City of Cockburn

wetlands to waves

City of Cockburn

Greenhouse Gas Emission Reduction Strategy 2.0

2011 -2020

included in events organised by the City.

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Prepared by:	Annette Adams, Greensense; Chris Beaton, City of Cockburn; Jennifer Harrison, City of Cockburn		
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Executive Summary

The City of Cockburn has been responding to climate change since it became a member of the Cities for Climate Protection Program in 1999. Since then, the City has taken its responsibility to act as a leader in this global challenge seriously by taking steps to measure and reduce greenhouse gas emissions and adapt to a changing climate. Since 2004, the City has prevented over 500,000 tonnes of greenhouse gas (GHG) emissions from entering the atmosphere through corporate abatement activities such as landfill gas capture, generation of renewable energy, the purchase of green power and offsetting.

This strategy represents the next period in the City's commitment to reducing greenhouse gas emissions and sets the following targets:

	2020 Target	2050 Target
Electricity & Gas	20% below 2008/09	80% below 2008/09
Streetlighting (Western Power)	10% below 2008/09	60% below 2008/09
Fleet	Zero Emissions from 2011/12	Zero Emissions from 2011/12
Waste	45% cap above 2008/09	50% below 2008/09
Combined	12.5% cap above 2008/09	60% below 2008/09

	2009 Levels t CO2e	2020 Target t CO2e	2050 Target t CO2e
Electricity & Gas	3,946	3,156	789
Streetlighting (Western Power)	4,532	4,079	1813
Fleet	2,463	100% offset	100% offset
Waste	15,565	22569	7,782
Combined	26,506	29,804	10,384

Figure 1 City of Cockburn GHG Reduction Targets

In addition to emission reduction targets the City has committed to a renewable energy target:

2020 Target	
Renewable Energy Target	20% of electricity for Council Buildings generated by renewable energy by 2020

Figure 2 City of Cockburn Renewable Energy Target

A methodology and an action plan have been developed for the first three years of this strategy to help the City achieve these targets. The actions will focus on:

- Improving energy efficiency through asset upgrades, behavioural change programs and investigating cogeneration opportunities
- Waste minimisation and management through increased resource recovery, education and addressing legacy emissions from waste already deposited in landfill
- Embracing a new energy future by expanding the City's wind and solar photovoltaic installations

The City will achieve these goals through a re-direction of funds previously spent on Green Power into the Greenhouse Action Fund. This will be used to support energy efficiency, and renewable energy initiatives.

The Strategy identifies 19 key actions for the City to undertake including commitments to:

- emissions reduction targets for electricity and gas:
  - 20% below 2008/09 levels by 2020
  - 80% below 2008/09 levels by 2050
- emissions reduction target for vehicle fuel
  - Zero Emission Fleet from 2011/12
- emissions reduction targets for waste:
  - no more than 45% above 2008/09 levels by 2020
  - 50% below 2008/09 levels by 2050
- emissions reduction targets for Western Power Street Lighting
  - 10% below 2008/09 levels by 2020
  - 60% below 2008/09 levels by 2050
- Renewable energy target:
  - 20% of electricity for Council Buildings generated by renewable technology by 2020
- adopt a three year action plan to achieve these targets
- reduce emissions through three focus areas including
  - improving energy efficiency by designing all new buildings to achieve best practice energy efficiency, undertaking an energy audit of all major community facilities and identifying a schedule of works to reduce energy emissions and continuing to monitor and reduce fleet emissions
  - waste minimisation and management by continuing to reduce the volume of organic waste going to landfill and maximise waste separation, education

and exploring ways of addressing legacy emissions.
    - embracing a new energy future by continuing investment in renewable energy
- establish a zero emissions vehicle fleet program
- cease the purchase of Green Power as from 30 June 2011 and redirect that funding to establish a Greenhouse Action Fund as from 1 July 2011
- allocate funds through: the Greenhouse Action Fund, existing operational and capital budgets and external funding opportunities
- proactively managing the impacts of the Carbon Price
- annual reporting on performance against the strategy

This strategy will not only enable the City to reduce its GHG emissions, but also to reduce operational costs, reduce dependence on grid-supplied electricity, reduce vulnerability to electricity price increases and possibly create a new revenue source for the City through the sale of excess clean energy.

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1. Introduction

Climate Change refers to a shift in global climates caused by an increase in greenhouse gases (GHG). Human activities are increasing GHG levels in our atmosphere, which is leading to a shift in global temperatures and weather patterns. Specifically, in the South West of Australia, climate change is predicted to lead to increased temperatures, reduced rainfall, increased periods of drought, rising sea levels and more extreme weather events.

