solar hot water installations, averaging 1.1 per month, followed by Windsor (0.4 per month);
- Port Melbourne has the most air source heat pumps (20), while St Kilda and Albert and Middle Park had the highest uptake of air-source heat pumps, averaging 0.35 per month.

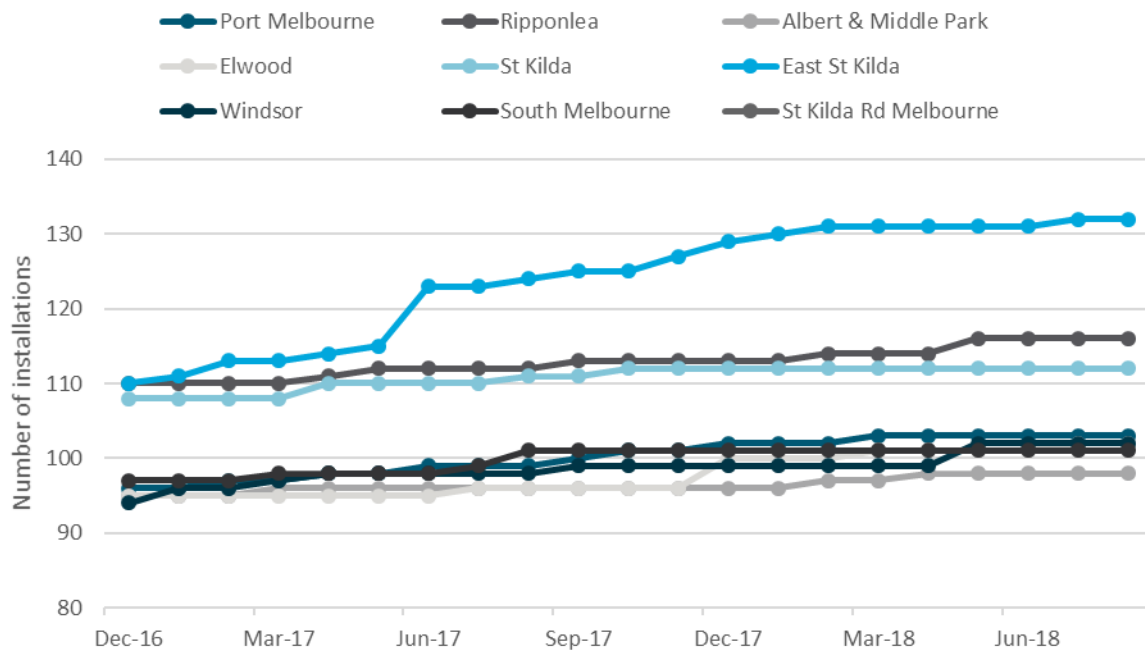


Figure 17: Solar hot water installations by suburb

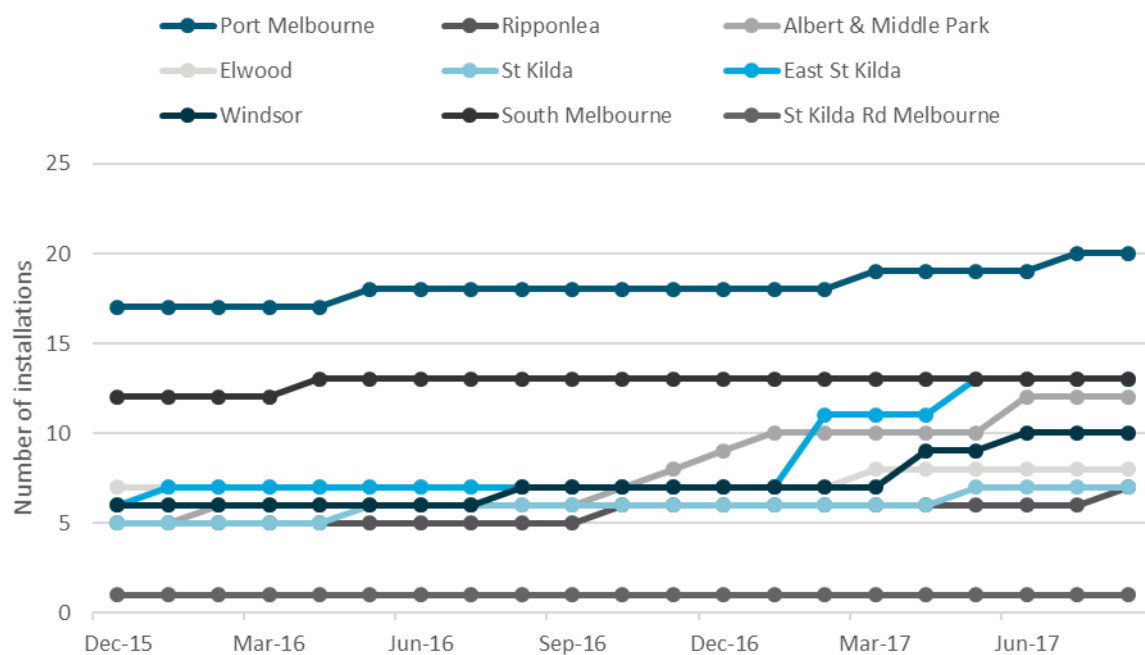


Figure 18: Heat pumps installed by suburb

4.2.2 Additional data and indicators

Additional data can be provided or measured to assist with setting targets and reducing stationary energy emissions in the community.

Data not available – additional work required to record indicators:

- Monthly gas use
- Diurnal and monthly profiles of electricity use

4.3 Transport

Transport emissions from the community are summarised in Table 6 . The GPC specifies two methods of estimating transport emissions:

- A top-down approach that estimates emissions from fuel consumption, which is used as a proxy for travel behaviour
- A bottom-up approach that uses detailed activity data including mode share percentages, energy intensity of fuel and vehicle type, and activity data (as vehicle kilometres travelled (VKTs).
 - For transboundary journeys, the inventory must consider only 50 % of all transboundary journeys **or** 100 % of all trips that start in the city.
 - Pass-through trips are not counted as part of the emissions inventory, since the city has not induced demand.

Chapter 7 of the GPC should be considered when defining the method to assess community transport emissions.

Table 6 Summary of community transport emissions

Description	Data and indicators	
