

BOROUGH OF QUEENSCLIFFE

WORKING TOWARDS CARBON NEUTRALITY ACTION PLAN



Corporate Carbon Neutral Action Plan

Prepared by Creative Environment Enterprises Pty Ltd

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Executive Summary

The Borough of Queenscliffe (BoQ) 'Working Towards Carbon Neutrality Action Plan' (CNAP) provides clear leadership to both the local government sector and the Queenscliffe community on a pathway towards a more sustainable future.

This document analyses Council's corporate carbon footprint, presents energy costs and forecasts and determines the most cost effective approach for the achievement of Council objectives of moving towards carbon neutrality for Council by 2013 and for the Borough community by 2020.

For the purpose of this project, the BoQ Carbon Neutral Action Plan Steering Committee defined carbon neutrality as achieved when the net balance of carbon dioxide equivalent emissions for the Queenscliffe Council & Community is equal to zero.

This document constitutes the BoQ Corporate CNAP and is equivalent to the International Council for Local Environment Initiatives (ICLEI) - Local Governments for Sustainability' 'Cities for Climate Protection Program (CCP) corporate Milestone 3 'Greenhouse Action Plan'¹.

There is a separate BoQ Community CNAP that addresses greenhouse gas emissions within the Borough's community.

This Corporate CNAP builds upon and works with existing Council documents and strategies. Strategic objectives outlined in the 'Council Plan – Incorporating the Municipal Public Health Plan (MPHP): 2010 – 13', 'Sustainable Living Action Plan', BoQ Annual Report and 'G21 Regional Plan' interact with the framework and actions outlined in this report.

Direct emissions reductions will be primarily achieved by investment in public lighting service provision improvements along with building upgrades and efficiency improvements. To achieve carbon neutral status the residual emissions will be 'offset' through credible sources and investment in local energy efficiency programs.

¹ Local Governments for Sustainability (ICLEI) is an international association of local governments as well as national and regional local government organizations who have made a commitment to sustainable development. The Cities for Climate Protection Program (CCP) includes Milestone 1- Establish an inventory and forecast of emissions of Council operations, Milestone 2- Set an Emissions Reduction Goal, Milestone 3- Develop and Adopt a local Green House Action Plan to achieve those reductions, Milestone 4- Implement a project under the Greenhouse Action Plan and Milestone 5- monitor and report on greenhouse gas emissions and implementation of actions and measures undertaken.

1. Introduction

1.1 Project Overview

The impacts of climate change are being felt now and are likely to become more severe. The implementation of mitigation programs and actions reduces the cost and effort in adapting to climatic changes and improves future environmental, social, health, and economic outcomes for both Council and the community.

The 'Working Towards Carbon Neutrality Action Plan' is the first step in the Borough of Queenscliffe (BoQ) Council Plan objective of moving towards carbon neutrality for Council by 2013 and for the Borough community by 2020.

In order to reduce exposure to impending changes in climatic conditions, increases in energy costs and enhance business operations and continuity, the BoQ has engaged consultants to develop a Corporate Carbon Neutral Action Plan (CNAP).

The Corporate CNAP analyses Council's corporate carbon footprint, presents energy costs and forecasts and determines the most cost effective approach to working towards being a carbon neutral council.

1.2 Purpose & Objectives

The BoQ appointed Creative Environment Enterprises Pty Ltd (CEE) to deliver an Action Plan for the Council to 'Work Towards Carbon Neutrality' by 2013. The Council seeks to reduce carbon emissions for a variety of reasons including:

- reduce the cost of living,
- minimise the financial impact of any future federally-imposed cost on emissions,
- make efficient use of resources,
- minimise negative impacts on the environment.

This document constitutes the BoQ Corporate CNAP and will be equivalent to the International Council for Local Environment Initiatives (ICLEI) - Local Governments for Sustainability' ²Cities for Climate Protection Program (CCP) corporate Milestone 3 'Greenhouse Action Plan'¹.

In addition to the goals of an ICLEI Milestone 3 'Greenhouse Action Plan', it will specifically address the target of carbon neutrality for corporate activities while showing particular consideration to the size and unique nature of the BoQ.

² Local Governments for Sustainability (ICLEI) is an international association of local governments as well as national and regional local government organizations who have made a commitment to sustainable development. The Cities for Climate Protection Program (CCP) includes Milestone 1- Establish an inventory and forecast of emissions of Council operations, Milestone 2- Set an Emissions Reduction Goal, Milestone 3- Develop and Adopt a local Green House Action Plan to achieve those reductions, Milestone 4- Implement a project under the Greenhouse Action Plan and Milestone 5- monitor and report on greenhouse gas emissions and implementation of actions and measures undertaken.

1.3 Definition of Carbon Neutrality & Implications for this Report

For the purpose of this project, the BoQ Carbon Neutral Action Plan Steering Committee defined carbon neutrality as achieved when the net balance of carbon dioxide equivalent emissions is equal to zero.

This definition is reinforced by the following definition as used by the Australian government in its recent National Carbon Offset Standard:

'Carbon Neutrality' commonly refers to a situation where the net emissions associated with a product or an organisation's activities are equal to zero through the acquisition and retirement of carbon offsets that meet additionality criteria³."

In line with the requirements of the project brief, the corporate Carbon Neutral Action Plan contains the following analysis:

1. Determination of current carbon emissions
2. Determination of annual required reductions
3. Reduction in Emissions: Recommendations for Actions and Possible Emission reductions
4. Monitoring and Reporting
5. Offsetting Options

1.4 Policy Framework

The BoQ has endorsed a number of policies on both a Council and regional level that complement and support the Corporate CNAP. These policies and how they relate to the Corporate CNAP are outlined below:

Council Plan – Incorporating the Municipal Public Health Plan (MPHP): 2010 – 13

The BoQ Council Plan & MPHP states Council's commitment to its key portfolio areas. A key direction being: 'Sustainability & Local Environment: Living sustainably and protecting and restoring our diverse environment'.

The Corporate CNAP and the actions that stem from it are integral to achieving the objectives of this important portfolio area. Additional strategic directions that intersect with this plan in relation to Councils corporate emission producing activities are:

Governance, Finance & External Relations: Providing accountable governance and long-term sustainable financial management.

Planning, Heritage & Community Assets: Striving to ensure development sustains and enhances the character of the natural and built environment.

The MPHP aspect of the Council Plan highlights the importance of a healthy and vibrant community and emphasizes the important role Council plays in ensuring the 'social determinants of health' are addressed in achieving health & wellbeing goals.

3 Australian Government, Department of Climate Change, National Carbon Offset Standard, Canberra, 2010

Climate Change action by Council has the capacity to support the objectives of the MPHP. Efficient and resilient buildings in predicted more extreme climatic conditions will assist the BoQ to offer the community a healthier and safer built environment. Similarly, renewable and distributed energy solutions will ensure service and business continuity and allow the BoQ to maintain service delivery to the community in extreme events.

The Borough of Queenscliffe Annual Report

The Borough of Queenscliffe Annual Report reiterates the directions set out in the Council Plan. In particular the Annual report states that the Borough 2009/10 Business Plan Priority to “progress further stages of the ICLEI program to produce a strategy to move the Council by 2013 and community by 2020 to carbon neutrality⁴”.

Sustainable Living Action Plan

The BoQ is developing a Sustainable Living Action Plan that facilitates community change as central to an emissions reduction strategy.

The ‘Sustainable Living Action Plan’ (SLAP) “focuses on actions that clearly fall within the jurisdictional authority of Local Government and it identifies where the Council and the community of the Borough can through liaison and community consultative and education processes influence government, the neighbouring councils, relevant agencies, and the local community to act in concert to bring about required change⁵”.

“The Plan also recognises and seeks to complement the broadest context of sustainability associated with maintenance of ecosystem structure and function, protection of biodiversity, use of renewable resources, and maintenance of human health and wellbeing, economic and social systems, and cultural and heritage assets⁶”.

Preparing for Climate Change: Climate Change Adaptation Action Plan for Council

Having successfully applied for a grant through the Australian Government's Local Adaptation Pathways Program, Council completed the ‘Preparing for Climate Change in the Borough of Queenscliffe Project’ by undertaking a risk assessment and developing adaptation actions to inform the development of the ‘Climate Change Adaptation Action Plan’ (CCAAP) for Council.

This plan identified that “as a small coastal council surrounded by water on three sides, the Borough of Queenscliffe (‘Council’) has recognised its particular vulnerability to heightened climatic risk factors such as storm surge and sea level rise⁷.”

CCAAP will assist Council to meet the following objectives:

⁴ P.21 – 2009-10 Borough of Queenscliffe Annual Report

⁵ Sustainable Living Action Plan – p.2

⁶ Sustainable Living Action Plan – p.2

⁷ Climate Change Adaptation Action Plan - BoQ

- Identify and prioritize climate change risks posed to Council operations, services and activities
- Identify adaptation actions to improve the resilience of Council
- Identify opportunities to engage with stakeholders and the community on further adaptation efforts.

The CCAAP report identified that the majority of Council's identified climate change risks relate to the following issues:

- Increased maintenance, expertise, repair, replacement and relocation costs, for both built and natural assets
- Loss of amenity
- Inability to satisfactorily deliver services and meet community demands
- Community expectations regarding Council's role in tackling climate change impacts
- Human health and safety hazards
- Financial impacts related to rising utility costs, increased need for Council advice, public liability issues and rate revenues⁸."

This Corporate CNAP will assist the BoQ in mitigating the climate change risks outlined in the BoQ adaptation report. For instance, efficiency activities that improve building performance in extreme weather will lessen the running costs and maintenance of Council facilities and offer a refuge for the BoQ's aging constituents. In this sense, the mitigating and adaptive responses to climate change are mutually beneficial and reinforce the importance of a cohesive and comprehensive approach to sustainable business practice.

G21 Regional Plan

As is stated in the BoQ Council Plan for 2010-2013⁹, BoQ is a committed member of the G21 Geelong Regional Alliance.

Council has clearly stated it will ensure that the four regional priority areas identified in the G21 Health and Wellbeing Strategic Plan 2009 - 2012 are echoed throughout Council's strategic directions, strategies and priority actions. These themes are as follows:

G21 Strategic Direction I Understand populations, planning and impacts of change

G21 Strategic Direction II Connect people, communities and services

G21 Strategic Direction III Build healthy, resilient and innovative communities

G21 Strategic Direction IV Strengthen community infrastructure and service systems

Each of these Strategic Directions relates closely to the implementation of a sound emissions management strategy and reinforces the direction of this Corporate CNAP.

⁸ Climate Change Adaptation Action Plan - BoQ

⁹ BoQ – Council Plan & MPHP – 2010 -2012

Tree Management Plan

Council commissioned a 'Tree Management, Removal and Replacement Strategy for Princess, Citizens and Victoria Parks' in September 2009 to guide the management of the park's trees for the next 10 years. The strategy was undertaken by John Patrick Pty Ltd.

The need for a strategy became apparent as the valuable trees within the parks mature and decline, leading to increasingly more removals with subsequent loss of amenity, heritage and environmental value. Public safety became a matter of increasing urgency, with many incidents and near misses as a result of tree failures.

Council also commissioned a 'Quantified Tree Risk Assessment of selected trees in Princess, Citizens and Victoria Parks' in September 2009 by ArbEcology. This assessment focused on trees that were recommended for removal in the original tree management strategy completed by John Patrick Pty Ltd.

Council established a Vegetation Advisory Group in 2009 comprising Councillors, officers and community representatives to provide advice to Council on tree and vegetation matters.

2. Emissions Scope

Defining the scope of emissions is an important step in understanding responsibility and potential to influence, establishing a baseline and monitoring performance in relation to the achievement of emissions reduction goals.

The BoQ has to date adopted the International Council for Local Environment Initiatives (ICLEI) Cities for Climate Protection (CCP) reporting protocol, a convention shared by many local governments across Australia active on climate change. However, ICLEI is no longer as active with program support for CCP as it has been in years previous. In addition, new Federal Government policies have been developed which provide a firmer framework for greenhouse monitoring that have currency across all industry sectors around Australia.

With this in mind, this action plan adheres to ICLEI reporting protocols as a minimum to maintain continuity with previous BoQ greenhouse programs. In addition, it adheres to the more comprehensive and more widely applicable Federal Government's recent National Greenhouse and Energy Reporting (NGER) Act 2007.

The NGER Act 2007 establishes a convention for defining emissions for corporations required to publically report under the NGER Act and participate in the Carbon Pollution Reduction Scheme (CPRS):

Scope 1 - Emissions released directly at a facility e.g. emissions from a gas furnace, car or generator

Scope 2 - Emissions released offsite due to energy consumption at the facility e.g. emissions from electricity

Scope 3 - Emissions generated in the wider economy as a consequence of the corporation's activities e.g. waste disposal, air travel.

The NGER Act will ultimately require corporations with emissions above 25 kilo tonnes (kt) for a single facility or 50kt overall to publically report on their Scope 1 & 2 emissions annually.

While smaller organisations including the BoQ are currently not required to report under the NGER Act the process sets an important reference for understanding responsibility for

managing carbon emissions in the broader community and economy. It also sets clear guidelines and standards that will allow the good work the BoQ does to be recognized around Australia.

It is recognised that Council plays a leadership role in reducing broader community emissions and as such the following categories have been adopted which allows Council to maintain established commitments under the CCP reporting protocol to align with the NGER Act.

Corporate Emissions

Defined as emissions resulting from Council facilities, sites and operations.

Buildings

Greenhouse emissions resulting from building use of electricity and gas which both result in greenhouse emissions either onsite or related to the production of electricity and gas. Building emissions are considered to be from all properties owned or leased by Council. Only building or facilities which are fully Council owned and operated are included in this Corporate CNAP.