The City has been proactive in its response to climate change and was recognised in a number of State and National Awards during 2011 and 2012 for leading community climate change action. These actions are extensive and include past investments in Green Power, improving energy efficiency, education and awareness campaigns, investment in renewable energy, updating and implementing policies and efficiency improvements to the vehicle fleet. Further details of past actions can be found throughout this document and in Appendix A.

While much of the City's climate change actions encompass the City as an organisation and the community, this strategy is focused on measuring and reducing the GHG emissions from the City of Cockburn's operations and facilities only.

Community actions continue to play an important part in the City's response to climate change and are addressed separately within the City of Cockburn Climate Change Community Awareness Strategy.

2. Strategic Alignment

The City of Cockburn *Strategic Community Plan (2012 – 2022)* was developed in conjunction with the community and guides the City's strategic directions and priorities to 2022.The Community Strategic Plan commits to action on climate change including:

- A reduction in energy dependency and greenhouse gas emissions within our City.
- Community infrastructure that is well planned, managed, safe, functional, sustainable and aesthetically pleasing.
- A responsive, accountable and sustainable organisation.
- Managing our financial and infrastructure assets to provide a sustainable future.
- A community that uses resources in a sustainable manner.
- Community and businesses that are supported to reduce resource consumption, recycle and manage waste.
- Greenhouse gas emission and energy management objectives.

This Strategy is also linked to a number of other strategic documents including the:

- Plan for the District 2010 – 2020, which commits to:
    - The development of a permanent Waste Transfer Station for domestic and commercial waste

- City of Cockburn Sustainability Strategy which encourages:
    - Management, accountability transparency and engagement
        - Ensure sustainability forms an integral part of corporate strategic planning (Gov 3)
    - Sustainable planning and development
        - Support increased walking, cycling and public transport use through the development of neighbourhoods with mixed housing types and densities (Gov 5)
    - Efficient settlements and use of resources
        - Increase the use of renewable energy (Env 6)
        - Reduce greenhouse gas emissions (Env 7)
        - Reduce waste and increase recycling (Env 8)

- Sustainability Policy (SC37) which commits to:
    - Implementing an integrated sustainability strategy, which is embedded in planning and development, the City's Annual Report and decision-making processes.
    - Developing partnerships and collaborating with the community to achieve sustainable development in the area of public transport, buildings and infrastructure.
    - Ensuring the City integrates best practice sustainable design principles into all Council initiated planning, building and development projects.
    - Setting targets for reduction in greenhouse gas emissions, energy, water use and waste from the City's operations.
    - Facilitating the sustainable use of natural resources within the community.
    - Facilitating increased recycling and reduced waste contamination and generation across City households.

- Ensuring the development of a robust transportation system that provides for the needs of residents and industry, whilst minimising environmental consequences.
- Facilitating community protection and conservation of the natural environment.

The endorsement of this strategy meets the City's commitment across a wide range of strategic objectives. The implementation of this strategy requires support and commitment from the whole organisation.