	Method 1: Top-down	Method 2: Bottom-up
Scope 1: In-boundary transport of people and freight	In-boundary fuel sales data	Resident activity: VKTs by resident based on vehicle registration records and surveys. Rail company queries or surveys (MYKI data).
Scope 2: Grid-supplied electricity used for transportation	Electricity use by charging station	VKTs of electric vehicles
Scope 3: Transboundary journeys: <ul style="list-style-type: none"> - Trips that originate in the city and terminate outside the city - Trips that originate outside the city and terminate inside the city - Regional transit (buses, trains, and trams) with an intermediate stop (or stops) within the city Transmission and distribution losses from grid-supplied energy for electric vehicle use. Emissions from large regional transit hubs (airports, seaports) outside the boundary driven by activities within the city.	In-boundary fuel sales data	Mode split data: <ul style="list-style-type: none"> - Travel surveys (CoPP) - Congestion data - Public transport ridership (PTV)

4.3.1 Measured and reported

The GHG protocol for Cities includes on-road and railway emissions as part of GHG emissions from city activities. Emissions from waterborne activities, aviation and off-road transport were not considered further.

Without a complete transport inventory, transport emissions were estimated using the ARUP inventory from 2007 and scaling emissions by population growth. Results of scaling the emissions by population growth are shown in Figure 19. Note that this will not reflect actual data / current behaviour from local residents, as it is an apportionment of state-wide data.

