



Appendix B

Council Inventory and Methodology

DRAFT GREENHOUSE PLAN

Contact us for a translation

This information is provided by the City of Port Phillip to inform residents about Council services and responsibilities. For a translation of this information contact the Council's interpreter service.

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CONTENTS

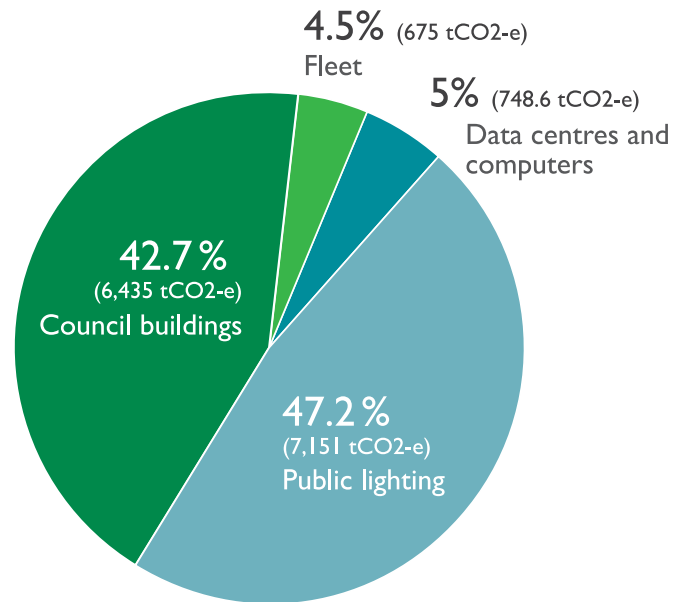
PORT PHILLIP COUNCIL EMISSIONS INVENTORY AND METHODOLOGY	2
Total Council emissions	2
How does Council monitor emissions?	3
Metered electricity	3
Unmetered electricity	3
Metered gas	4
Fuel	4
GreenPower and offsets	4
Tracking over time	4
Ratio indicators	6
Operational control and scope	7
What emissions are not included in the inventory?	7
Which Council emissions are targeted for zero by 2020?	8
TREND ANALYSIS – METHODOLOGY TO PREDICT FUTURE EMISSIONS	9
Business as usual scenario	9
Scenario Modelling Assumptions	9
Assumptions behind Council's Action Frameworks	10

PORT PHILLIP COUNCIL EMISSIONS INVENTORY AND METHODOLOGY

Council's gross greenhouse gas emissions for the financial year 2009/10 have been calculated to be 15,010 t.CO₂-e (tonnes of carbon dioxide equivalent). Council purchased GreenPower in the form of renewable energy certificates (RECs) to account for approximately 25% of electricity consumed, resulting in net emissions of 11,356 t.CO₂-e. Total community emissions for a year have been calculated to be approximately 1,561,000 t.CO₂-e, so Council's gross emissions account for approximately 1% of the total community emissions.

Council emissions can be broken into three main sources: general building energy consumption (including electricity and gas consumption), electricity consumption in council's IT infrastructure, electricity consumption in public lighting, and fuel consumed in Council's fleet of vehicles (see Figure 1).

Figure 1: Total Council emissions by sector



Source: ACX Argyle 2011, Background Technical Report and Trend Analysis for City of Port Phillip Greenhouse Action Plan



How does Council monitor emissions?

Council collects utility (gas and electricity) consumption information from a range of sources and adds it to its Utility Tracker software program. Utility Tracker is an open source program maintained by Sustainability Victoria to allow organisations, in particular local government, to track and report on utility consumption. While the software has some facility for calculating emissions, it is not a complete package. Council has allocated funds in 2011/12 to identify and upgrade processes and software to streamline the carbon accounting process.

At present, greenhouse gas emissions are calculated from utility and fuel consumption data in a spreadsheet using emissions factors from the National Greenhouse Factors report, published annually by the Department of Climate Change and Energy Efficiency.