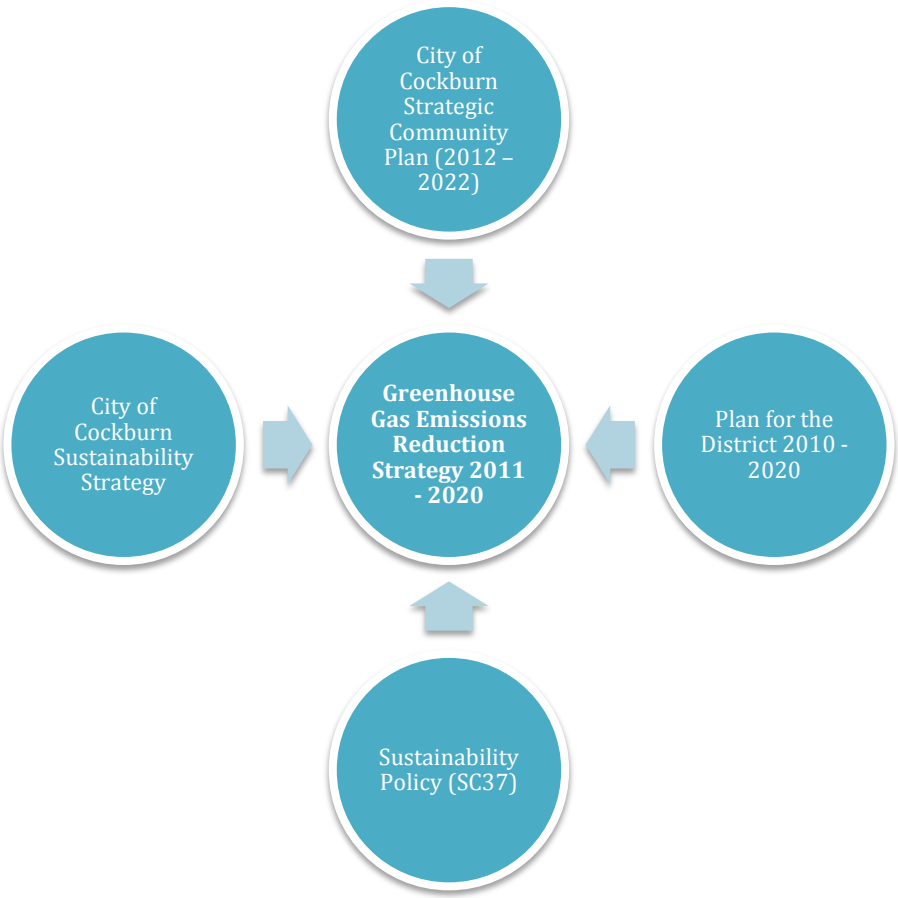

Figure 3. Relationships with other Strategic Documents

3. Understanding the City's Corporate Emissions Profile

The City's corporate emissions profile is made up of all council owned and operated facilities and the emissions resulting from activities undertaken by staff in the provision of services to the community.

As for most local governments, this includes electricity, gas, vehicle fuel use and street lighting. However, the City of Cockburn also owns and operates a landfill site. Waste emissions from the Henderson Waste Recovery Park (HWRP) must also be included in the City's corporate emissions profile.

The City's emissions profile and targets have been separated into 4 sectors:

1. waste
2. streetlighting (Western Power)
3. electricity and gas
4. fuel emissions

Figure 4 illustrates the breakdown of the City's emissions for the base year of 2008/09.

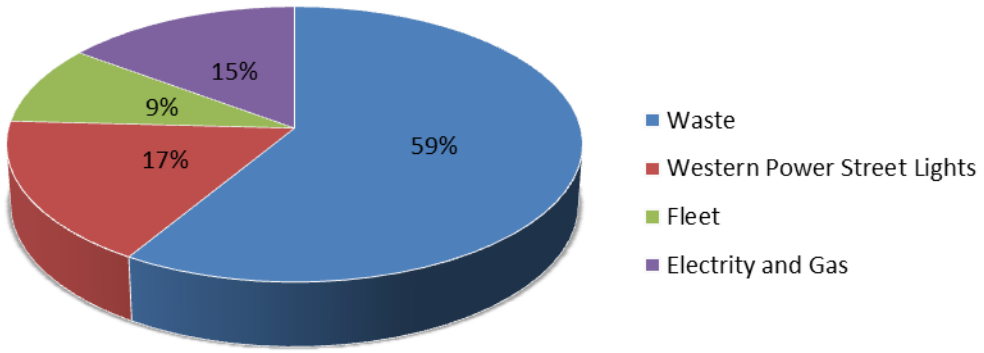

Figure 4. City of Cockburn Emissions Profile 2008/09

In 2008/09 the City's total GHG emissions were 26,505 tonnes CO_2e, of which waste emissions were responsible for 59%.

The next largest source of emissions is generated from Western Power street lights (17%).

Emissions from electricity and gas consumption in council facilities, streetscapes, parks and sporting facilities account for 15% of the City's total emissions.

The remaining 9% of emissions results from the use of fuel in the City's vehicle fleet.

It should be noted that household waste from within the City of Cockburn is processed via the South Metropolitan Regional Council (SMRC) and therefore the City of Cockburn is not required to report on these emissions as part of its *corporate* emissions profile. However the City may elect to include them in community emissions reporting for other purposes.

Action 1:

The City will separate emissions into the following categories:

- Streetlighting (Western Power)
- Electricity & gas
- Fuel
- Waste

Past Performance

The City of Cockburn has been taking action on climate change for almost 15 years.

Since 1999 the City was a member of Cities for Climate Protection (CCP) until this program was concluded in 2009. Under CCP the City achieved the highest milestone by setting GHG reduction targets (20% below 1996 levels by 2010/11) and defining a climate change action plan.