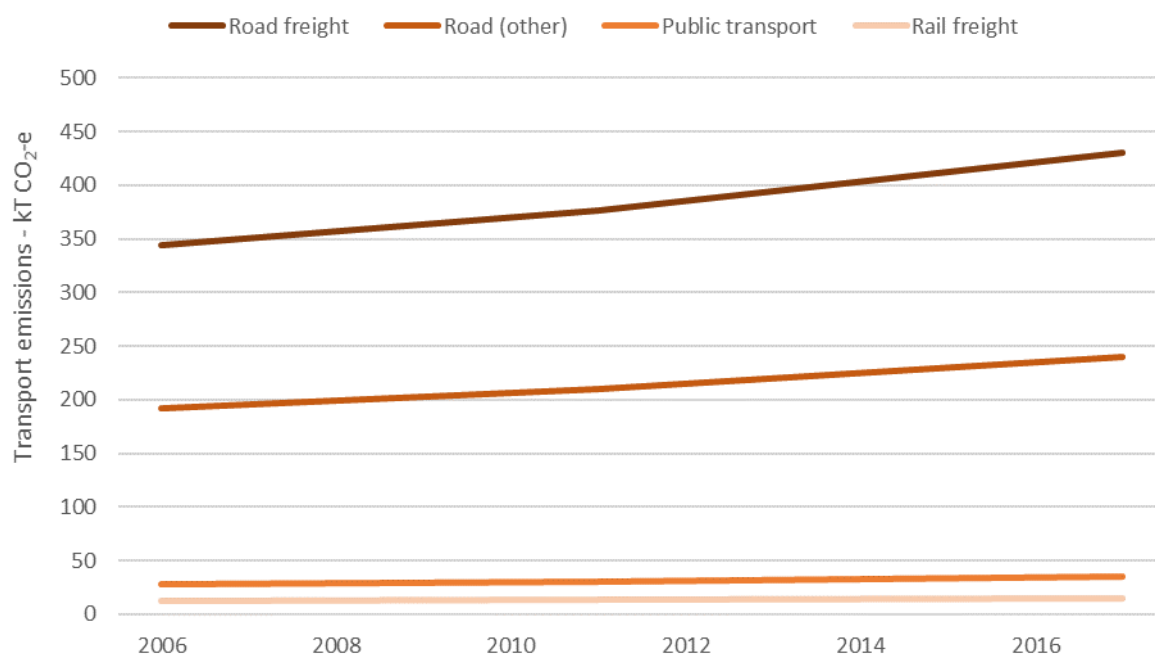


Figure 19: Transport emissions from ARUP (2009) increasing by population growth

4.3.2 Additional data and indicators

Additional data can be provided or measured to assist with setting targets and reducing emissions within transport.

Data available but not provided:

- Congestion data
- Mode share data (limited):
 - Active transport trips (CoPP surveys conducted and tracked);
 - Public transport trips (train, bus, tram) - MYKI data;
 - Private vehicle trips.

Data not available – additional work required to record indicators:

- Freight data:
 - VKTs travelled by truck class;
 - VKTs travelled by rail;

4.4 Waste

Municipal solid waste (MSW) generated within the CoPP has remained relatively constant since 2012, as shown in Figure 20. This uses data provided by CoPP on waste generation and diversion rates.