Fleet

Greenhouse emissions result from the use of transport fuels such as petrol, diesel and LPG. Transport emissions are considered to cover all council owned fleet.

Waste

Greenhouse emissions result from the disposal of waste to landfill. Corporate waste emissions are considered to be from all Council owned facilities and exclude waste collected in the community (i.e. residential curbside waste/recycling and caravan parks).

Street Lighting

Council is responsible for funding public lighting across the municipality. Council does not have primary operational control over the asset ¹⁰(NGER Guidelines pg. 16). Therefore, under NGER, Council would not be obliged to incorporate streetlights into its emissions scope.

However, in the ICLEI CCP reporting protocols, street lighting is included in the corporate inventory because Council pays the bills and can exert an influence on how streetlights are maintained and therefore has some capacity to reduce the emissions associated with street lighting provision.

Given that Council has included streetlights in previous inventories and can exert an influence on the emissions associated with this sector, street lighting will be included in the scope of corporate emissions for this report.

Other

Scope 3¹¹ emissions are recognised but not included in present emissions scope or footprint calculation. These emissions are more complicated to calculate and influence and reduce. Scope 3 emissions typically include indirect emissions, like the embodied energy, associated with the purchase and use of goods and services. Scope 3 emissions are recognised as often being significant amounts of pollution, but are difficult to influence and reduce. For this

¹⁰ National Greenhouse and Energy Reporting Guidelines, Dept. of Climate Change

¹¹ National Greenhouse and Energy Reporting Act, Dept. of Climate Change

reason Council can plan towards requesting this information from suppliers, as the first step in measuring these emissions sources. This has been included in Summary of Actions table in Section 6 of this document, but will not be discussed further within this document. As a first step towards total carbon neutrality, Scope 3 emissions will be considered in future Council procurement practices.

3. Methodology

Efficiency, Renewable then Offsets:

In order to achieve carbon neutrality in the most cost effective and credible way, a process of measurement, reductions and offsets will be implemented.

This is in line with the Federal Governments National Carbon Offset Standard¹² (NCOS) standard that states, “for an organisation or product to become carbon neutral, it is generally accepted as best practice that an organisation would:

1. Measure its carbon footprint;
2. Reduce emissions; and
3. Offset any residual emissions¹³.”

“Through this approach a company’s investment in measurement of its carbon footprint can serve multiple goals. When greenhouse gas emissions are measured and reported, they are generally better managed¹⁴.”

This process incorporates the following steps:

Measure

The BoQ must actively measure and monitor emissions based on defined scopes. It includes regularly collecting data for analysis and actively reporting on the data.

Reduce

Direct actions to reduce and avoid emissions are vital in reaching carbon neutrality goals. The implementation of actions reduces emissions and saves money on the expenditure on resources.

Actions to reduce emissions can include retrofits of more efficient appliances and fittings or the switching to low or no carbon energy generation.

Ultimately, emissions reductions activities mean a smaller carbon footprint for BoQ operations, less expenditure on resources and less offsets to be purchased to achieve carbon neutrality.

Offset

¹² <http://www.carbonplanet.com/NCOS>

¹³ p.1 - National Carbon Offset Standard, Department of Climate Change

¹⁴ p.1 - National Carbon Offset Standard, Department of Climate Change

Carbon emissions that cannot be reduced or avoided through efficiency actions or the use of renewable energy can then be offset. Offsetting of emissions is done through the purchase of accredited carbon offsets equal to the value of the carbon footprint of BoQ's operations.

While there is uncertainty as to the future direction of the Federal Government's Carbon Pollution Reduction Scheme (CPRS) and associated carbon costs, by investing in carbon reduction strategies Council is protecting itself against exposure to higher future electricity costs.

Through investment in emission reductions, the BoQ will continue working towards carbon neutrality. In addition, the cost of offsetting will be reduced through a smaller carbon footprint to offset.

4. Council Energy Costs & Carbon Footprint

Energy Costs

Council subscribed to the Planet Footprint scorekeeping service in December 2010. This service monitors Council's consumption, costs and emissions for energy (electricity & gas), streetlights, water, fleet and waste.

Based on the data provided by Planet Footprint, the energy costs from both Council fleet (petrol and gas) and stationary energy or buildings (electricity and gas), has not changed significantly over the last three-year period. Council moved into its newly renovated offices in October 2008, and so data has been analysed for this CNAP from August 2008 when the building was completed.

As presented in Table 1 and Chart 1 below, the expenditure on petrol and diesel has dropped from \$30,000 in the 2008/09 financial year to \$25,000 in the most recent 2010/11 financial year period. Stationary energy (mains gas and electricity) has increased steadily from \$91,000 in 2008/2009 to \$ 94,000 in 2009/2010 financial years to \$97,000 in the 2010/2011 financial year.

Financial Year	2008/2009	2009/2010	2010/2011
Stationary Energy	91	94	97
Transport	30	30	25

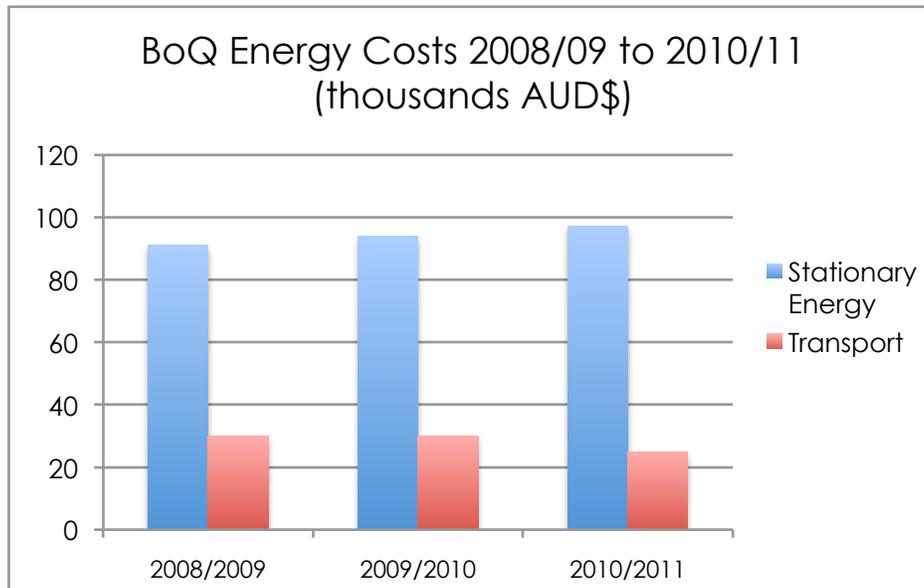


Chart 1. Annual Energy Costs 2008/09 to 2010/2011

Future Energy Pricing Trends

It is certain that energy prices will rise in future. The Australian Energy Market Commission (AEMC) modeling shows that most Australian states and territories face nominal increases of 20-40% for electricity between 2009-2010 and 2012-2013¹⁵. Pricing outcomes and drivers behind the increases are due to network investment expenditure, higher wholesale electricity prices, and government schemes.

The MAV is currently updating calculation on carbon price impacts for local government, by surveying councils for their 2010-11 consumption data, analysing the carbon price impacts and providing a summary report for the sector¹⁶.

Given these impending price rises, the implementation of energy efficiency actions to reduce BoQ energy consumption will reduce expenditure on energy and save money. Money saved on energy efficiency should be reinvested in further activities to achieve carbon neutrality.

¹⁵ <http://www.aemc.gov.au/Media/docs/Information%20sheet-9110c5bf-385f-4ed4-8642-f9569133e97e-0.pdf>

¹⁶ [http://www.mav.asn.au/CA256C320013CB4B/Lookup/latestmavbulletin/\\$file/latestMAVbulletin.html#Link02](http://www.mav.asn.au/CA256C320013CB4B/Lookup/latestmavbulletin/$file/latestMAVbulletin.html#Link02)

Carbon Footprint

The data used to calculate the BoQ's carbon footprint has been gathered from the best available data sources and is presented here to inform planning and activities for the Corporate CNAP. Currently BoQ carbon emissions from Council owned facilities and operations totaled 933 t.CO₂e over the 2010/11 financial year.

In relation to energy use and associated greenhouse gas emissions, the largest single source (90%) of greenhouse gas emissions is from electricity production at 834 tonnes of carbon dioxide equivalent (t.CO₂e). This can be broken down into electricity from buildings (502 t.CO₂e or 54%) and streetlighting which is currently accountable for 332 t.CO₂e or 36% of BoQ total emissions.

After electricity, the second largest source of greenhouse gas emissions is the corporate fleet of vehicles at 55 t.CO₂e or 6% of total annual emissions, followed by the emissions from reticulated natural gas, 38 t.CO₂e (4%), and lastly emissions from corporate waste going to landfill at an estimated 6 t.CO₂e or just 0.7%, which completes the Council's Corporate carbon emissions profile. This information has been presented below in Table 2 and again in Chart 2.

BoQ Annual Carbon Emissions

Table 2. BoQ Annual Carbon Emissions 2010/2011 FY

Source	t.CO ₂ e	Percentage
Electricity (Buildings)	502	54 %
Streetlighting	332	36 %
Mains Gas	38	4 %
Fleet	55	6 %
Waste	6	0.7 %
Total	933	100%

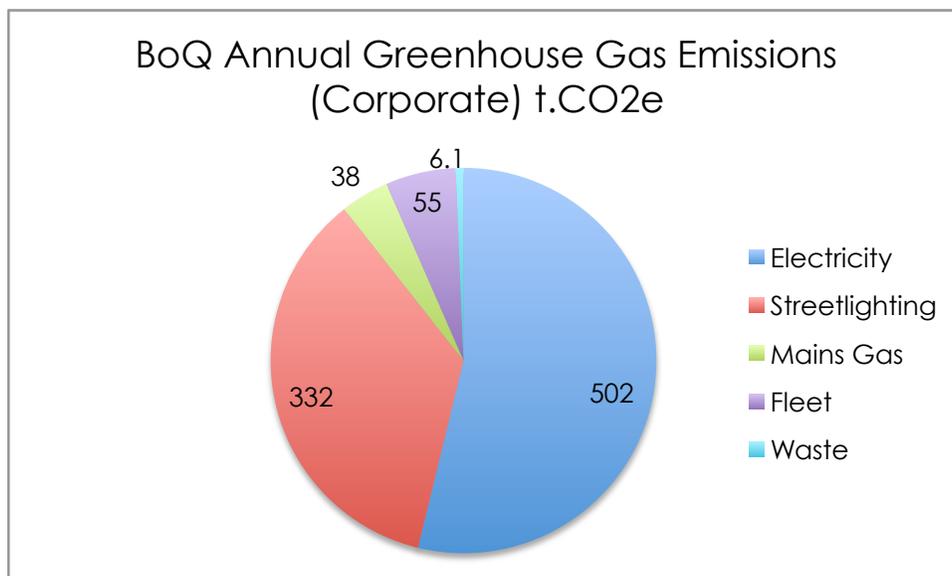


Chart 2. BoQ Annual Corporate Greenhouse Gas Emissions Breakdown (t.CO₂e) FY 2010/11

Electricity

As the largest single source, 834 t.CO₂e or 90% of greenhouse gas emissions, emissions associated with electricity use should be the primary focus for planning and activities to reduce Council's emissions and achieve carbon neutrality.

A breakdown into the types of infrastructure that are the points in which electricity is used at Council has been presented here to inform the direction of the Corporate CNAP.

Council's electricity accounts cover a wide range of 'points of use' and have been grouped here into four categories that relate to the infrastructure type as a basic format to assist analysis. These four electricity account types are:

1. Buildings,

2. Public lighting,
3. Water Pumps and
4. Miscellaneous: this includes electric BBQs, the Bridge street boat ramp, the annual Christmas Tree on Pt. Lonsdale Road and a selection of small Council facilities that do not fit within the main three categories.

Table 3 presents the breakdown between these four 'points of use' categories using the annual number of kilowatt-hour (kWh) units of electricity consumed by each 'point of use' type.

In addition, the carbon emissions associated with the annual kWh consumption are also displayed in t.CO₂e. Finally, each of the four categories is displayed as a basic percentage of the total kWh of electricity consumed. This information is produced in a graphic format in the Chart 3 below.

Table 3. BoQ Electricity and Carbon Emission Breakdown 2010/11 FY

Point of Use	kWh	t.CO ₂ e	percentage
Public Lighting	242,023	332	40 %
Buildings	343,500	471	56 %
Water pumps	10,151	14	2 %
Miscellaneous	13,052	18	2 %
Total	608,725	834	100

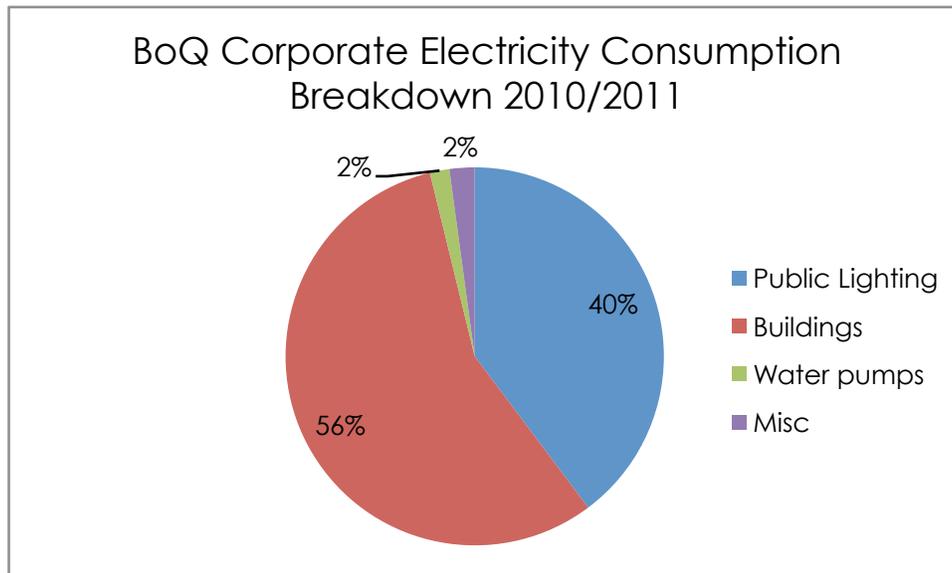


Chart 3. BoQ Breakdown of Annual (Corporate) Electricity Consumption (2010/11 FY)

5. Action

Introduction

Chapter 5, 'Action' summarises information relevant to each corporate emissions sector as identified in Chapter 2 'Emissions Scope' (these being Buildings, Fleet, Waste, Transport & Streetlights).