In 2010 the City achieved its CCP emission reduction targets for electricity and fuel, largely due to the procurement of green power.

With respect to waste, the City invested in a number of initiatives including increased resource recycling and partnered in the installation of methane extraction technology. Despite this, the City did not reach its 20% reduction target for waste emissions in 2010.

In 2011 the City undertook a forecast of future emissions through to 2050 to understand the expected emissions profile over time and facilitate the setting of appropriate targets into the future.

The first version of this strategy was endorsed by Council in July 2011 and included emissions reductions targets for 2020 and 2050. It was supported by a 3 year action plan. A Greenhouse Action Fund was established under the Strategy, enabling a shift away from the purchase of greenpower to allow increased investment in renewable energy infrastructure and energy efficiency.

On 8 November 2011 the Clean Energy Future legislation was introduced by the Australian Federal Government. The legislation placed a fixed price on carbon of $23 a tonne from 1 July 2012, moving to a flexible price after three years.

Following this, the City initiated a review of the broad impacts and opportunities the Carbon Tax legislation package on the City's operations.

In 2012 the Strategy was revised resulting in this version which takes into consideration the impacts of the Carbon Tax legislation package, results of the 2011/12 Greenhouse Gas Inventory, and WALGA's determination on the scope of street lighting.

4. Objectives & Targets

Objective

The primary objective of this strategy is to reduce the City of Cockburn's total greenhouse gas emissions. The benefits of implementing this strategy are many and include:

- The City of Cockburn seen as a community leader by responding to climate change and contributing towards a long term solution.
- Reduced operating costs through energy savings and onsite electricity generation.
- Reduced dependence on grid-supplied electricity.
- Reduced vulnerability to electricity price increases.
- Potential revenue streams from the sale of surplus clean energy.

Targets

The City has elected to set targets for two target years: 2020 to drive behavioural change in the short to medium term and; 2050 in recognition of the long term nature of some abatement activities and to ensure that behavioural change is embedded for the long term.

Before adopting new GHG emissions targets, the City undertook a forecast of future emissions through to 2050 to understand the expected emissions profile over time and facilitate the setting of appropriate targets. The results of this forecast can be seen in the following chart.

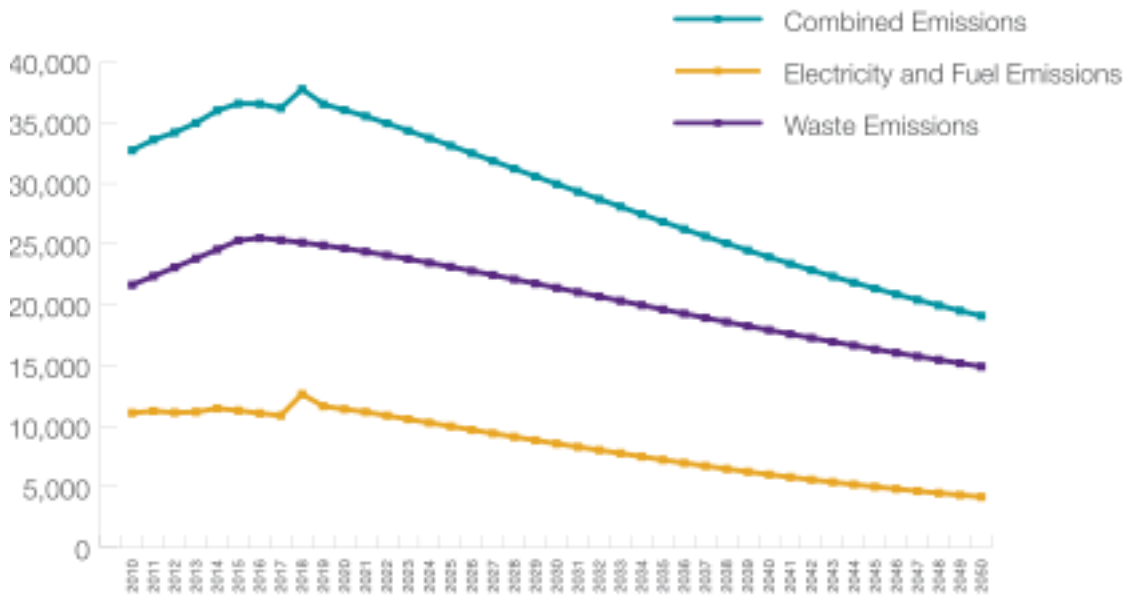

Figure 5. Forecast Greenhouse Gas Emissions 2010-2050

Electricity and Gas

Electricity and gas emissions are forecast to remain relatively constant in the short term, with some fluctuations for new facilities (particularly the new Regional Aquatic and Recreation Centre). After 2018, emissions will slowly decline due to:

- Improved efficiencies in building standards, and streetlighting.
- Limited greenfield development.
- Reductions in the emissions generated from grid-supplied electricity.