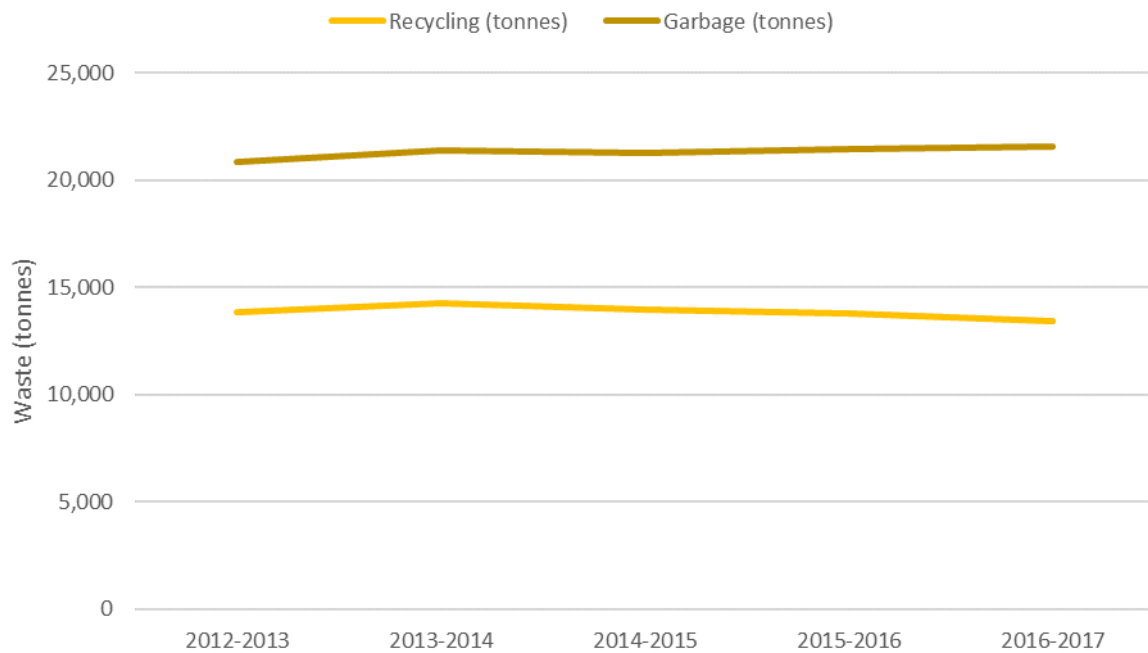


Figure 20: Municipal solid waste generated per year

Waste produced per person is shown in Figure 21.

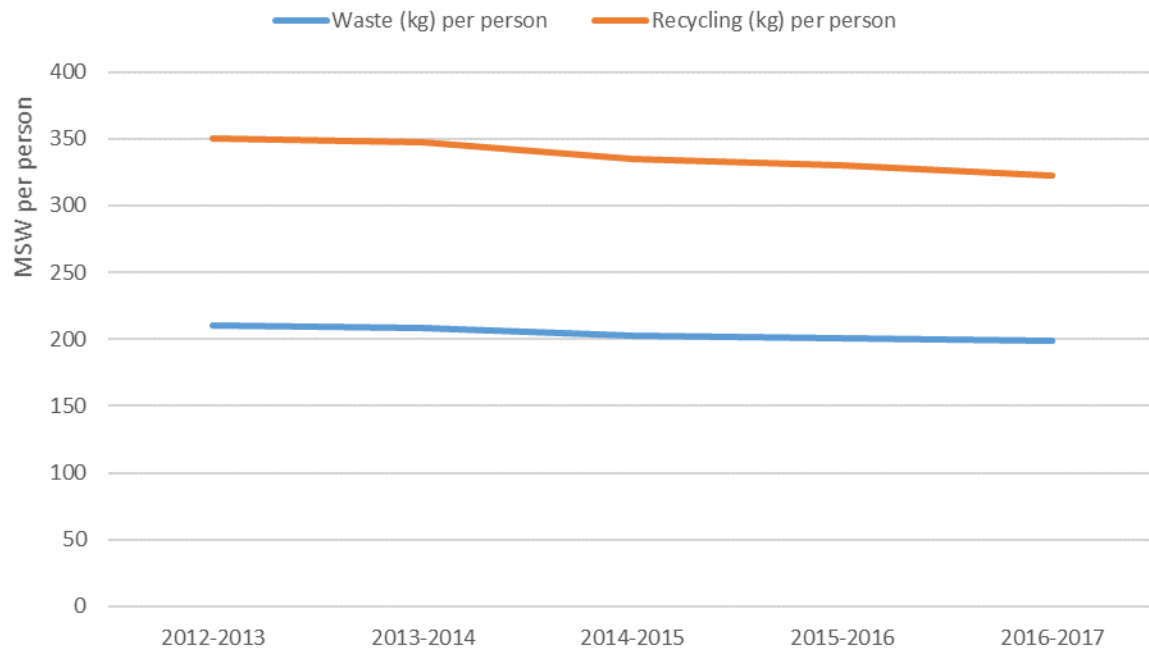


Figure 21: Waste (MSW) produced per person

Non-residential waste emissions were estimated by Kinesis using ABS jobs data and waste data from Sustainability Victoria.