Council engages an external expert to audit utility consumption data and provide a summary of annual emissions for that financial year.

Metered electricity

Metered electricity sites include all buildings, all Council-owned public lighting and most minor powered amenities such as parking meters and barbecues. For reporting purposes, all metered electricity use is categorised as building emissions.

Metered electricity site data is sourced from the retailers, who provide billing data in electronic format to the Sustainability Department.

A number of council's buildings are classified as "large market" electricity consuming sites (consuming more than 160MWh of electricity a year) and have historically been connected to smart meters, which allow a direct download of data at intervals down to 15 minutes. This is useful for regular monitoring and to observe the impact of energy efficiency projects at these sites. The interval data is used to confirm the billing data.

Council has two electricity retailers and some sites with multiple meters are serviced by both retailers.

Electricity consumption in Council buildings in 2009/10 totalled 5,121 MWh. Emissions were calculated at 6229.3 t.CO₂-e for Scope 2 and 717.0 t.CO₂-e for Scope 3 (see scope definitions under heading 'Operational control and scope'). Building electricity consumption contributed 46.7% of Council's gross emissions based on the full fuel cycle (Scope 2 and 3).

Unmetered electricity

The City of Port Phillip has metered and unmetered public lighting. The unmetered lighting includes the majority of street lighting and some additional 'watchman' (public space security) lighting. For reporting purposes, all unmetered electricity sites are categorised as public lighting emissions. The metered lighting electricity consumption data is captured in the metered electricity data and is treated as building emissions for reporting purposes.

Electricity consumption for unmetered lighting is calculated based on 'deemed usage' figures that are provided by the electricity distributors to the electricity retailers. These deemed figures include the electricity consumption of the light fittings and the hours of operation. The retailer uses the figures to calculate consumption. The consumption figures are provided to the Sustainability Department in electronic form, where they are stored for record-keeping purposes and calculated into emissions in a spreadsheet.

Electricity consumption in public lighting in 2009/10 totalled 5,220 MWh. Emissions were calculated to be 6420.8 t.CO₂-e for Scope 2 and 730.8 t.CO₂-e for Scope 3. Public lighting contributed 47.6% of Council's gross emissions based on the full fuel cycle (Scope 2 and 3).

Metered gas

Gas consumption data is all metered, occurs only in buildings, and for reporting purposes is categorised as building emissions.

Gas consumption data is sourced from the retailers, which provide billing data in electronic format to the Sustainability Department. The data is converted and uploaded into Utility Tracker.

Gas consumption in Council buildings in 2009/10 equalled 3024 GJ. Scope 1 emissions were calculated at 155.2 t.CO₂-e and Scope 3 at 12.1 t.CO₂-e. Gas consumption contributed 1.1% of Council's gross emissions based on the full fuel cycle (Scope 1 and 3).

Fuel

Fuel is consumed in Council fleet vehicles, salary package vehicles, heavy vehicles used for waste and infrastructure services and in some standby generators and power tools. Fuel consumed includes unleaded petrol, LPG and diesel. For reporting purposes, emission from all fuel types and uses are rolled into the category of fleet emissions.

Many of these vehicles are cars that are part of staff salary packages and are made available during working hours as part of the car pool. Others are cars leased by Council and available for staff to use at any time. In addition, Council has seven heavy vehicles that are used by staff to empty litter bins and around the transfer station.

Fuel consumption in 2009/10 was 173.3 kL of unleaded petrol, 60.9 kL of diesel, and 41.4 kL of LPG. Total emissions were calculated at 627.0 t.CO₂-e for Scope 1 and 48.8 t.CO₂-e for Scope 3. Fuel consumption contributed 4.5% of Council's gross emissions based on the full fuel cycle (Scope 1 and 3).