Given this forecast profile, a target of 20% reduction on 2008/09 emissions by 2020 is considered appropriate for electricity and gas emissions. However, given the natural decline in emissions by 2050, the City has elected to set a challenging but achievable target of 80% below 2008/09 by 2050.

Action 2:

The City adopts the following emissions reduction targets for electricity and gas:

- 20% below 2008/09 levels by 2020, and
- 80% below 2008/09 levels by 2050.

Street lights (Western Power)

WALGA have determined that Local Government should report street light emissions as 'Scope 3', meaning the City is not directly liable for these emissions. Despite this, street lights account for a large percentage of emissions and are a significant cost to Council.

The City has elected to report street light emissions separately and has set an emissions reduction target that takes into consideration future growth and strives for improvements to the energy efficiency of street lamps.

Action 3:

The City adopts the following emissions reduction targets for Street lights:

- 10% below 2008/09 levels by 2020, and
- 60% below 2008/09 levels by 2050.

Fleet

Vehicle emissions include greenhouse gases such as carbon dioxide, nitrous oxide and methane, all of which contribute to climate change. Vehicle exhaust emissions also contribute to urban air pollution and can be harmful to both human health and the environment.

Emissions from the City's vehicle fleet amounted to 9 percent of the City's total emissions in 2008/09. Cockburn is a growing Council and it is anticipated that the City's vehicle fleet will continue to expand into the near future.

Measures are being implemented by the City to reduce the emissions generated by its fleet as far as practical.

In 2011 the City established a Zero Emissions Fleet Program to offset the residual emissions from its fleet beyond what cannot be reduced from implementing emission reduction initiatives.

Action 4

The City adopts the following emissions reduction targets for its fleet:

- Zero emissions fleet program

Waste

The City's waste emissions are forecast to grow in the short term due to legacy emissions from waste already deposited and continued high volumes of waste disposal. From 2016 the effects of improved resource recovery will be realised and emissions are expected to decline.

It is not realistic to set a 2020 emissions reduction target for waste below the base year. Instead it is more appropriate to set a target that limits what this growth can be. This limit has been set at no more than 45% above 2008/09 levels for 2020, which corresponds to a 10% reduction on forecast emissions. Likewise, a target of 50% below 2008/09 levels in 2050 is equivalent to 10% below its forecast level for this point in time.

Action 5:

The City adopts the following emissions reduction targets for waste:

- no more than 45% above 2008/09 levels by 2020.
- 50% below 2008/09 levels by 2050.

The emission reduction targets adopted by this strategy are summarised below.

	2020 Target	2050 Target
Electricity & Gas	20% below 2008/09	80% below 2008/09
Streetlighting (Western Power)	10% below 2008/09	60% below 2008/09
Fleet	Zero Emissions	Zero Emissions
Waste	45% cap above 2008/09	50% below 2008/09
Combined	12.5% cap above 2008/09	60% below 2008/09

Figure 6. City of Cockburn Greenhouse Gas Reduction Targets

Although the combined 2020 target allows for an overall increase in emissions, it represents a significant reduction on combined **forecast** emissions for 2020.

	2009 Levels tCO2e	2020 Target tCO2e	2050 Target tCO2e
Electricity & Gas	3,946	3,156	789
Streetlighting (Western Power)	4,532	4,079	1,813
Fleet	2,463	0	0
Waste	15,565	22,569	7,782
Combined Total	26,506	29,804	10,384

Figure 7. Required GHG Emissions Savings

Renewable Energy Target

In addition to emission reduction targets the City has established a renewable energy target which reinforces the City's commitment to embracing a new energy future.

The City's renewable energy target is aligned with the Australian Government's commitment which ensures that the equivalent of at least 20 per cent of Australia's electricity comes from renewable sources by 2020.

More information on the City's commitment to renewable energy can be found in Section 6: Embracing a New Energy Future.