It contains the following information on each Corporate Emissions Sector:

1. Context

Broad information on the corporate emissions sector and how it relates to the Borough's corporate emissions scope.

2. Data Summary

A summary of corporate emissions data and related information.

3. Current Activity

Implemented or planned actions to reduce emissions.

4. Measure

Recommendations and considerations for further measurement and monitoring of data relevant to that sector.

5. Reduce

Policies, actions and examples of projects that will reduce emissions in that sector.

5.1 Buildings

Context

The small seaside villages of Queenscliff and Point Lonsdale on the Bellarine Peninsula form the Borough of Queenscliffe, which is the smallest local government area in Victoria, covering 10.83 square kilometres.

The BoQ is unusual in local government in that it only has a small number of major buildings it owns and operates. Council also operates four caravan parks, which have also been analysed under the Major Buildings section of the corporate action plan.

Sites included in the Corporate CNAP include:

Major Buildings	Address
Town Hall & Civic Offices	48-50 Learmonth Street, Queenscliff
Library & Visitor Information Centre	57 Hesse Street, Queenscliff
Monahan Centre Sports Complex	Hesse Street, Queenscliff
Queenscliff Recreation Reserve office/residence	Hesse Street, Queenscliff
Golightly Caravan Park	Bowen Road, Point Lonsdale
Victoria Park Caravan Park	Mercer Street, Queenscliff
Royal Park Caravan Park	Point Lonsdale
Queenscliffe Recreation Reserve Caravan Park & Sportsground	Mercer Street, Queenscliff

There are seven other facilities in the BoQ that are Council-owned, but which are operated and funded by community organisations. These include Neighbourhood House, Maritime Museum, Senior Citizens Centre, Music Festival House, Sea Scouts Clubrooms, Tennis Clubrooms, Kindergarten). Only buildings that are owned and fully operated by Council will be included in this Corporate CNAP.

The small number of buildings is significant in terms of planning for energy efficiency and carbon neutrality because it means activities can be focused on the small number of large facilities that are the largest contributions to the BoQ carbon emissions profile.

There are also a number of smaller miscellaneous facilities operated by the Borough. Given this, 'Major Buildings' and 'Miscellaneous Facilities' (such as BBQ's, boat ramps & water pumps) are addressed separately in this report to better focus emissions reduction activities that are applicable to facilities that share similar characteristics.

It is worth noting that the top 8 facilities are consuming 92% of the annual electricity consumed in facilities other than streetlights, which equates to approximately 55% of the total annual greenhouse gas emissions for Council owned and operated infrastructure. The breakdown across all Council facilities and buildings, in terms of electricity consumption and carbon emissions is captured below in Table 4. Here we can clearly see the breakdown in electricity consumption between each electricity meter or account which the Council is responsible for.

Of the buildings listed below in Table 4, the highest consumer of electricity is the Victoria Caravan Park that consumed 98,435 kWh in the 2010/11 financial year. The second highest consumer was the Town Hall and Council Civic Offices. This complex consumed 80,687 kWh in the 2010/11 financial year. The third highest consumer of electricity was the Royal Caravan Park in Point Lonsdale (58,332 kWh).

Table 4. BoQ Total Annual Electricity and Carbon Emissions (all accounts) 2010/11

Facility	Annual Total kWh	t.CO ₂ e
Victoria Park Caravan Park	98,435	134,855
Town Hall / Council Offices	80,687	110,541
Royal Park Caravan Park	58,332	79,914
Golightly Caravan Park	37,705	51,656
Queenscliff Recreation Reserve Caravan Park	24,860	34,058
Library & Visitor Information Centre	23,840	32,660
Queenscliff Recreation Reserve Office/Residence	14,387	19,710
Point Lonsdale Rd Xmas Tree	5,295	7,254
Monahan Centre Sports Complex	4,585	6,282
Bridge Street Boat Ramp	4,059	5,561
Water Pump Near Creek - Bay Street	2,931	4,015
Water Pump, Nelson Road	2,540	3,480
Water Pump, Bedggood Ave	2,286	3,132
Waiting Shed Pier, Weeroona Pde	2,032	2,784
BBQ, Gellibrand St	1,213	1,661
Water Pump Rayleigh Ave	886	1,213
Gellibrand Street, Citizens Park Toilet	670	917
Water Pump, Simpson Street	485	664
Point Lonsdale Rd BBQ	453	621
Water Pump, 24 Roddick Grove	308	422
Water Pump, Ocean Road	299	410
Water Pump, Elliot Court	90	123
Water Pump, Downton Cres	79	109
Water Pump, Lindors Cls	60	82
Water Pump, 43 Roddick Grove	55	76
Water Pump, 8L Cygnet Ct	55	76

Water Pump, Queenspoint Cres	44	60
Water Pump, Rayleigh Ave	32	44
Total	366,702	502,382

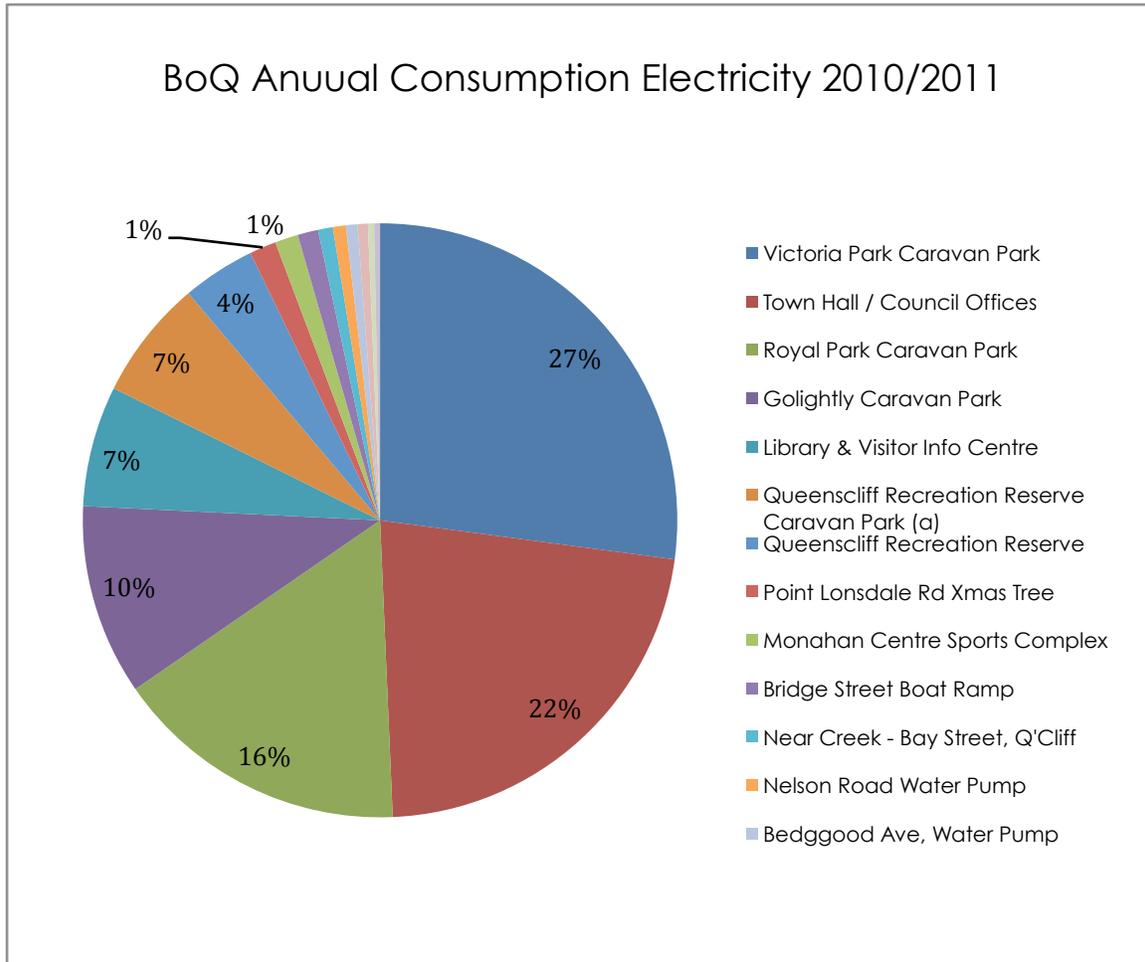


Chart 4. BoQ Annual Total Electricity Consumption in Buildings and Miscellaneous Facilities (not including Streetlighting) 2010/11 FY

Victoria Caravan Park

The largest single site in terms of mains electricity consumption is Victoria Park Caravan Park in Queenscliff. This seasonal park is open from the last weekend in November until May 1 and covers approximately 1.7ha. It has capacity for 110 casual sites, plus 14 annual permit holders.

The site is a large and complex site including numerous facilities, small buildings and facilities that are serviced by two individually metering electricity supplies that have been combined here for the purposes of this analysis.

In overall terms, the total consumption has grown a small amount from the 2008/09 financial year to the 2010/11, but dipped a little during the 2009/10 financial year. This is clear shown in Chart 5a.

Consumption for this site has not varied considerably in onsite electricity use over the 2008/09 to 2010/11 financial years. It is interesting to note that the winter quiet periods have stayed very constant at approximately 15,000 kWh per quarter. The summer peak period has dropped slightly over the last three years, but is also relatively consistent as the highest period of electricity consumption which can be safe to assume is the highest period of activity during the Christmas summer holiday season.

Interestingly the 'shoulder periods' of spring and autumn have varied the most over the same period. During the 2009/10 FY the spring period of 2009 was considerably higher than the 2008/09 and 2010/11 period of the same time. Conversely the following autumn period of 2010, presumably covering the Easter holiday break was significantly lower than the other years, which is clearly illustrated in Chart 5c

Whether this change in electricity consumption is due to a change in the utilisation of the site is not fully understood at this stage. Like other municipal caravan parks and recreation reserves in regional Victoria the distribution of electricity is complicated and has evolved over a considerable time. Due to the size and complexity of the site it is not fully understood at the time of writing which facilities and services are connected to which electrical meter.

A Level 2 Energy Audit needs to be undertaken to fully understand the energy consumption profile and times of use across this site.

The quarterly electricity consumption at the Victoria Caravan Park has been presented here in Table 5 and Chart 5a, 5b and 5c below.

Table 5. Victoria Caravan Park Electricity Consumption (kWh)

	2008/09	2009/10	2010/11
Jul - Sep	15,579	15,729	15,845
Oct - Dec	19,863	25,787	23,492
Jan - Mar	37,347	36,139	34,692
Apr - Jun	27,435	19,049	24,406
Total	100,225	96,704	98,435

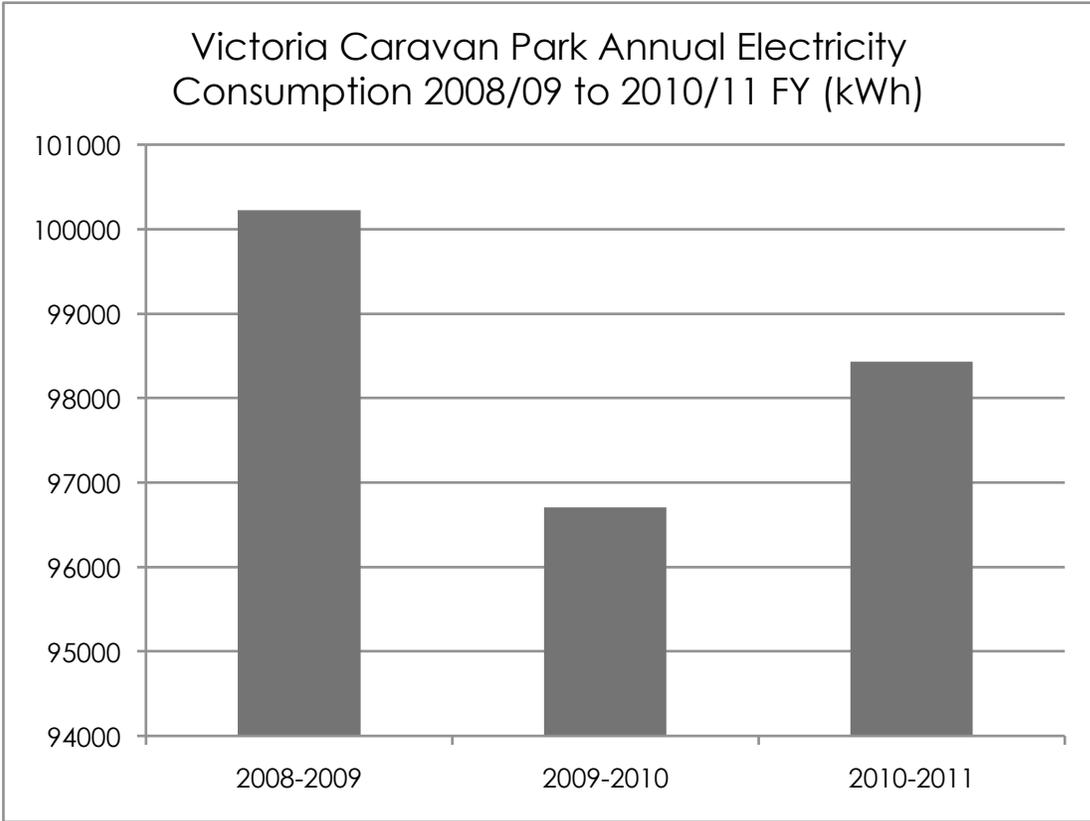


Chart 5a Victoria Caravan Park Annual Electricity Consumption 2008/09-2010/11 FY (kWh)