Kinesis estimated that waste emissions account for 94 kt CO₂-e per year. As such, C&I and C&D waste account for two thirds of this amount, while MSW accounts for the remainder. Waste emissions are shown in Figure 22.

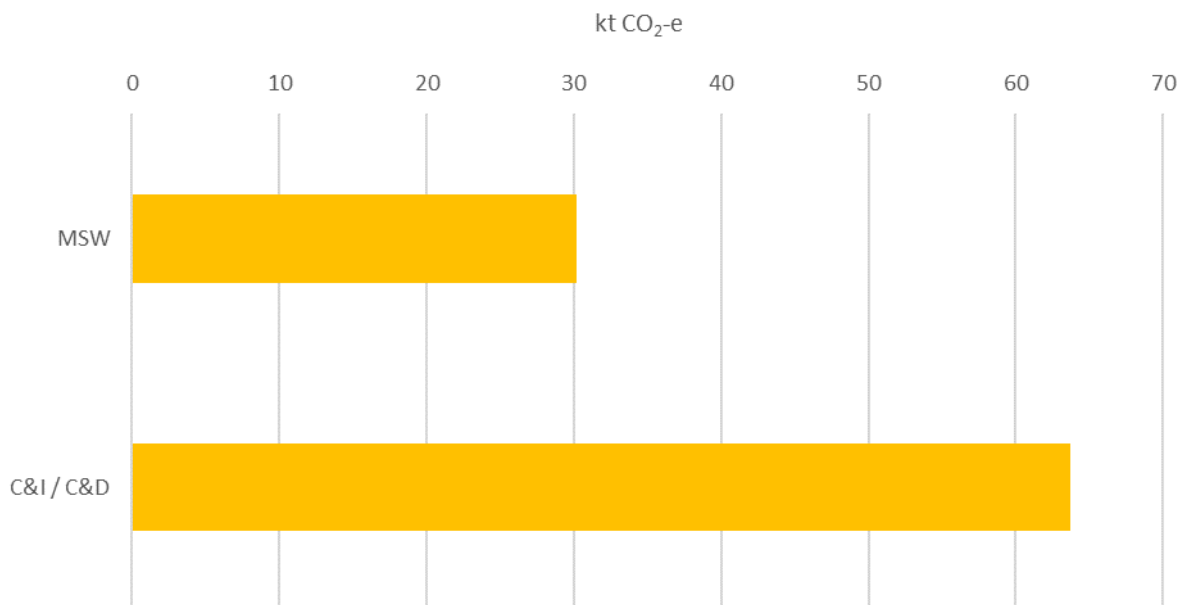


Figure 22: Community waste emissions (based on data provided by Kinesis, 2017)

Water



5 SUMMARY: WATER USE

5.1 Council use

Water use trends are shown in Figure 23, broken down by facility type. Most of the water used by Council is for parks and gardens (59 %) and sports facilities (16 %). Water use has sporadically increased for parks and gardens since 2008/09, except in 2010/11 and 2013/2014 when it decreased. Rainfall is also shown in Figure 23, and is likely to be inversely correlated to variations in water use.