Action 6:

The City adopts a Renewable Energy Target

- 20% of electricity for Council Buildings generated by renewable energy by 2020

Carbon Neutrality

In recent years carbon neutrality has been advocated by a handful of local governments in Australia. Most pathways to carbon neutrality involve a significant purchase of accredited offsets to balance emissions at zero tonnes. Whilst carbon offsets will be pursued by the City of Cockburn to offset emissions from activities beyond what cannot be replaced or reduced (eg vehicle fleet), they are not the focus of the City's approach.

This strategy places emphasis on the need to reduce emissions through energy efficiency improvements, effective waste management and investment in renewable energy. To this end, the City has elected not to pursue carbon neutrality but has established challenging but achievable emissions reduction targets.

Action 7:

The City will reduce emissions through energy efficiency improvements, effective waste management and investment in renewable energy, rather than achieving carbon neutrality through offsetting.

5. Methodology

The City of Cockburn has adopted the following process for greenhouse gas reduction planning:

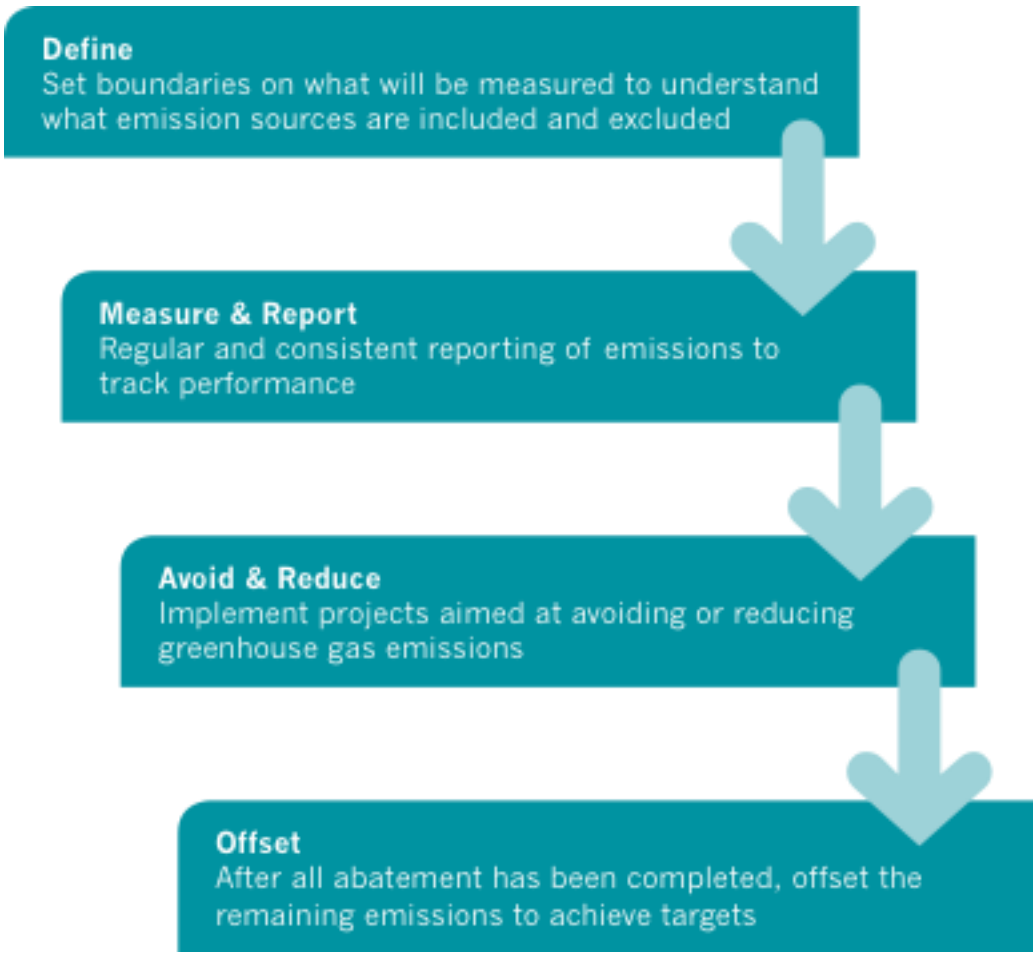

Figure 8. Methodology

Define

The City has elected to include emissions from the use of electricity and natural gas at all Council operated facilities; electricity for street lighting, fuel from the vehicle fleet and; emissions associated with waste disposed at the Henderson Waste Recovery Park. This is in line with Australian Greenhouse Gas Accounting Standards.