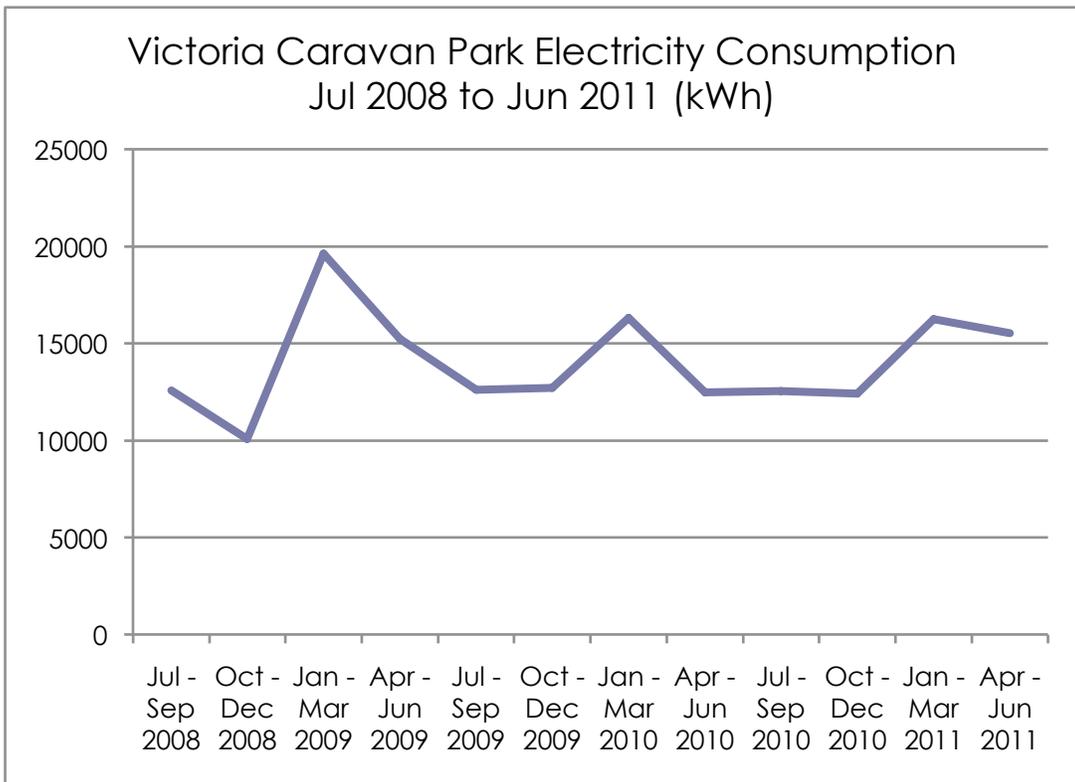


Chart 5b. Victoria Caravan Park Electricity Consumption July 2008-June 2011 (kWh)

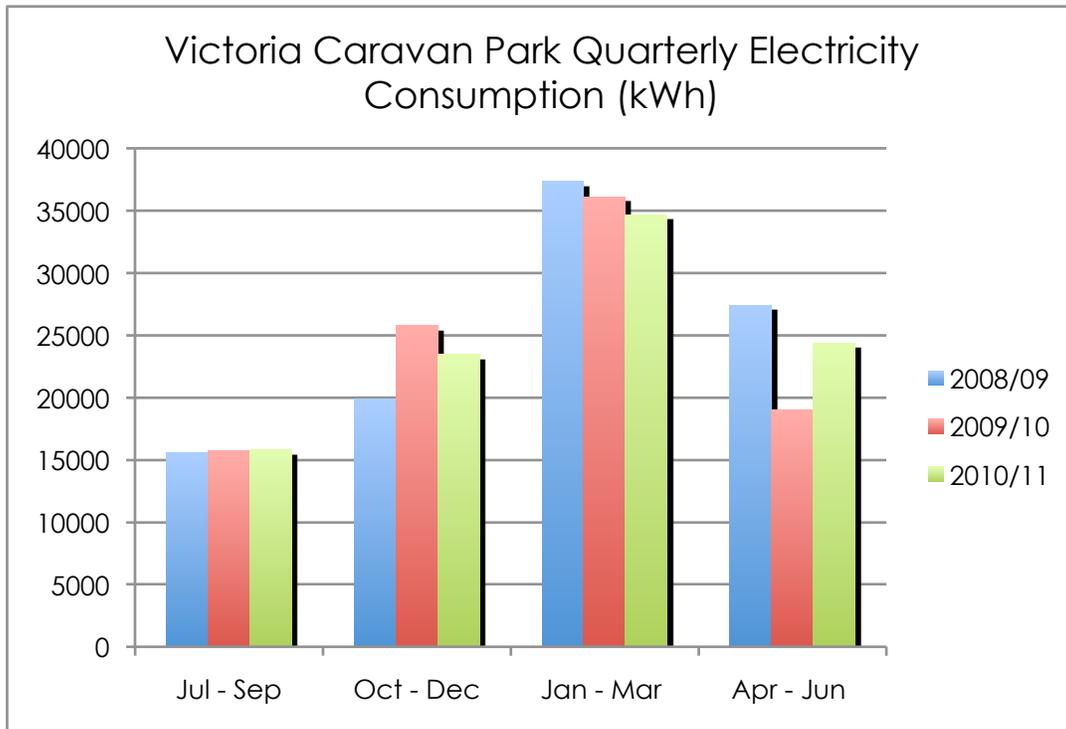


Chart 5c. Victoria Caravan Park Quarterly Electricity Consumption (kWh)

The Town Hall and Council Civic Office

The Town Hall and Council Office is the second largest site of electricity consumption in the BoQ Corporate Carbon Footprint. As is evidenced in Table 6 and the accompanying Charts 6a, 6b and 6c, electricity consumption has been fluctuating considerably over the three-year period between 2008/09 financial year and 2010/11. Both the most recent 2010/11 and 2009/10 years are considerably higher (approximately 30% higher) than the first year 2008/09, since the major renovations were completed.

Table 6. Town Hall and Council Offices Electricity Consumption (kWh)

	2008/09	2009/10	2010/11
Jul - Sep (Q1)	15,784	19,245	16,487
Oct - Dec (Q2)	16,730	22,682	19,706
Jan - Mar (Q3)	13,968	21,130	25,395
Apr - Jun (Q4)	11,158	19,486	19,099
Total	57,640	82,542	80,687

It should be noted that the Town Hall and Council Offices consumption figures are combined but they cover two very different building types. The Town Hall is constructed of traditional building materials, is of considerable historical significance, and currently does not have any energy efficient systems in place. By contrast the Council Offices are recently renovated, modern commercial premises with leading energy efficient technologies in place. It has been observed that there has been a major increase in usage after hours in the past couple of years with community reference groups and committees utilising the Town Hall in particular. It is likely that this is the reason behind the overall 30% increase from the first year of opening in 2008/09, although this is not completely clear at this current time.

It is important to note that although the winter period (Q1 Jun-Sep) has increased considerably, possibly driven by increased use of after-hours heating, the summer and autumn periods (Q3 Jan-Mar and Q4 Apr-Jun) decreased significantly from the 2009/10 to the 2010/11 financial years. This is clearly shown below in Chart 6c.

A detailed Level 2 Energy Audit should be undertaken of the Town Hall and Council Office as part of an ongoing energy efficiency and monitoring project to better understand where and how electricity is being used within the site, and what the most appropriate means are for improving efficiency, given the complex usage patterns, different technologies and building materials, and the significant historical and architectural heritage of the Town Hall.

It is recognised that a number of energy efficient systems and features have been incorporated in the new Council facilities and these have been recognised in this report, in conjunction with other initiatives listed below. A thorough Energy Audit and continuing monitoring can support these investments, by maximising the potential of technical commissioning.

Table 6 (above) and accompanying Chart 6a, 6b and 6c below, present the electricity consumption at the Town Hall and Council Offices for the financial years between July 2008 and Jun 2011.

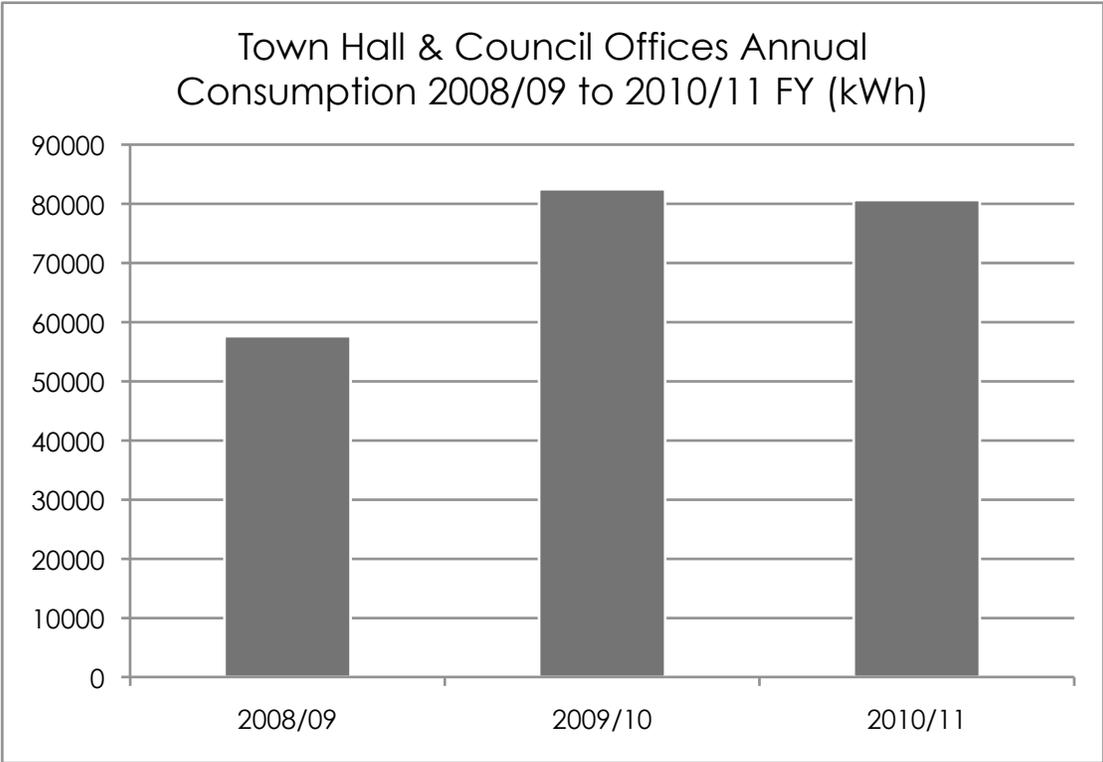


Chart 6a. Town Hall & Council Offices Annual Electricity Consumption 2008/09-2010/11 FY (kWh)

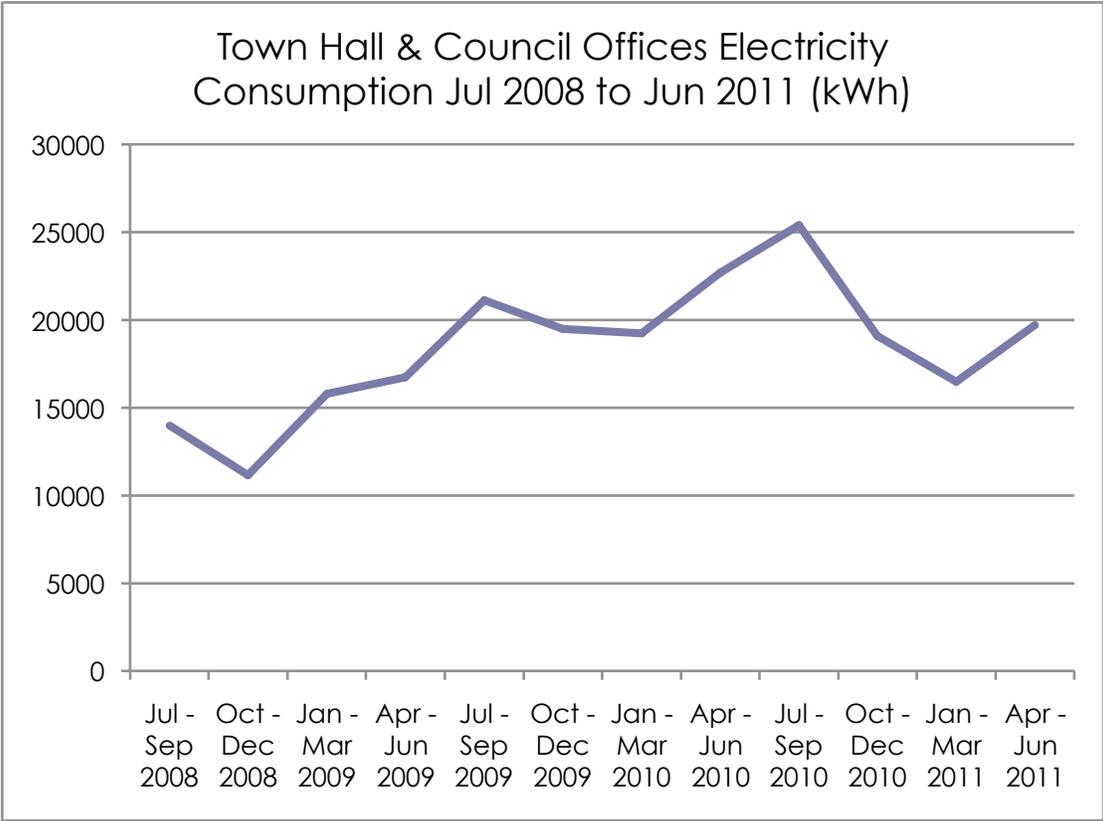


Chart 6b. Town Hall & Council Offices Electricity Consumption July 2008-June 2011 (kWh)