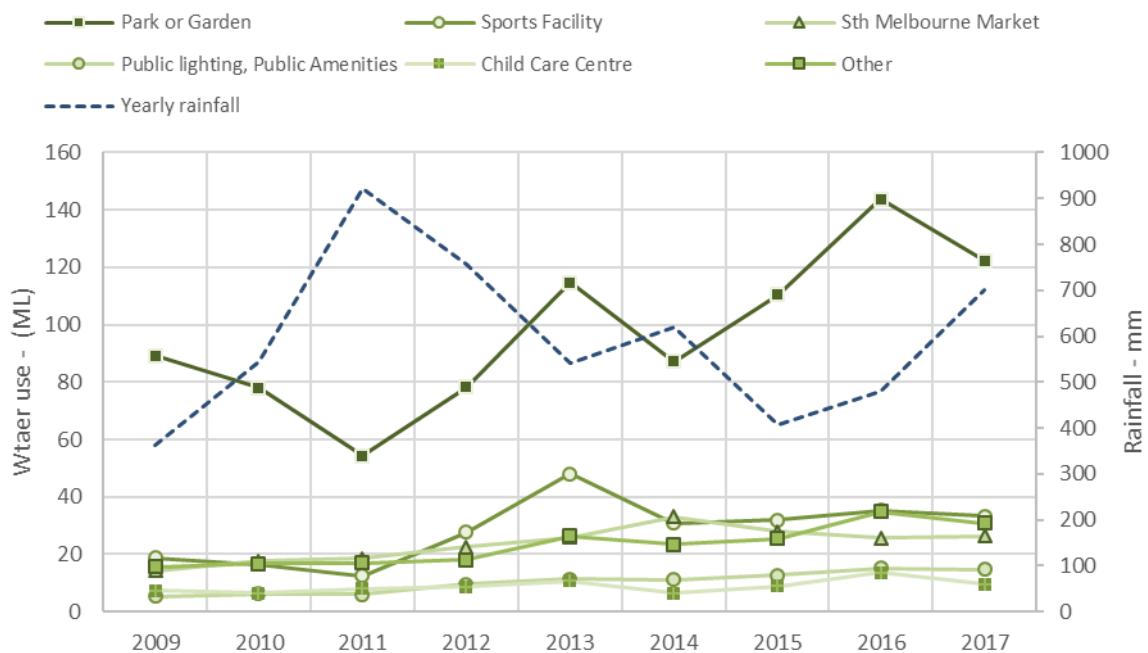


Figure 23: Water use by facility type

Total water use is shown in Figure 24 and was equal to 237 ML in 2016/17.

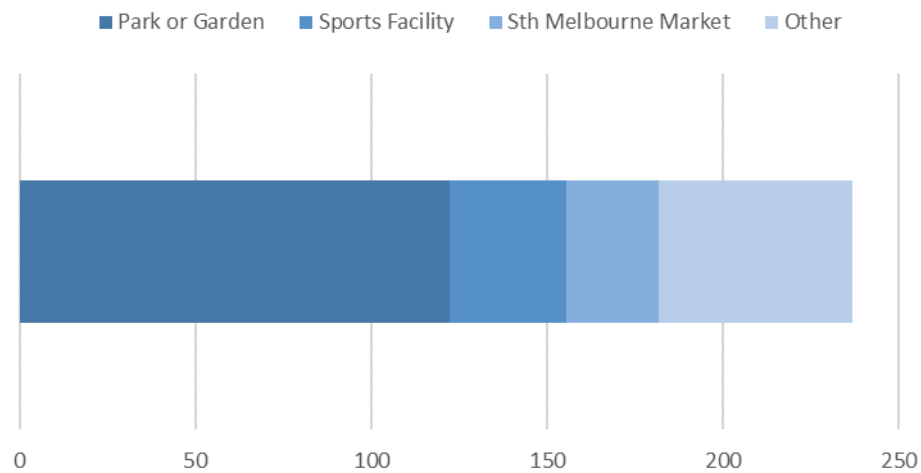


Figure 24: Council water use (ML) by facility type (2016/17) source: CoPP Potable water use

5.2 Community use

The following data was obtained from Water Plan: Toward a water sensitive city (Port Phillip City Council, 2010):

- 8,180 ML of mains water was used across the municipality.
- 5,100 ML of stormwater was generated per year across the municipality, of which:
 - 47 ML/yr was treated through WSUD;
 - 14 ML/yr was harvested through WSUD.