Emissions from household waste (green and yellow-topped bins) are not within scope as these are processed by the South Metropolitan Regional Council.

Measure & Report

The City is using the Western Australian Local Government Association's Greenhouse Gas Reporting and Abatement Platform to track and measure emissions and will report on performance at the end of each financial year. This platform is compliant with Australian GHG accounting standards and legislation pertaining to the measurement and reporting of GHG emissions.

Avoid & Reduce

The City has chosen to avoid and reduce emissions through three focus areas, which are discussed in the next section:

- Improving Energy Efficiency
- Waste Minimisation and Management
- Embracing a New Energy Future

Action 5:

The City will focus on the following activities to reduce overall emissions:

- Improving Energy Efficiency
- Waste Minimisation and Management
- Embracing a New Energy Future.

Offset

The City will continue to purchase offsets as a part of this strategy, but will limit offsetting to fleet emissions only.

6. Focus Areas

The City emissions reduction activities have been grouped into three focus areas:

- Improving Energy Efficiency
- waste minimisation and management
- embracing a new energy future

Improving Energy Efficiency

In order to reduce greenhouse gas emissions the City must find ways of using less energy to deliver the same outcomes.

In line with its Sustainability Strategy, the City aims to improve energy efficiency through projects that will generate economic, environmental and social benefits for the City and community. Following an extensive process to identify and review of energy efficiency opportunities utilising Multi Criteria Assessment (MCA) techniques, the following options with strong GHG abatement potential and economic and social benefits were identified:

- Behaviour change programs
- Design new buildings to
- Upgrade existing facilities and assets (eg air conditioner upgrades, irrigation system upgrades, lighting retrofits and external shading)
- Vehicle fleet improvements such as shifting to cleaner fuels and reducing vehicle size and engine capacity
- Co-generation and tri-generation plants where feasible
- Details of these projects and their expected impact on GHG emissions can be found within the Action Plan section.

Since the MCA process was undertaken, the City has given consideration to district energy, tri-generation and geothermal options. It is likely feasibility studies will be undertaken to assess further opportunities to contribute to City's energy efficiency activities through such initiatives.

Action 9:

The City will:

- Design all new buildings to achieve best practice energy efficiency.
- Undertake an energy audit of all major community facilities and identify a schedule of works to reduce energy emissions
- Establish a zero emissions vehicle fleet program.

Waste Minimisation and Management

If the City is to achieve its goals and play a leading role in responding to climate change, it is imperative to find ways of reducing emissions from waste, which formed 59% of 2008/09 corporate emissions.

Where organic waste is disposed of via landfill it generates methane, a powerful GHG, for many years after its disposal. Reducing organic waste sent to landfill will address future waste emissions. However, to address all waste emissions, the City must also address legacy emissions from waste already deposited in landfill.

The City acknowledges the importance of strategic management coupled with effective education to minimise waste and associated emissions.

To date the City has reduced waste to landfill through initiatives such as:

- Henderson Waste Recovery Park (HWRP) recycle shop
- Collection points for E-waste and hazardous waste
- Waste education in primary schools, at events, businesses and community
- Domestic waste transfer station at the HWRP
- Resource recovery at the HWRP (including steel and wood)
- A partnership for the installation of a methane capture and electricity generation facility at the HWRP
- Partnership with the Southern Metropolitan Regional Council for household municipal solid waste and recycling.

The City will continue to address waste emissions through:

- The development of a Waste Management Strategy
- Community education and awareness raising on waste recycling,
- A biomass plant trial,
- The investigation of Carbon Farming Initiative (CFI) opportunities
- Improvements to accuracy of emissions estimation.
- the construction of a commercial waste recovery facility, and
- the ongoing capture of landfill gases for new cells,

Together these actions will reduce the total volume of waste going to landfill and associated emissions.

While landfill gas capture addresses some legacy waste emissions, it is clear the City needs to do more in this area. However, under current landfill emissions reporting methodologies, there are limited opportunities for abatement activities undertaken today to be verified as an emissions reduction. The proposed Carbon Farming Initiative (CFI), introduced to Parliament in March 2011 aims to address legacy emissions, however the current legislative format precludes HWRP from participating. This is because the methane capture facility was installed in 2006. Determining how best to leverage the CFI for legacy emissions will be a key part of addressing waste emissions.

Action 10:

The City will continue to reduce the volume of organic waste going to landfill and maximise waste separation.