Green Power and offsets

Council has been buying decoupled Renewable Energy Certificates for the past two years to convert some of its electricity consumption into GreenPower. The number of RECs purchased has remained steady so that as efficiency actions reduce overall power consumption, the portion of electricity that is GreenPower will increase. In 2009-2010 council purchased 2,667 MWh of decoupled RECs

GreenPower purchases contribute to the net emissions calculations. Council has not yet started to purchase offsets.

Tracking over time

Council has produced a carbon inventory every year since 2006/07, the baseline year for its Toward Zero carbon emissions target. Absolute gross emissions since that time have decreased only slightly, while net emissions have reduced dramatically due to increasing use of Green Power. (see Figure 2).

Figure 2: Absolute emissions, 2006-2010

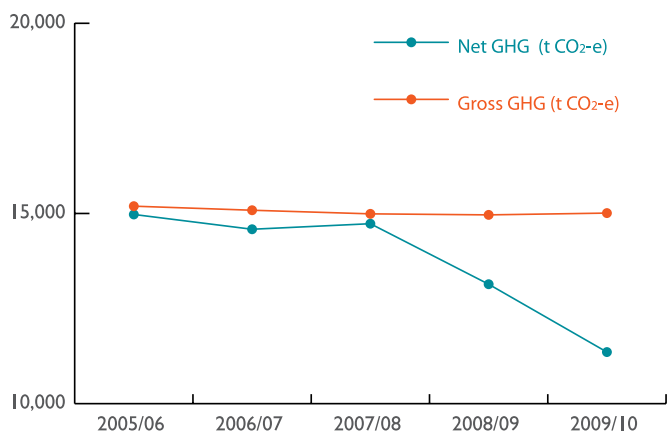
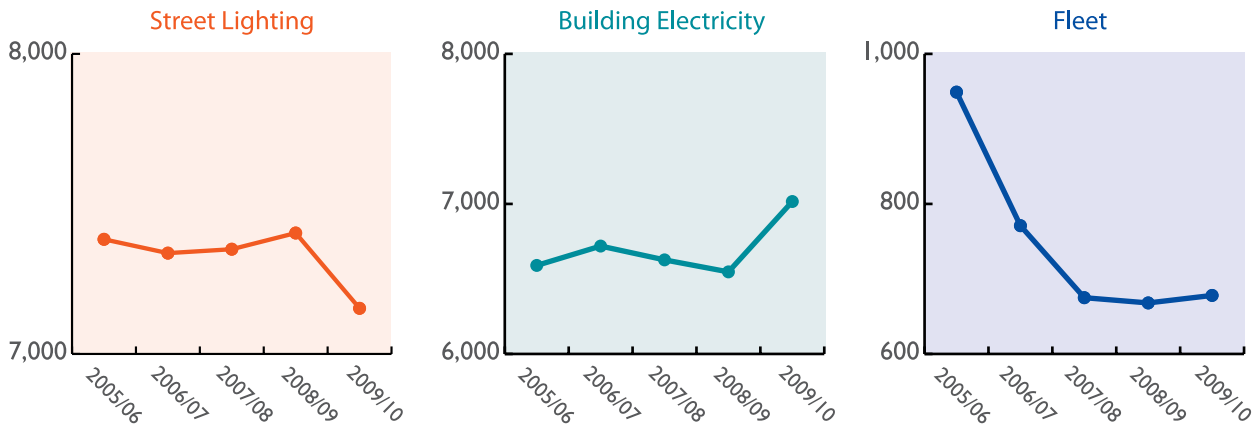