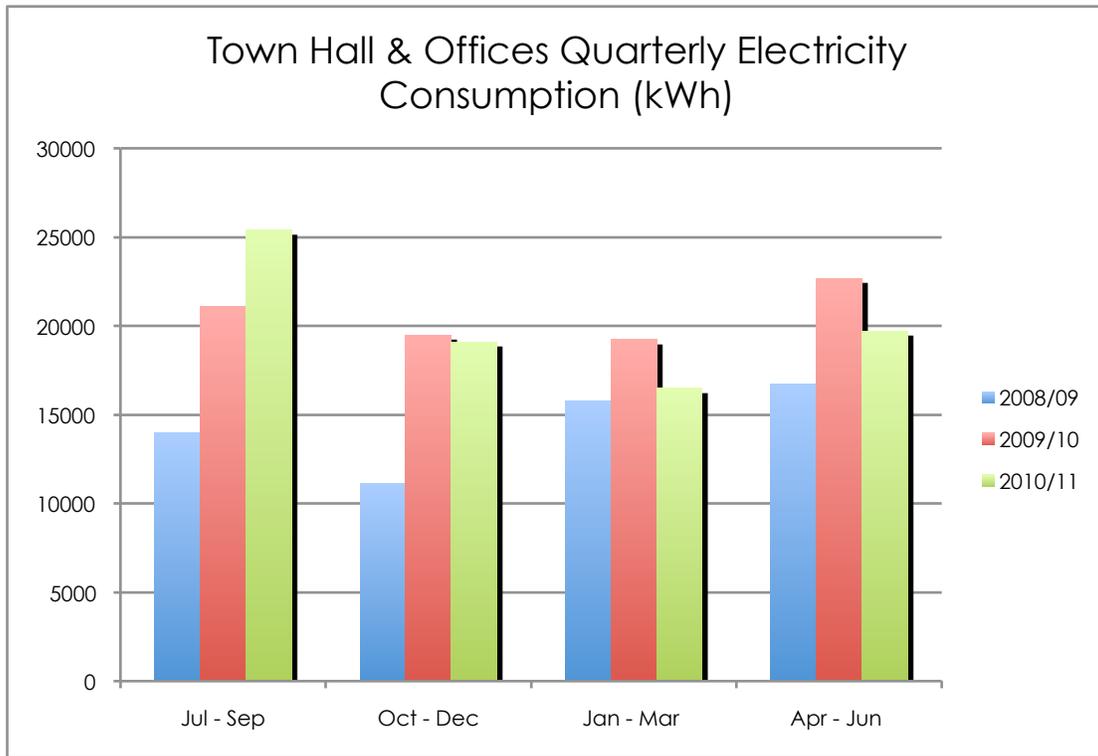


Chart 6c. Town Hall & Council Offices Quarterly Electricity Consumption (kWh)

Royal Caravan Park, Point Lonsdale

The third largest site in terms of mains electricity consumption is Royal Caravan Park in Point Lonsdale. This seasonal park is open from the last weekend in November until May 1 and covers approximately 2.8ha. It has 98 sites and features two amenities blocks, a barbecue shelter, and transportable caretaker office. The park is used as public open space throughout the winter months.

In overall terms, the total consumption has grown a small amount from the 2008/09 financial year to the 2010/11, but dipped a little during the 2009/10 financial year. This is clear shown in Chart 7a.

Consumption for this site has not varied considerably in onsite electricity use over the 2008/09 to 2010/11 financial years. It is interesting to note that the winter quiet periods has increased steadily in small increments, as has the summer peak holiday season, which is clearly illustrated in Chart 7c. The two 'shoulder seasons' of spring and autumn have however fluctuated in a similar pattern.

Whether this change in electricity consumption is due to a change in the utilisation of the site is not fully understood at this stage.

A Level 2 Energy Audit needs to be undertaken to fully understand the energy consumption profile and times of use across this site.

The quarterly electricity consumption at the Royal Park Caravan Park has been presented here in Table 7 and Charts 7a, 7b and 7c below.

Table 7 Royal Park Caravan Park Electricity Consumption

	2008/09	2009/10	2010/11
Jul – Sep (Q1)	3,099	3,320	3,443
Oct – Dec (Q2)	11,775	9,782	9,988
Jan – Mar (Q3)	27,901	31,729	32,646
Apr – Jun (Q4)	12,046	9,668	12,255
Total	54,821	54,500	58,332

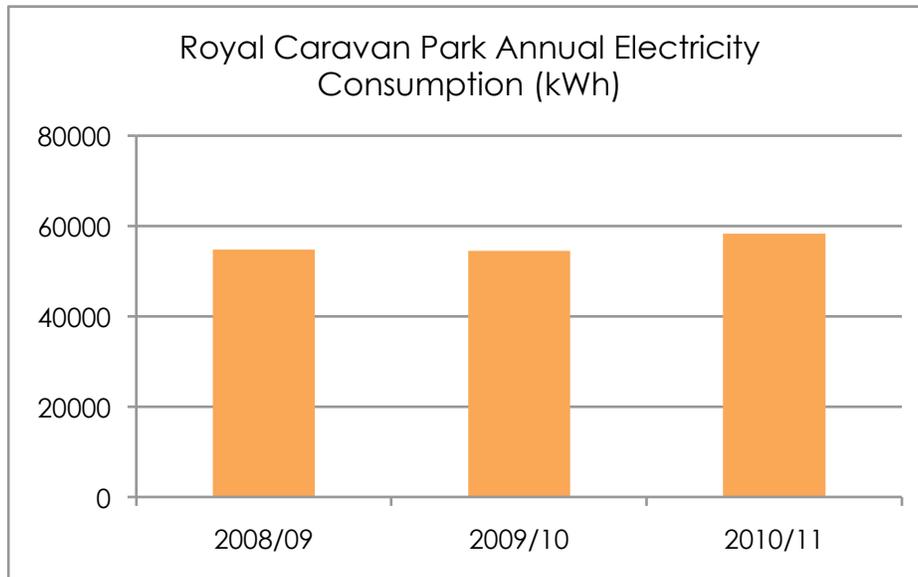


Chart 7a. Royal Caravan Park Annual Electricity Consumption 2008/09-2010/11 (kWh)

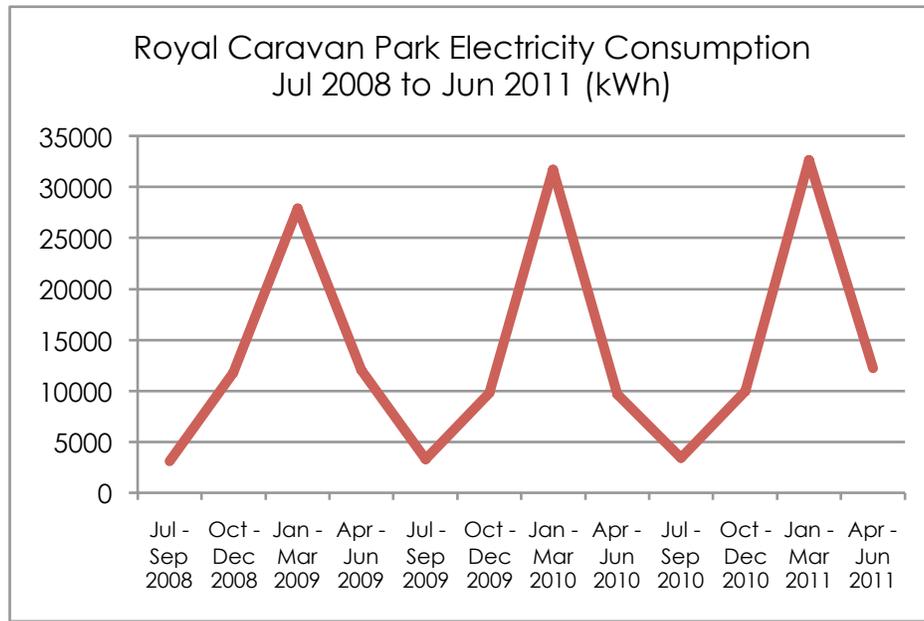


Chart 7b. Royal Caravan Park Electricity Consumption July 2008-June 2011 (kWh)

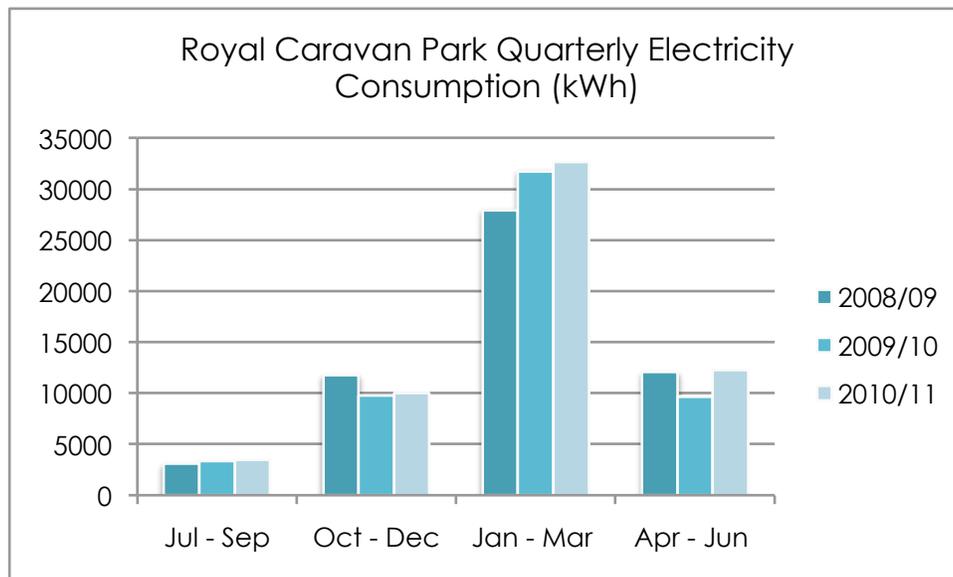


Chart 7c. Royal Caravan Park Quarterly Electricity Consumption (kWh)

Mains Gas

The consumption of mains gas is a much smaller percentage of the BoQ's overall carbon emissions profile, at just 4% of the total emissions. The single largest site in terms of consumption of mains natural gas is the Victoria Park Caravan Park, which consumed 175,045 MJ during the 2010/2011 financial year. The Sports Club Showers, located on Flinders Street are the second highest consumer of reticulated natural gas, followed by the Caravan Parks.

Table 8. Breakdown of Annual Gas Consumption (GJ/p.a) January – December 2010

Facility Description	Address	Usage	GJ/pa
Victoria Park Caravan Park	Mercer Street, Queenscliff	Hot Water	175
Sports Club Showers	Flinders Street, Queenscliff	Hot Water	109
Sports Club Away Rooms	Flinders Street, Queenscliff	Hot Water	59
Council Offices and Town Hall	50 Learmonth Street, Queenscliff	Town Hall – Heating Council Offices – Kitchen	56
Point Lonsdale Road Barbecue	Point Lonsdale Road	Barbecue	56
Golightly Caravan Park	Bowen Road, Point Lonsdale	Hot Water	55
Royal Park Caravan Park, Library	Pt Lonsdale Rd, Point Lonsdale	Hot Water/Clothes Dryers	51
	55 Hesse Street, Queenscliff	Hot water	37
Public Toilets, King St	King Street, Queenscliff	Hot Water	31
Princess Park Pavilion	Gellibrand Street, Queenscliff	Hot water/Cooktop	22
Ocean View Kiosk	140 Hesse Street, Queenscliff	Stovetop	22
Boat Ramp	Bridge Street, Queenscliff	Hot Water	14
Total Mains Gas			687

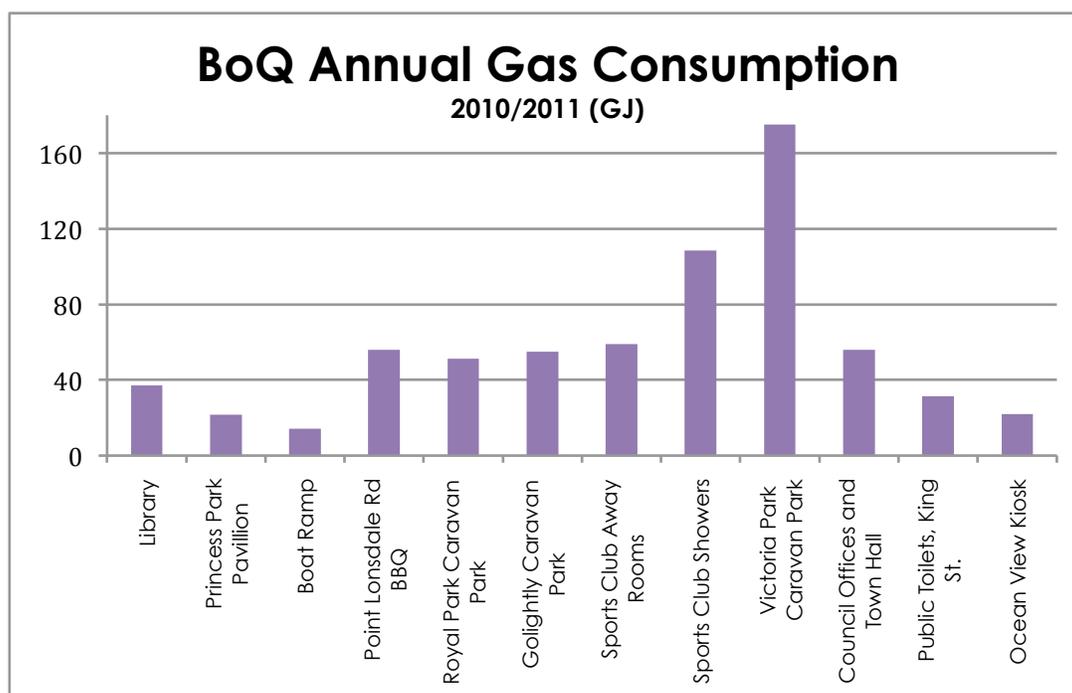


Chart 8. Annual Mains Gas Consumption at Sites Across BoQ 2010/2011 (GJ)

Current Activity

- The construction of the new Civic Offices in 2008 incorporated sustainable building design and practices. However, it is possible that new equipment and/or an increase in office activity have led to the overall increase in emissions over the three-year period since the building was completed in October 2008. These alterations to building use over the period may have undermined some of the initial design features of the building. Given this, the building's operational protocols and system may need to be reassessed in order to maximize building performance.