A summary of the average water use per resident (by suburb) is shown in Figure 25, based on more recent data. Only 1 of 10 suburbs assessed (East St Kilda) was below the 155 l/person/day target.

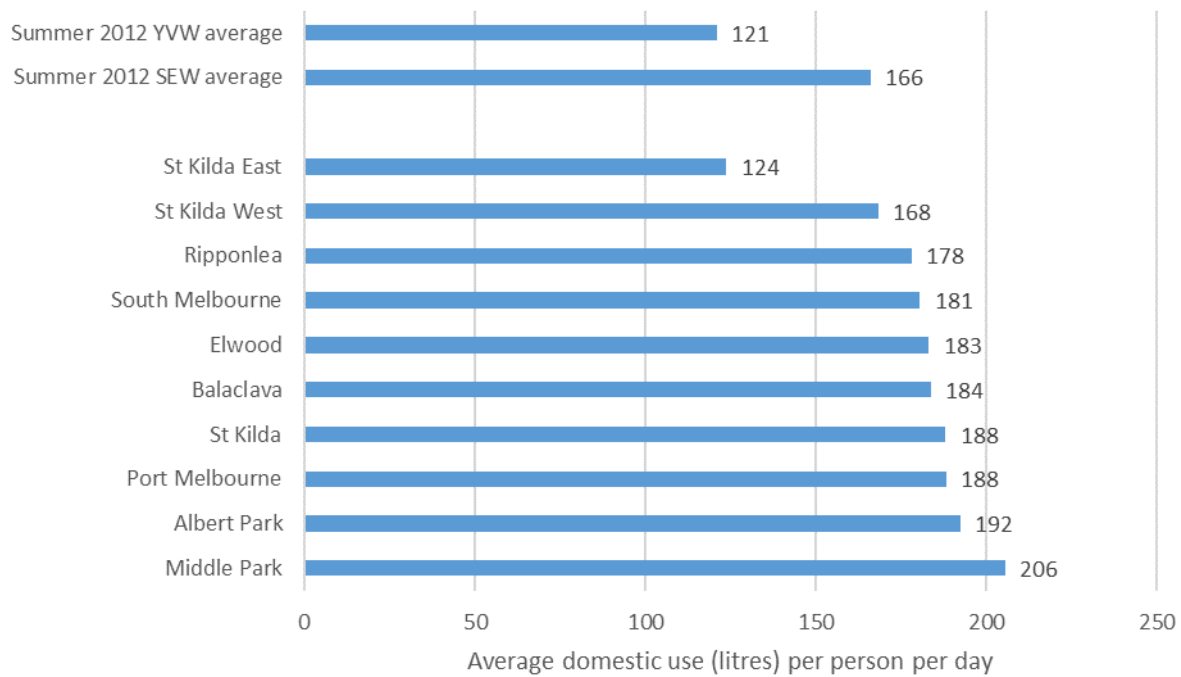


Figure 25: *Average domestic water use (YVW: Yarra Valley Water, SEW: South East Water)*

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Appendices



APPENDIX 1: FULL CARBON INVENTORY

1.1 Council inventory

Council's inventory is summarised below in Table 7 and Table 8.

Table 7: Summary of Council energy use

Sector	Emission source	Unit	2016/17 use
Facilities	Electricity	kWh	4,510,777
	Gas	MJ	3,597,514
Street lights	Electricity	kWh	3,305,956
Street lights (watchmen)	Electricity	kWh	169,889
Transport	Diesel	kL	260
	ULP	kL	179
Waste	(waste)	tonnes	92

Table 8: Summary of Council emissions

Emissions sector & cope	Emission source	2016/17 tCO ₂ -e
Scope 1 & 2		
Facilities	Electricity	4,917
	Gas	185
Transport	Diesel	707
	ULP	414
Scope 3		
Facilities	Electricity	451
	Gas	14
Street lights	Electricity	3,934
Street lights (watchmen)	Electricity	202
Waste	(waste)	129
Totals		
Scope 1&2 emissions		6,224
Scope 3 emissions		4,730
Scope 1, 2 and 3 emissions		10,954
Offsets purchased (2016/17)		4,490
Reported - SES Strategy		6,464

1.2 Community inventory

The City of Port Phillip's estimated carbon inventory is summarised below in Table 9 and Table 10. Note that transport emissions are highly uncertain and were scaled based on population growth in the City.