Table 1. City of Port Phillip Corporate Greenhouse Gas Inventory 2009/10

Emission Source Data	Value (Q)	Calculated Emissions (t.CO2-e)	Proportion of Total Inventory %
Scope 1			
Natural Gas	3,024 GJ/yr	155.22	1.0%
Transport Vehicle Fuels - Unleaded Petrol	173,280 L/yr	396.58	2.6%
Transport Vehicle Fuels - Diesel	60,890 L/yr	164.08	1.1%
Transport Vehicle Fuels - LPG	41,410 L/yr	65.31	0.4%
Total Scope 1		781.19	5.2%
Scope 2			
Electricity - Buildings	5,121,416 KWh/yr	6,299.34	42.0%
Electricity – Street lighting	5,220,167 KWh/yr	6,420.81	42.8%
Total Scope 2		12,720.15	84.7%
Scope 3			
Natural Gas	3,024 GJ/yr	12.10	0.1%
Electricity - Buildings	5,121,416 KWh/yr	717.00	4.8%
Electricity – Street lighting	5,220,167 KWh/yr	730.82	4.9%
Transport Vehicle Fuels - Unleaded Petrol	173,280 L/yr	31.19	0.2%
Transport Vehicle Fuels - Diesel Petrol	60,890 L/yr	12.18	0.1%
Transport Vehicle Fuels - LPG	41,410 L/yr	5.38	0.0%
Total Scope 3		1508.67	10.1%
			100.0%
Gross Total Emissions		15,010.01 t.CO2-e	
Emission Offsets			
GreenPower	2,667,000 kWh	3653.79	
Other offsets	0 t CO2-e/yr		
Total Offsets		3653.79	
Net Total Emissions including offsets		11,356 t.CO2-e	

Source: Environ Inventory updated by ACX Argyle 2011

Figure 3: Absolute emissions by category, 2006-2010



By separating different sources of emissions (see Figure 3), it can be seen that fleet emissions have generally decreased before plateauing recently, street lighting emissions have dropped recently, and building emissions have risen sharply since 2008/09.

Ratio indicators

The present series of inventories measure only absolute emissions, as is required for mandatory reporting under the Local Government Act. The inventories do not include any carbon ratio or carbon intensity indicators. Without these, it is difficult for Council to track its abatement progress over time or to compare itself with other councils or organisations. Trends in absolute emissions, such as those in Figure 3, do not take account of potential increases in the number of ratepayers being serviced, the number of staff, etc.

The key ratio indicator considered by Council is greenhouse gas emissions per full-time staff member. This is based on the logic that the number of staff

is tied to the level of service delivery. In 2006/07, Council produced 26.7 t.CO₂-e per FTE (full-time staff equivalent), which reduced to 23.2 t.CO₂-e per FTE (13% reduction) in 2009-2010

Other key ratio indicators should be developed. Council proposes to collect data to help develop indicators for:

- emissions per m² of office space
- emissions per ratepayer
- emissions per dollar of rates
- emissions per child (childcare centres only).

It is important that any ratio indicator is presented in context and along with the absolute figures, lest they be used to disguise poor performance.

Operational control and scope

Council aspires to maintain a greenhouse inventory that is in accordance with the methods described in the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (the GHG Protocol). This is widely recognised as the best international standard in carbon accounting methodology for recording and managing greenhouse gas emissions (World Resources Institute, 2004).

The GHG Protocol uses organisational and operational boundaries to determine which particular emission sources an organisation takes into account. Defining the organisational control of Port Phillip Council is straightforward, as there are no subsidiaries. For the City of Port Phillip:

Scope 1: those emissions we cause and have direct control over, such as fuel burned in a car or gas in an appliance.

Scope 2: those emissions that result from electricity we consume, which is generated by a power station.

Scope 3: those emissions we cause but don't control, such as emissions embodied in products we consume or emissions produced by contractors undertaking work on behalf of council.

What emissions are not included in the inventory?

Council's greenhouse inventory is not yet complete. Some Scope 1 emissions are not included, and Scope 3 emissions are limited to upstream emissions on fuel and electricity consumed and reported in Scopes 1 and 2.

The GHG Protocol lists several activities as suitable for inclusion in Scope 3:

- purchased items – embedded energy/emissions
- transportation – goods, employee business travel, employee commuting, waste
- leased assets and outsourced activities, including contractors
- waste disposal.