- The current Asset Management plan and proposed works for the Town Hall, Offices and all other Council facilities and public spaces needs to be closely analysed, to look for opportunities to include sustainability measures within the existing schedule of any changes to these buildings and facilities. This assessment needs to occur in order to identify future works and ensure that all appropriate sustainability measures are included in any proposed works. In anticipation of the endorsement and adherence of Council to efficient building standards, the early planning stages of works must be inclusive of sustainability objectives.
 - Consultation needs to occur with all relevant stakeholders for proposed new works and buildings to identify priorities for the performance and design of new spaces and buildings.
 - Specifications for passive design and resource efficiency need to be included in any tenders and specifications for associated works.
 - Consideration must be given to the predicted changes in climatic conditions the BoQ is set to face (see 'Preparing for Climate Change: Climate Change Adaptation Action Plan for Council' report) to ensure Council community buildings and public space adequately cater for the community health and comfort requirements in the decades to come.
 - The lifetime cost of building design and fittings also needs consideration so that the long-term business viability of the Borough is not compromised due to costs associated with resource intensive inefficient building design.

A Level 2 Energy Audit looking at specific energy efficiency opportunities also needs to be undertaken. Under the AS3598, a Level 2 Audit includes the detailed investigation of energy efficiency opportunities. A Level 2 Energy Audit includes and moves beyond architectural and structural features to look at how energy efficiency can be implemented through a 'systems approach' that looks at operational, physical and electro-mechanical elements. A Level 2 Audit report can also be used to investigate the initial feasibility of onsite solar photovoltaic (PV) generation.

Energy and water saving measures already in place at Council offices in 50 Learmonth Street, Queenscliff include:

- Double glazed windows
- Energy efficient lighting with motion sensors throughout office
- CBUS building management system operates exterior lights controlled by photo electric switch
- Ceiling insulation: R1.5 ceiling blanket plus R2.5 batt insulation
- Heat exchange unit installed on roof of Council offices
- Wall insulation: aluminium foil
- Computer stand by after 20 minutes
- Run out timers on air conditioners
- Solar hot water with electric booster supplying kitchen & toilets
- 10,000 litre underground water tank for use in toilets and garden beds
- Drip systems in all gardens surrounding council offices

Council has also established a 'Green Team' comprising three council staff members who meet quarterly to implement and review sustainable actions.

A sustainable procurement strategy also forms part of Council's Sustainable Living Action Plan adopted by Council in August 2010.

Other actions include recycling of all suitable paper & packaging from the Council offices, while organic waste from the Council office is composted.

Measure

The electricity and mains gas consumption information is currently being tracked by Planet Footprint.

This service is of considerable value to BoQ, however it needs continuing monitoring and updating of accounts by BoQ staff, if the full value of this service is to be utilised and accurate and up to date information can be reported to Council on a regular basis.

Electrical sub-metering of some larger or complex sites, like the Town Hall and Victoria Park Caravan Park might also be useful in order to gain a more detailed set of energy consumption data. It should be noted that a major upgrade to the electricity supply to the Queenscliff Recreation Reserve is expected to be completed by 2013/14. This will include consolidating to a single point of supply to the Queenscliff Recreation Reserve Caravan Park, the park's office & residence, and the Monahan Centre.

Reduce

Although there has been significant actions already implemented to date within the Council Offices particularly (see previous section *Current Activity*), given the current electricity consumption profile over the last three years it is likely that there are considerable efficiency gains to be made across other Council owned buildings. Energy efficiency goes beyond good building design and choice of equipment, it is important that systems are being used properly across all Council owned buildings and facilities. These gains could be made in both the Town Hall and Council Offices as well as in the caravan parks and sporting/recreational facilities. Water pumps should be included in an energy efficiency analysis as the pumps may also yield some energy reductions, depending on their type, age and utilisation requirements.

The industry standard for basic energy efficiency improvement in similar buildings is an improvement of 10% to 30% across all buildings. This would typically include the implementation of the following basic energy efficiency actions:

- Installation of energy efficient lighting across all buildings
 - T5 fluoro and LED lighting with sensor/timer controls
- Replacement of all electric hot water systems with solar or heat-pumps
- Replacement of all inefficient white goods and office equipment
 - Photocopiers, refrigeration, IT systems, tea/coffee boilers
- Automation and control of building Heating Ventilation and Air Conditioning (HVAC) system optimised for efficiency
 - Building Management Systems and sensors throughout all facilities
- Some improvement to building thermal shell
 - Blocking draughts, window treatments, insulation and external shading, etc.

Policy & Planning

To ensure that energy efficiency is maintained as a guiding principle for all Council owned and operated buildings, it is necessary that all new buildings are designed and constructed with energy efficiency in mind. The industry standard tool for ensuring energy efficiency principles in new buildings is the Green Building Council of Australia's Green Star methodology. It is therefore important to specify that all new buildings meet a Five Star Green Star standard as minimum level.

Renewable Energy

In addition to the basic energy efficiency actions, further emissions reductions of 30% to 100% are possible only with advanced efficiency measures, and typically, the purchase of Green Power or the installation of on-site renewable energy generation. Green Power purchased from 100% accredited renewable energy exists as one of the simplest and effective actions BoQ can take to reduce emissions immediately.

It is recognised that Council has been purchasing 100% Green Power for its caravan parks and camping sites since July 2011. It is worth investigating that Council extend that to the remaining facilities, given appropriate analysis, planning and budgeting. Green Power is often regarded as a simple and effective way to reduce carbon emissions, which warrants the investigation providing 100% Green Power to all Council electrical accounts.

Renewable energy generation also exists as a medium-term action to reduce emissions and possibly retain investment within the BoQ. Although Green Power is simple and effective, it does effectively see Council investment in renewable energy generation systems outside the municipality. A detailed feasibility study needs to take place to accurately cost and scope potential systems however technologies typically considered are:

- Solar photovoltaic (PV)
 - A grid connected solar PV array for the Town Hall and Council Offices site
 - Other smaller solar PV arrays, sports clubs, rec areas, etc.
- Solar thermal
 - Solar hot water systems could be considered for all sites
- Micro-wind
 - Possibly suitable for caravan parks or recreational reserves.
- Geothermal and tidal/wave
 - For larger sites such as the Town Hall or Victoria Caravan Park

Actions in Buildings

The actions below summarise the most cost effective way to reduce carbon emissions in Council owned buildings and facilities:

- Conduct Level 2 Energy Audit on the Town Hall, Council offices and four Council-operated caravan parks
- Implement prioritised energy efficiency opportunities identified during energy audits

- Purchase 100% Green Power for all remaining Council Buildings and facilities
- Implement a policy for all new Council buildings to meet the highest possible Green Star standard, or equivalent at the time
- Investigate renewable energy options for Council facilities
- Identify funding opportunities to progress renewable energy generation options
- Implement emissions reductions activities within the Borough to offset waste and mains gas emissions.

5.2 Streetlights

Context

Public lighting is a significant cost and energy consumer for the local government sector across Victoria. On average, if Councils did not purchase Green Power or offset emissions in other ways, the emissions from Public Lighting would represent around 40% of total Council corporate greenhouse gas emissions¹⁷. As is evidenced in Section 4 of this report (Table 2 and Chart 2) in Council's emission profile, the BoQ is no different with street lighting accounting for around 40% of all Council emissions.

Although the BoQ does not actively maintain streetlights, Council pays an Operation, Maintenance & Repair (OMR) fee on a per light basis to the energy Distribution Business (DB) to operate and maintain the service on Council's behalf. In addition to the OMR charge, Council pays for the electricity each light consumes.

As discussed in Chapter 2, (Emissions Scope) given that streetlights are operated and maintained externally to the Borough, under the terms of NCOS, responsibility for the emissions associated for the street lighting sector could be excluded from the BoQ's footprint. However, given the previous ICLEI protocol of including lighting within scope and the fact that the Borough can influence the carbon intensity of the lighting sectors emissions, street lighting is included in the BoQ's emissions scope.

The Table 9 and accompanying Chart 9 below shows the quarterly energy consumption for streetlights in the BoQ. Higher consumption in the winter months is shown when there is less daylight and the lights are on for longer.

Table 9. Electricity consumption in streetlights (kWh) 2010/11 FY

<i>Month</i>	<i>kWh</i>
Jul-Sep	68,058
Oct-Dec	51,331
Jan-Mar	52,869
Apr-Jun	69,765
Total	242,023

¹⁷ 17 p. 2–17 p. 11 - NAGA – Sustainable Public Lighting Action Plan NAGA – Sustainable Public Lighting Action Plan

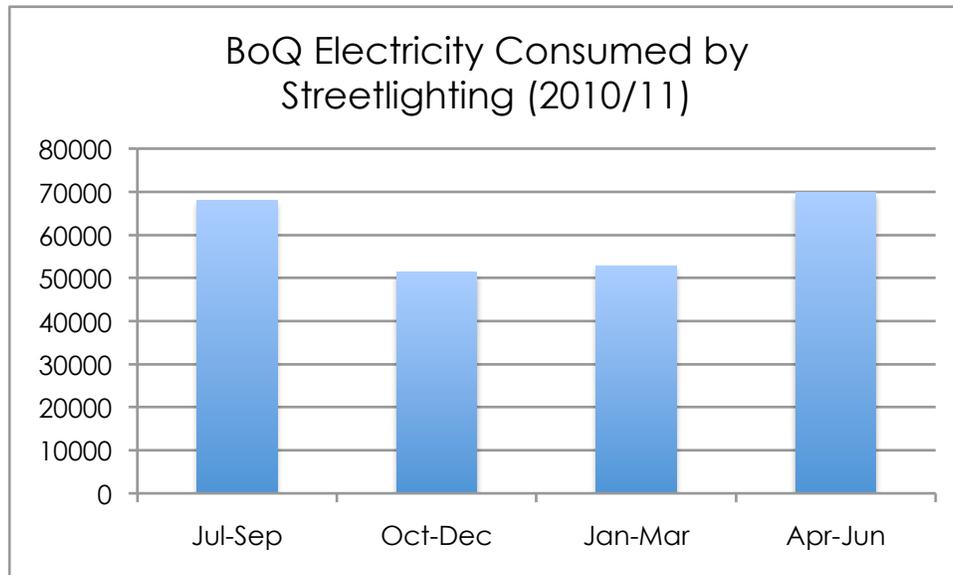


Chart 9. BoQ Total Electricity Consumed by Streetlighting (Quarterly 2010/11 FY)

Street lighting Types in the Borough

The main street lighting types in the BoQ are the 80 Watt (W) mercury vapour (MV) and the 150W and 250W high pressure sodium (HPS). The BoQ, like most Australian councils, has a large population of 80W MV lights totaling 366, which equates to around 82% of total lights within the municipality.

Table 10. Breakdown of street lighting by type

Lighting Type	Mercury Vapour	High Pressure Sodium	High Pressure Sodium				
Wattage	125W	250W	400W	50W	80W	150W	250W
Number	11	1	0	2	366	40	29

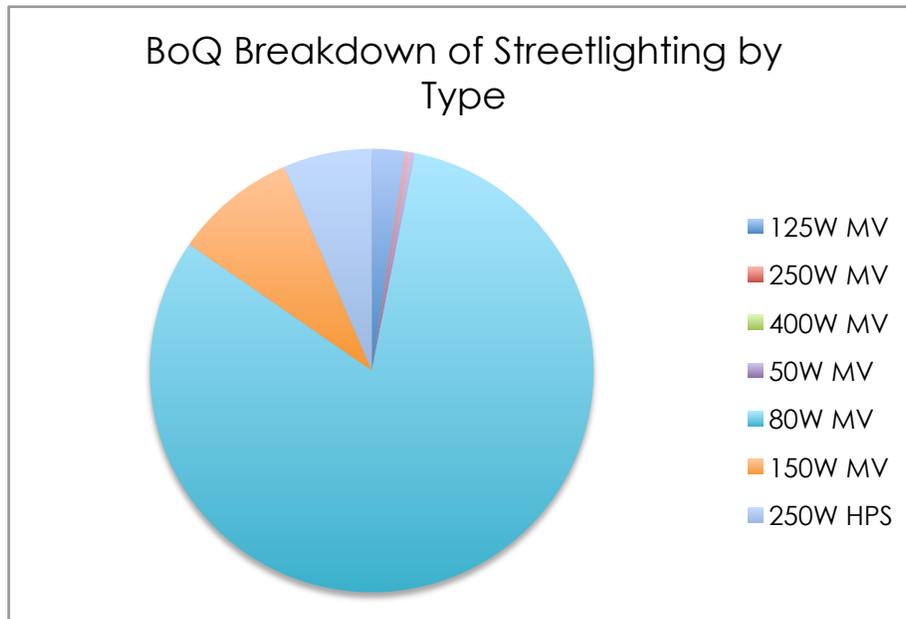


Chart 10. BoQ Breakdown of Streetlighting by Type

Measure

The data these calculations are based upon information received by BoQ in September 2011. Although street lighting data and numbers do not change markedly from year to year, this needs to be closely managed and recorded and keep up to date on a regular basis.