Table 9: Total energy use: residential, commercial and industrial energy

Emission source	Unit	2016/17
Electricity	kWh	601,390,251
Gas	GJ	4,099,837

Table 10: Summary of Community emissions

Scope 1 & 2 emissions by sector	Emission source	2016/17 tCO ₂ -e
Community	Electricity	655,515
	Gas	211,265
Transport	Road freight	433,639
	Road private	241,474
	Public	34,807
	Rail freight	15,228
Waste	MSW	30,178
	C&I and C&D	63,708
Total (rounded)		1,700 kT (rounded)

1.3 Emissions factors used by CoPP

Table 11 summarises emission factors used by the CoPP for the carbon inventory.

Table 11: Emissions factors used by CoPP

Emission source		Factor
Electricity	scope 2	1.09 kgCO ₂ -e/kWh
	scope 3	0.10 kgCO ₂ -e/kWh
Gas	scope 1	51.53 kgCO ₂ -e/GJ
	scope 3	3.9 kgCO ₂ -e/GJ
Transport fuels:		
Diesel	scope 1	2,722 kgCO ₂ -e/kL
	Scope 3	139 kgCO ₂ -e/kL
ULP	scope 1	2,313 kgCO ₂ -e/kL
	Scope 3	123 kgCO ₂ -e/kL
Waste		1.4 tCO ₂ -e/tonne waste

APPENDIX 2: PREVIOUS CARBON INVENTORIES (COMMUNITY EMISSIONS)

Two sources detailed an inventory of community emissions within the CoPP:

- Carbon Footprint of Community Emissions (ARUP, 2009); and
- CCAP City Emissions Inventory (Kinesis, 2017)

The data used for each study is summarised below.

Table 12: Past estimates of community emissions

	Main data sources	
	Carbon footprint of community emissions	CCAP City emissions inventory
Stationary energy	ABARE 2005/2006 data – Energy production consumption and trade	ABS data, Profile ID, Kinesis estimates
Transport	Australian Bureau of Statistics data (2006): Freight movements; Method of Travel to Work by Sex, By Place of Usual Residence (B45); Industry of employment; Port Phillip Expanded Community Profile	Victorian Integrated Survey of Travel and Activity (VISTA) 2009/2013 data for inner-city Melbourne, updated every 3 years ABS data (2011 / 2016)
Waste	State-wide C&I / C&D data	Profile ID; Kinesis estimates; Annual waste survey by Council
Land use	AGO FullCAM model	Profile ID; ABS Census data

Due to different accounting methods, the two inventories completed on emissions from the CoPP do not align. The inventory in 2017 uses more recent data but does not consider dominant emissions sources such as vehicle freight transport. The inventory in 2009 is more complete, but the sources generally estimate emissions using state-wide data and attributing a proportion of these emissions to the CoPP. The difference in emissions inventory is shown in Table 13.

Table 13: Previous estimates of emissions

	Emissions – kT CO ₂ -e		
	Carbon footprint of community emissions (ARUP, 2009)	CCAP City emissions inventory (Kinesis, 2017)	Percentage increase: 2009 to 2017 (%)
Stationary energy	1468.2	1783.8	21 %
Transport	576.4	163.3	-72 %

Emissions – kT CO ₂ -e			
	Carbon footprint of community emissions (ARUP, 2009)	CCAP City emissions inventory (Kinesis, 2017)	Percentage increase: 2009 to 2017 (%)
Waste	132.8	93.9	-29 %
Land use	-	-	
TOTAL	2,177	2,041	- 6 %