Being able to calculate and monitor such emissions depends on the availability of reliable emissions factors and access to data. This is problematic, particularly for calculating embodied emissions in purchased items or building materials where emissions factors may not exist.

However, in Victoria there are Scope 3 emissions factors available for water consumption and paper consumption, which Council intends to add to its inventory. Council will expand its inventory to include:

Scope 1 – refrigerant emissions. Because of the extreme global warming potential of several common refrigerants and the unavoidable leaks that occur even from well-maintained systems, refrigerant leaks can contribute a not insignificant amount to the greenhouse gas footprint of an organisation with a large portfolio of assets with cooling systems, such as buildings and cars. Council will undertake an audit of refrigerants to add these to its inventory as a Scope 1 emission.

Scope 3 – waste emissions. Council generates a significant volume of waste through corporate operations, but there has been no system for monitoring and reporting waste volume. Council will begin a waste monitoring program to generate reliable figures that can contribute to the calculation of Scope 3 waste emissions. (This measure does not include municipal waste.)

Scope 3 – contractor emissions. Council outsources much of the work to maintain facilities and services to contractors. Contractors generate emissions through their fuel and materials consumption, but Council has limited control over these emissions. Council will build into contract renewals a requirement for contractors to provide fuel consumption data. It will also monitor the consumption of materials in road maintenance and renewal contracts.

Scope 3 – upstream emissions. Delivery of water via the mains system results in emissions. In Victoria an emissions factor is available for reticulated water, so the emissions from water consumption can be calculated. Council will review the emissions factor for reticulated water in Melbourne and add this to the Scope 3 inventory.

Scope 3 – transport emissions. Emissions from transport can include emissions from staff travel on planes and in taxis. Council will collect data on staff business travel via airlines, taxis and public transport, then use available emissions factors to add these sources to the Scope 3 inventory.

Scope 3 – embodied emissions. Council will monitor the consumption of those materials used in bulk amounts and for which there are emissions factors, focusing primarily on road materials.

Which Council emissions are targeted for zero by 2020?

For the purposes of demonstrating zero emissions, including any purchase of offsets required to achieve this, Council's greenhouse gas inventory should include only Scope 1 and Scope 2 emissions. Therefore, the emissions sources targeted for zero emissions in 2020 will be:

Scope 1

- Gas consumption in buildings (stationary energy consumption)
- Fuel consumption in the vehicle fleet (transport energy consumption)

Scope 2

- Electricity consumption in buildings (stationary energy consumption)
- Electricity consumption in public lighting (stationary energy consumption)

Accordingly, for emissions resulting from stationary and transport energy consumption Council will seek to reduce emissions to zero by applying the principles of the greenhouse management hierarchy: measure, reduce, switch, advocate, offset and repeat.

In addition, Council has committed to reducing emissions from its own waste generation, which is a Scope 3 emission. Council will seek to reduce waste to landfill as a primary action to reduce emissions and will use available emissions factors to calculate how many offsets it will need to purchase.

Council will not be seeking formal carbon neutral certification.

TREND ANALYSIS – METHODOLOGY TO PREDICT FUTURE EMISSIONS

In developing the Draft Greenhouse Plan, it has been necessary to make some predictions about what emissions might be like in the future under a business as usual scenario, and what contribution various actions might make to reducing emissions from that business as usual scenario to the stated council targets.

Business as usual scenario

The Business as Usual (BAU) case attempts to predict the Council's annual emissions between 2011 and 2020. As stated in Appendix A, this is clearly an exercise that depends heavily on assumptions and modelling, and tries to take account of political, social, technical, and economic factors, all of which introduce significant uncertainty.

The Draft Greenhouse Plan presents only one scenario, in which council reaches zero emissions by 2020. The scenario is considered realistic and relies on an optimistic view of the political process, and

accepts the targets of current government policy, both federal and state, in good faith. This is the same assumption as the optimistic scenario as presented for the community in Appendix A and assume projected BAU of 12% reduction in absolute emissions from 2010 to 2020.