Reduce

80 W MV Bulk Changeover

80 watt MVs, consume 96 watts when you include the additional 16 watts for control gear (totaling 96 watts) in the estimate of its energy load. Twin 14 watt Triphosphor Fluorescent streetlights, or 'T5' for short, produce comparable light output to the MV, but at only 31 watts, which makes the T5 about 70% more energy-efficient¹⁸.

T5's have been accepted by energy distribution businesses (DB's) as a legitimate alternative to MVs and (after much lobbying and hard work by Council representative bodies such as the Northern Alliance for Greenhouse Action) are approved on the state lighting table.

A bulk changeover of streetlights from 80 W MV to energy efficient T5's will most likely reduce Councils overall emissions by over 10% and will save thousands of dollars annually in OMR costs and energy consumption.

For bulk changeovers of 80W MV, the most opportune time is to integrate the changeover with the existing distribution business maintenance regime. Currently, energy DB's are legally required to change streetlight globes every 4 years with the globe and PE¹⁹ cell changed

¹⁸ <http://www.banyule.vic.gov.au/Page.aspx?ID=286>

¹⁹ PE cell is calibrated to turn lights on once the illumination level drops below a certain lux (ie sunset) and to switch off when light levels increase above a certain lux (ie sunrise).
<http://www.iclei.org/index.php?id=6627>

every 8 years. By changing the whole light fixture at this time it is possible to leverage contributing funding from the distribution businesses because of the savings from not having to replace the globes or PE cells.

The bulk changeover of streetlighting across the BoQ in 2010 presented the best opportunity for the introduction of energy efficient lighting. During this time, the value of the lamps being replaced is at its lowest and Council avoids any additional charges from the distributor to cover the remaining life of the lamps.

A \$20,000 pilot program to replace approximately 15% of the BoQ's Mercury Vapour lamps with T5 fluorescent streetlights was considered in the 2010/2011 budget, however, due to Council's financial constraints the project did not proceed. Given these difficulties in securing funding, external financial support may be required to implement the bulk lighting changeover.

Funding for street lighting efficiency

There are few external funding opportunities for street lighting efficiency. This reinforces the need for Local (and state) government to complete business cases to determine the overall benefit with or without external funding. However, some funding is of relevance including the federally funded Low Carbon Communities program. This is an \$80 million funding program for local government and community organisations from the Federal Government It is designed to fund programs to reduce energy costs through energy efficiency upgrades to street lighting, community facilities and council buildings.

Low Carbon Communities will provide competitive grants to local councils and operators of community facilities via three funding streams.

1. Small scale grants of up to \$500,000 for local councils to undertake smaller scale projects to reduce energy consumption in facilities such as outdoor lighting.
2. Large scale grants of up to \$5 million for operators of community facilities to invest in energy efficient upgrades such as the installation of cogeneration or new heating and air conditioning.
3. Greener Suburbs grants of up to \$500,000 for councils to implement capacity building and demonstration projects that improve the use of parks and green spaces in urban areas.

Similar programs have been promised in Victoria. While this funding will assist the transition in certain areas, the scale of these incentives is not likely to result in large-scale change on their own²⁰.

²⁰ Materials from Ironbark Sustainability, Australia's local government public lighting specialists, were used as a key source to complete this Streetlighting analysis.

Process for Accessing Funding

In order for Council to make an informed decision on street lighting efficiency projects and to be in a position to access Federal Government funding that may become available it is recommended the following process is adhered to:

Process	Why do this?
Complete a business case	Bulk changes are expensive. A business case allows you to discuss the program with your distributor and senior management in an informed manner.
Decide what lights you want changed when	This allows the program to consider issues such as which lights to replace, needs for public transport and community safety and Council budgeting processes.
Procure the project services	Through tendering or working/negotiating directly with your distribution business this stage is aimed at getting the best price for Councils preferred program.

Each of the steps above can take time and can involve difficult negotiations internally and externally. It is best to try and be as inclusive as possible in terms of consultation and the technologies you replace so that you don't need to go through the negotiations several times for different regions, technologies or outcomes.

In Victoria a large number of changes are expected over the coming 3-5 years because of a perfect storm of state and federal funding, centralised support for lighting technical approvals and collective action with distributors to make changes easier for local governments to engage with.

To complement the efficiency gains and utilizing the cost savings from T5 replacement, the remaining carbon emissions from street lighting can be simply reduced to zero through the purchase of 100% Green Power for the total electricity consumed annually.

Actions in Street Lighting

The following actions below summarise the most cost effective way to reduce carbon emissions in Council operated street lighting.

- Prepare a Streetlighting Bulk Replacement Program Business Case outlining financial and environmental impacts of a bulk change
- Develop a Sustainable Public lighting policy
- Continue to monitor and investigate the most efficient technologies available
- Purchase and install solar-powered public lighting in nominated locations
- Purchase 100% Green Power.

Case Study: Yarra Sustainable Public Lighting Retrofit

The City of Yarra bulk changeover of Mercury Vapour 80 Watt (MV80) streetlights to energy efficient T5's is the largest single emission reduction project undertaken by Yarra to date.

Council replaced all its old MV80 lights in the Citipower area with the new T5 fluorescents using 68% less electricity than the MV80's.

Additionally the T5's will give Council the flexibility in future to choose a long life lamp (to be approved shortly) which will further reduce maintenance costs substantially and will increase energy savings by a further 5%, on top of the figures quoted below.

Total Cost: \$1,625,929
1 Annual \$ Savings: \$168,000 approx
GHG Savings: 1500 tCO ₂ -e p.a



The 1,500 tonnes saved by replacing these 80-watt mercury vapour streetlights will reduce the City of Yarra's current total emissions by 9.4% and emissions from all streetlights by 24.6%. A comparable outcome could be expected by the BoQ given the prevalence of inefficient 80 W MV lights in the Borough of Queenscliffe.

5.3 Fleet

Context

Council's corporate fleet emissions result from the use of transport fuels such as petrol, diesel and LPG. Transport emissions are considered to cover all council owned fleet.

Data

- At approximately 68 t.CO₂e each year, the BoQ fleet contributes around 7% of total Corporate emissions.
- The total diesel consumption was 11,518 litres in the 2010 calendar year which resulted in approximately 35 tonnes of CO₂e polluting the atmosphere. This equates to approximately 51% of the emissions from the Fleet sector.
- The total unleaded petrol consumed in 2010 was 14,030 litres. This resulted in 33.4 tonnes of CO₂e and represents about 49% of the total carbon emissions from Council owned corporate Fleet.

Table 11. Total fuel consumption and carbon emissions Jan – Dec 2010

Source	Litres	t. CO ₂ e	Percentage
Diesel	11,518	35	51%
Petrol	14,030	33	49%
Total		68	100

Current Activity

The BoQ has taken steps in recent years to reduce the level of emissions created by its fleet vehicles. In 2009, Council's fleet comprised eleven vehicles, many of which have recently been replaced and include a number of diesel and more efficient vehicles. The current fleet includes the following vehicles:

Table 12. BoQ Council Fleet by Make/Model and Fuel Type

Vehicle Make/Model	Fuel Type
VW Golf Wagon 77TDI 1.6L Turbo	Diesel
VW Golf Wagon 77TDI 1.6L Turbo	Diesel
VW Golf Wagon 77TDI 1.6L Turbo	Diesel
Volvo MY10	Unleaded
Peugeot 1.6 litre 5 door turbo hatchback	Diesel
Ford Focus LV 5 door hatch 2.0l	Diesel
Ford Territory TX RWD 2.7L V6 Turbo	Diesel
Mitsubishi Triton Double Cab	Diesel
Mitsubishi Triton Double Cab	Diesel
Toyota Hilux	Diesel
Toyota Hilux	Diesel
Hilux 4x2 Workmate 2.7l	Unleaded

The BoQ has a high number of diesel vehicles relative to that of most Councils around Victoria. In the case of diesel, its greenhouse emissions per litre are higher than petrol, but engines designed to operate on diesel tend to be far more fuel-efficient than petrol engines²¹. Given this, the BoQ should be commended for the low greenhouse gas (GHG) intensity of its vehicle fleet.

However, there are still some efficiency opportunities and lower carbon intensive options that can be investigated in the coming years as lower emission vehicles reach the Australian market, which will assist in reaching Council's carbon neutral goals.

Council also has two bicycles that are used by staff, particularly local laws officers, during appropriate weather.

Measure

The measurement of Council's fleet emissions can be met through the continuing subscription to the Planet Footprint service, which is currently collecting the annual litres of fuel consumed by BoQ vehicles and providing the fleet fuel consumption figures for this Corporate CNAP process.

In addition, the BoQ keeps information on fleet vehicles as part of the 'BoQ Motor Vehicle Schedule for Insurance Renewal Purposes'.

21 <http://www.environment.gov.au/settlements/transport/fuelguide/environment.html>

Reduce

Reducing the emissions from Council fleet can be achieved in a similar manner to other sources of carbon emissions. Namely, first looking at efficiency opportunities and low carbon fuel options, and secondly to look at appropriate carbon offsets available.

The BoQ's high diesel fuel use is a positive step towards a low emissions fleet. Further progress towards more sustainable fuel practice could be made by finding an accredited bio-diesel fuel supplier.

Biofuels

Biofuels have the capacity to reduce carbon emissions for in vehicle use as biofuels are derived from renewable material that substitutes the use of fossil fuels. However, there are differing types and derivatives of biofuels available with conflicting information about their true carbon emissions, availability and use.

Biofuels are biologically derived replacements and or additives to fossil fuels commonly referred to as alternative fuels. The 2 commonly available biofuels are bio-diesel and Ethanol.

Biofuels and Emissions Reductions

The CSIRO also did a comprehensive study comparing the emissions from any fuel you may wish to run engines on. Bio-diesel from used cooking oil came out on top. A link can be found on the environment page of the grown fuel web site www.gfb.cc or from this link: www.greenhouse.gov.au/transport/comparison/index.htm

Electric Cars

Advances in vehicle efficiency and electric vehicle technologies have been continuing to transform the vehicle market in Australia. Recent announcements from major vehicle manufacturers indicate that new models of efficient diesel and electric vehicles will be available over the coming years. With this in mind, advancements in electric vehicle technologies should be monitored to allow informed decision making when new vehicles and equipment are upgraded.

Actions in Fleet

The following actions below summarise the most cost effective way to reduce carbon emissions in Council operated vehicles.

As new vehicles and equipment is purchased, all new purchases incorporate investigation of most environmental and fuel efficient equipment of market tested products. This could include electric and biodiesel vehicles, but does not exclude other technologies and options that may be developed over the coming years. As such, this is best be covered by a sustainable procurement policy.

The total annual tonnes of carbon emissions from the fleet are currently only 68 tonnes per annum, this represents a small percentage of the overall emissions, at approximately 7%. The annual offsetting of these emissions is not an expensive exercise, at approximately \$1,300 to \$1,500 a year. Offsetting carbon emissions will be discussed further in the document below.

- Develop and endorse a sustainable procurement policy

- Develop an offset statement outlining Council's approach to offsets for fleet, waste and mains gas emissions
- Implement emissions reductions activities within the Borough to offset corporate vehicle emissions

5.4 Waste

Context

Corporate waste emissions result from the disposal of waste to landfill. Corporate waste emissions are considered to be from all Council owned facilities and exclude waste collected in the community. Only waste and recycling from the Town Hall and Council offices will be included in this Corporate CNAP.

More potent greenhouse gases are emitted through waste if organic compounds aren't composted or broken down naturally. If we don't compost and put organic materials into landfill, organic matter decomposes anaerobically - meaning it breaks down into methane instead of carbon dioxide (as it often does in natural conditions). As methane is over 20 times stronger as a greenhouse gas than carbon dioxide, the amount of organic materials we send to landfill is an important landfill input to reduce in order to reduce greenhouse emissions.

Data

The current data reflects a small and constant pattern of waste generation and recycling in Town Hall and Council Offices. It has been summarised here below.

- Recycling – 5 x 240l recycling bins emptied weekly. 100% full each week.
- Waste – 3 x 120 litre bins emptied weekly. 100% full each week.
- Organic waste from council offices/lunchroom – 1 x bokashi bins (100% full) taken to Neighbourhood House for composting weekly.

The main source of carbon emission are from waste going to landfill which are presented in the Table 13 below.

Table 13. BoQ Corp Waste

360	weekly litres
18,720	Annual litres
18.72	Annual m ³
5.55	Annual tonnes waste ²²
6.10	Annual t.CO_{2e}

Current Activity

²² The conversion of volume to weight has been based on an average factor of 0.3 t./m³ which is an average of different waste types, from Australian Government National Greenhouse Factors and Methods (2010)

Recycling and waste from the Town Hall and Council offices is collected weekly through the kerbside collection service. There are five 240l recycling bins and three 120l waste bins servicing both buildings.

There are two bokashi bins in the council lunchroom for organic waste collection. The units are taken to the Neighbourhood House in Tobin Drive for composting.

Recycling and waste containers with obvious signage from Eco Bins are located throughout the council offices. There are also fliers distributed throughout the building to advise staff members of what can be recycled.

The Town Hall kitchen has permanent recycling and waste containers from Eco Bins. These are used during council functions only.