Scenario Modelling Assumptions

Since council is a part of the community with respect to the business as usual scenario, refer to Appendix A for a breakdown of the business as usual scenario modelling assumptions for the optimistic scenario.

To paraphrase however, the **optimistic** BAU assumes that by 2020 the Victorian grid has a full fuel cycle emissions factor of 1.26 tCO₂-e/MWh, a reduction of 8% on its current carbon intensity. Another 7% improvement is assumed to come from natural energy

Baseline GHG 2010	Reduction in emissions	Sector	
BAU reduction	12%	All	RET,VEET and energy efficiency
Action Wedges			Notes and assumptions
Renewal	5.7%	Buildings	Assumes 4 major building renewals average 40% improvement
Upgrades	5.4%	Buildings	Assumes 5 upgrades with a 30% improvement in performance efficiency
Minor	2.4%	Buildings	Assumes all other buildings receive basic upgrades with 20% EE improvement.
Streetlight upgrades	28%	Street Lighting	Eventual improvement in lighting to 30% of 2010 to occur pre 2020.
Behaviour	4.2%	Buildings	Alteration in staff and contractor behaviour
Fuel Switch Elec	26%	Buildings, public lighting	Assumes 30% of all elec from targeted non RET renewables
Fuel Switch Fleet	3%	Fleet	Assumes 50% drop in carbon intensity of fleet.
GreenPower or offsets	14%	All	Remainder as national renewable 15%
Total	100%		

Source: ACX Argyle 2011

efficiency improvement, and also from the effect of the Victorian Energy Efficiency Target Scheme (VEET) and the continuing energy efficiency opportunities program (this 7% is a net figure and takes into account increasing consumerism and the rebound effect).

The contribution of council actions to reduce emissions which are presented in the scenarios were calculated in modelling undertaken by consultants on behalf of council (ACX Argyle (2011), "Background Technical Report and Trend Analysis for City of Port Phillip Greenhouse Action Plan"). Scenario modelling

The table (right) shows the contribution of the BAU and other potential actions to reduce emissions to zero by 2020.

Assumptions behind Council's Action Frameworks

In preparing the Greenhouse Plan, all attempts were made to predict and quantify the kinds of actions that council will be taking to reduce emissions. Where feasible the Greenhouse Action Plan has depended on actual investigations into the actions available, for example public lighting actions are based on the Sustainable Public Lighting Strategy.

Elsewhere the potential for savings have been calculated based on assumptions (building emissions) or only defined as actions and not quantified (IT infrastructure emissions).

In the case of waste emissions it has been acknowledged that further investigative work is required to define the level and sources of emissions before actions can be proposed or quantified.

Building Emissions Reductions

Building emissions reductions proposed in the Draft Plan are derived from modelling undertaken by a consultant on behalf of council. Building emissions reduction (ACX Argyle (2011), "Background Technical Report and Trend Analysis for City of Port Phillip Greenhouse Action Plan")

Fleet Emissions Reductions

Potential actions as described in the Draft Greenhouse Plan have been identified by relevant council staff and workshopped with staff in Council's Sustainability Department.

Public Lighting Emissions Reductions

Public Lighting emissions reductions described in the Draft Greenhouse Plan have been taken from detailed modelling conducted by consultants to develop Council's Sustainable Public Lighting Strategy. The

IT infrastructure Emissions Reductions

Actions to reduce emissions from Council's IT infrastructure have been identified by relevant council staff and workshopped with staff in Council's Sustainability Department. The actions are based on their detailed knowledge of current IT infrastructure as well as best practice opportunities to reduce energy consumption, and an assumption that council will continue to move toward best practice technology.

Waste Emissions Reductions

Due to a lack of data on how much waste is generated by council and what its composition is, the main action for waste is to begin collecting better data on waste around council, an exercise that will begin in September 2011.