It should be noted that when the Town Hall is hired for private functions, it is the responsibility of the hiring party to organise their own recycling/waste bins and disposal (ie they must take their own recycling and waste away for disposal).

One of the simplest and most cost-effective way for BoQ Council operations to minimise waste outputs is to minimise the amount of waste generating from purchased materials, products and consumables such as paper, kitchen supplies and other regularly purchased items. Although efforts through the ad hoc choices have already achieved this to some extent, it is advisable for these efforts to be formalized in a *sustainable procurement policy*, to ensure ongoing improvements and to track and monitor performance into the future.

Measure

Waste from the BoQ is taken to the Drysdale landfill, which is operated by the City of Greater Geelong (CoGG). Council receives monthly invoices from CoGG describing the tonnage and cost of disposal.

Reduce

The following actions below summarise the most cost effective way to reduce carbon emissions from its waste stream.

- Develop and endorse a sustainable procurement policy
- Implement emissions reductions activities within the Borough to offset waste and mains gas emissions.

6. Summary of Actions

The following table summarizes the actions to reduce BoQ Corporate emissions and create the basis for working towards carbon neutrality.

Year	Number	Action	Sector	Responsibility	Annual Carbon Emission Reduction	Cost
2012	1	Establish project page on Council's website profiling emissions and actions taken to reduce greenhouse gas emissions.	General	Sustainability Officer	0	\$ 1,500
2012	2	Conduct Level 2 Energy Audits on the Town Hall, Council offices and four Council-operated caravan parks.	Buildings	Consultants/ Sustainability Officer	0	\$ 20,000
2013	3	Implement prioritized energy efficiency opportunities identified during energy audits.	Buildings	Sustainability Officer	150 ²³	\$ 30,000
2014	4	Purchase 100% Green Power for all remaining Council Buildings and facilities.	Buildings	Engineer/ Sustainability Officer	320 ²⁴	\$ 12,160
2012	5	Prepare a Streetlighting Bulk Replacement Program Business Case outlining financial and environmental	Streetlighting	Consultants/ Sustainability	0	\$2,500 ²⁵

²³ Based on 30% energy efficiency gain across Council's facilities and a cost estimate only. Actual costs need to be based on quotes from industry.

²⁴ Based on \$38/t.CO₂e for Green Power.

		impacts of a bulk change.		Officer		
2013	6	Develop a Sustainable Public Lighting policy.	Streetlighting	Engineer/ Sustainability Officer	0	Staff time
2012	7	Continue to monitor and investigate the most efficient public lighting technologies available.	General	Engineer	0	Staff time
2012	8	Investigate renewable energy generation options for Council facilities.	Buildings	Engineer/ Sustainability Officer	0	Staff time
2012	9	Identify funding opportunities to progress renewable energy generation options.	Buildings	Sustainability Officer	0	Staff time
2012	10	Purchase and install solar-powered public lighting in nominated locations.	Streetlighting	Engineer/ Sustainability Officer	TBC	\$10,000 ²⁶
2014	11	Implement a policy for all new Council buildings to meet the highest possible Green Star standard or equivalent at the time.	Buildings	Engineer/ Sustainability Officer	0	Staff time
2013	12	Develop and endorse a sustainable procurement policy.	General	Sustainability Officer / Engineer	0	Staff time
2013	13	Develop an offset statement outlining Council's approach to offsets for fleet, waste and mains gas	General	Sustainability Officer	0	Staff time

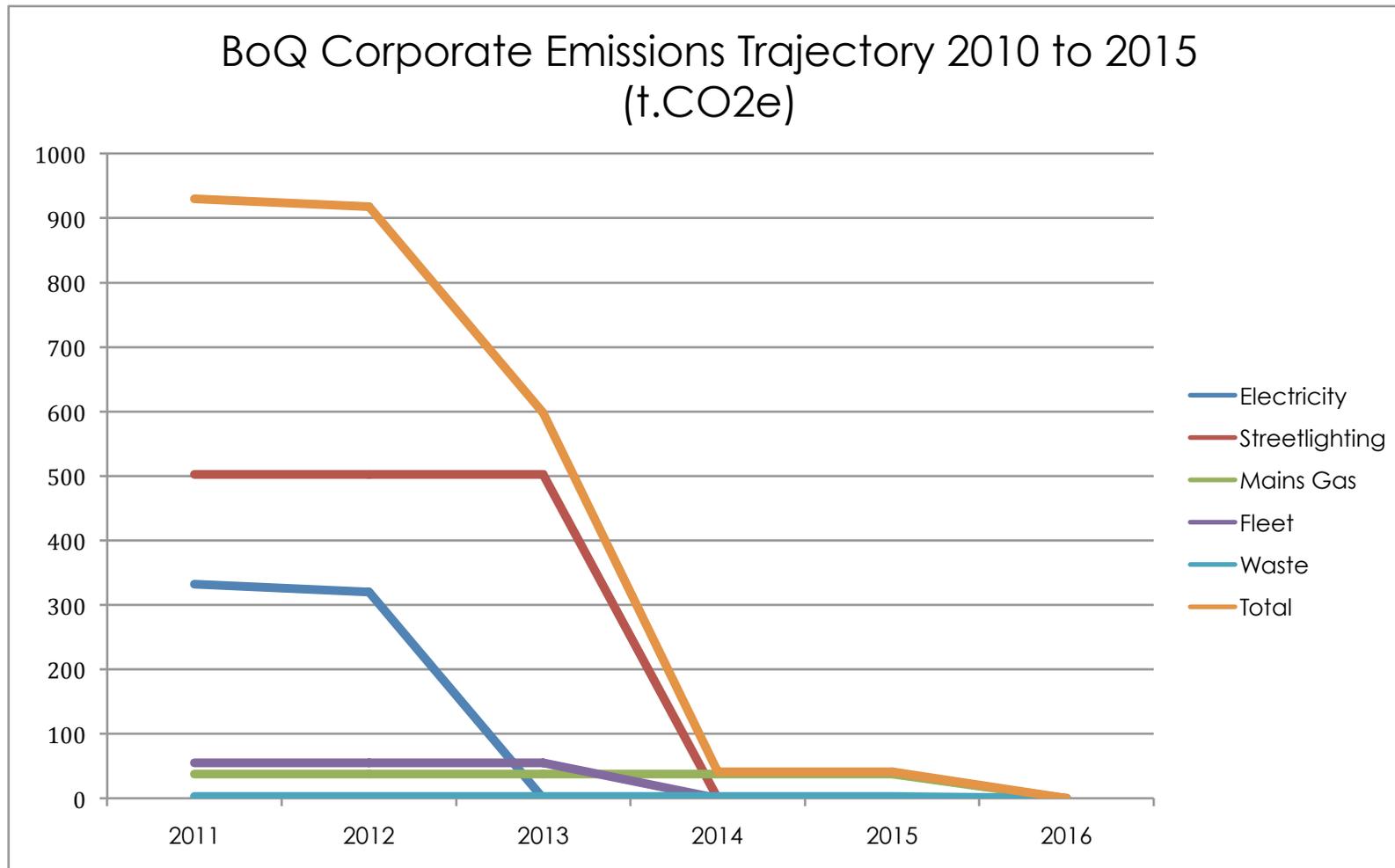
²⁵ Cost estimate only. Actual cost needs to be based on quotes from industry.

²⁶ Cost estimate only.

		emissions.				
2014	14	Implement emissions reductions activities within the Borough to offset corporate vehicle emissions.	Vehicles	Sustainability Officer	68	\$1,360
2014	15	Purchase Green Power for remaining street light electricity use	Streetlighting	Engineer/ Sustainability Officer	502	\$ 19,000 ²⁷
2015	16	Implement emissions reductions activities within the Borough to offset waste and mains gas emissions.	Waste / Buildings	Sustainability Officer	41	\$820
2015	17	Review original Corporate CNAP actions and develop new actions and initiatives.	General	Sustainability Officer	0	Staff time

²⁷ Based on \$38/t.CO2e for Green Power at current consumption levels or 502 t.CO2e per year. Actual consumption levels should be reduced after implementing Sustainable Public Lighting policy.

Based on the actions listed above the following carbon emissions trajectory can be modelled. This clearly shows the reduction of various greenhouse gas emission sources over a five-year period.



7. Offsets

It is the BoQ's ultimate objective to have no emissions associated with corporate activities. However, in the short term, the zero net emissions target of Council may need to be achieved through the purchase of carbon offsets in parallel to investment in energy efficiency and low carbon energy generation.

A carbon offset is an investment in a project or activity that abates greenhouse gas (GHG) emissions or sequesters carbon from the atmosphere to compensate for GHG emissions from other activities. Offsets can be bought by a business or individual in a voluntary market or within a carbon-trading scheme.

A carbon offset usually represents one tonne of carbon dioxide equivalent (tCO₂-e). The purchase of these credits for carbon sequestered elsewhere works to 'offset' those emissions attributed to Council's operations thereby creating a zero net emissions balance for the BoQ. To achieve this balance, Council would obtain offset certificates to cover all emissions remaining after direct reductions in emissions.

An approach that promotes investment of offsetting funds into localised distributed generation and energy efficiency projects within the BoQ and surrounding area as a means to offset residual corporate emissions is recommended. Opportunities to implement such projects are discussed further in the Community Carbon Neutral Action Plan.

Does BoQ purchase offsets?

There is now an array of carbon offset products and schemes that provide certificates based on offsets generated through renewable energy, energy efficiency, and carbon sequestration. However there are significant issues relating to the type, price, quality, 'additionality' and location of offset activities for Council to navigate.

Additionality is a key concept in evaluating whether or not an offset project leads to real and measurable greenhouse gas reductions. To be regarded as a valid offset, a project must be proven to be 'additional' to what would have occurred without the investment of carbon offset credits.

The issue of additionality is not very clear at the moment, as there are complexities surrounding offset purchases due to the transitional nature of current federal policy which impacts carbon accounting and offsetting definitions, standards and processes.

Given these complex issues, the development of a Carbon Offset Policy will be a key element for Council to consider in defining how Council will seek to achieve the goal of carbon neutrality through offset purchases.

In the absence of a policy for offsets, the online Carbon Offset Guide Australia (COGA)²⁸ is

²⁸ The COGA is an independent directory of Australian carbon offset providers developed through a partnership between EPA Victoria and Global Sustainability at the Royal Melbourne Institute of Technology (RMIT) <http://www.carbonoffsetguide.com.au/>

recommended as a resource to obtain the most up to date and independent advice on offsets. COGA is an independent directory of Australian carbon offset providers that is updated every 6 months. As the COGA is an independent, regularly updated listing maintained by government in conjunction with RMIT University, it will give the most up to date and non-biased advice that will be relevant to the BoQ at the time offsets need to be purchased.

Local carbon offsets

There are many different types of offsets that can be purchased. In general, it is recommended that as much benefit as possible be derived from offset purchases through activities that improve energy efficiency, stimulate the local economy and support local renewable energy production.

With this in mind, it is recommended that localised distributed generation and energy efficiency projects within Council buildings and assets and the local community be strongly consider as a means of offsetting Council corporate emissions.

The direction of potential offset expenditure towards energy efficiency within Council assets provides a cumulative return on investment over many years as annual resource expenditure is reduced. This also creates an added benefit in that the annual expenditure on offsets (which do not create a return on investment as energy efficiency does) will be reduced.

The investment of offset expenditure into efficiency and low carbon energy production is in line with the methodology of the CNAP as outlined in Chapter 3 of this report. That is, the 'measure, reduce & offset' process recommended by the Australian Federal Government. The direction of funds that would be used to purchase offsets external to Council towards efficiency that creates a payback to Council will act to 'reduce' council emissions. Once all possible efficiency actions that demonstrate a reasonable payback have been implemented, then the offsetting of residual emissions should be implemented.

The cost of carbon offsets

It is important to note that the cost of offsetting currently varies from \$15 to \$40 per t.CO₂-e. Other means of emissions reduction such as energy efficiency may have a much lower cost. Several recent studies have shown a net *return* or financial benefit of up to \$100 per tonne, rather than a cost. For this reason, energy efficiency is often a higher priority for immediate action, rather than simply offsetting greenhouse gas producing activities.

Key Offsetting Actions

Develop Offset Policy

Responsibility – BoQ (possibly with help from CEE)
Support - Finance

Implement Offset Policy

Responsibility – BoQ – Sustainability Officer
Support – Finance (and CEE if required)

8. Implementation Framework

1. Data & Analysis

Key to tracking the progress of the Corporate CNAP is the regular analysis and maintenance of the data sets. Tracking of progress and improvements over time and analysis of resource consumption and waste generation in order to identify trends and any issues that may arise over time. Some of these data sources have been accessed as part of this CNAP process, but new data sets may become available overtime, with the aim to improve the management of the resource consumption and carbon emissions profile of the Council.

2. Policy development

Key policies and documents specified in the Corporate CNAP need to continue to be developed and implemented by Council.

3. Funding

Business cases need to be developed through audits and the analysis of Case Studies from other Councils. Some business cases involving energy efficiency will be able to attract an internal rate of return on investment. The development of such business cases which take advantage of energy efficiency opportunities are generally advised from the outputs of energy audits. In some cases other local governments have explored 'performance contracting' where the capital invested into an energy efficiency upgrade can be paid back to a consulting firm from the avoided expenditure as a result of the energy efficiency measures.

Other measures and initiatives, such as renewable energy generation systems are likely to require support and funding external to Council. State Government agencies and other Federal programs have been set-up to support the implementation of sustainability measures within the local government sector.

Lastly, there are some measures and initiatives within this Action Plan that do not require additional capital investment. In essence these rely on the specification of new products or services that already have Council budget allocation.

4. Technical Support

The experience of neighboring councils, staff, consultants plus government and non-government agencies should be used as a resource to identify actions, approaches and to collaborate on project implementation.