Action 11:

The City will explore ways of addressing legacy and fugitive emissions (e.g. through land fill capping and improved technology)

Embracing a New Energy Future

As the world transitions towards a low-carbon future, new and cleaner energy technologies are being developed. Renewable energies such as solar, wind, geothermal, biomass and wave energy are becoming more efficient and cost effective.

The City of Cockburn is well positioned to take advantage of renewable energy technologies due to its location in a sunny and windy part of the world. In recent years, the City has embraced this opportunity by investing in multiple solar photovoltaic installations, utilising wind power and mapping the wind-resource of Cockburn to support community wind power. The City has further taken advantage of cleaner energy technology by partnering in the installation of methane extraction for electricity generation at the HWRP.

The benefits of investing in renewable energies are many, and include:

- Reduced electricity bills
- Provides a buffer to the impact of electricity price increases
- May provide revenue from the sale of surplus energy
- Photovoltaic projects can be implemented quickly
- Provides a long term, accumulative GHG reductions for the life of the asset
- Photovoltaic projects reduce peak energy demand
- Photovoltaic systems are low maintenance
- Use of renewable energy systems have been linked to increased awareness of energy use and behaviour change
- Helps to raise awareness amongst the community of energy issues and enables informed decision making

The City has committed to a Renewable Energy target of 20% by 2020 and will continue its investment in onsite renewable energy generation, reducing its dependence on grid-supplied electricity and investing in infrastructure within the City.

Action 12:

The City will continue to invest in onsite renewable energy generation and aims to generate 20% of its electricity for council facilities from renewable energy.

7. Action Plan

A three-year action plan has been developed to ensure that the City progresses towards achieving its 2020 reduction goals. The action plan is outlined on the following page and will be reviewed annually with the strategy.

Project	Focus Area	Responsibility and Funding	Abatement 2011/12	Progress Report
2011/12				
Energy Audit Program	Energy Efficiency	Infrastructure services	n/a	Program developed by Environmental Services in Oct 2011.
Develop a Renewable Energy Policy	New Energy Future	Environmental Services (Operational budget)	n/a	Completed by Planning.
Renewable Energy Program Administration Complex Photovoltaic (additional 10kW)	New Energy Future	Environmental Services (Greenhouse Action Fund)	n/a	Currently not economically viable to exceed 30kW. Will to continue to explore PV options at this site.
Renewable Energy Program Renewable energy art project Senior centre photovoltaic (10kW) Success regional sporting facility photovoltaic (6 kW) Administration Building Wind turbine (10kW)	New Energy Future	Environmental Services (Capital Works Projects)	30 tCO2e	1. Renewable energy art project initiated 2011. Completion April 2013 2. Seniors Centre PV (9kW) system installed May 2012 3. Success regional sporting facility PV (8 kW) installed July 2012 4. Administration Building Wind turbine (10kW) installed 2012
Waste Education Officer p/t	Waste minimisation	Waste Services (Operational budget)	TBC	Completed Waste Education Officer employed.
Administration Complex Air Conditioning Upgrade	Energy Efficiency	Infrastructure Services (Capital Works budget)	n/a	In progress. Feasibility studies commissioned. Tender awarded for detailed design.

Zero Emissions Fleet Program	Offsets	Environmental Services (Operational budget)	3713 tCO2e	Program developed by Environmental Services Oct 2011. 3419 Offsets purchased for 2011/12
Street lighting and Facility Offset Program	Offsets	Environmental Services (Greenhouse Action Fund)	8254 tCO2e	5838 Offsets purchased for 2011/12
Ensure continued improvement in landfill methane gas capture efficiency	Waste minimisation	Waste Services (Operation budget)	76,333 tCO2e	Partnership with Waste Gas Resources. Extensive grid pipework installed in new landfill benches to improve future gas capture.
Construction of new workshops at Henderson Waste Recovery Park	Waste minimisation	Waste Services (Capital Works budget)	TBA	Increased resource recovery of metals
Assess implications of Carbon Tax to the City, accurately model carbon price liability for HWRP, and develop a plan to manage the liability	Waste minimisation	Waste Services (Operation budget)	n/a	Internal Review conducted and commissioned Aurecon to undertake the *HWRP – Clean Energy Future Assessment Carbon Cost Management Plan*.
Report landfill emissions to Federal Government via NGERS.	Waste minimisation	Waste Services (Operation budget)	n/a	National Greenhouse and Energy Report For City of Cockburn submitted

Project	Focus Area	Responsibility and Funding	Abatement Potential Per annum
2012/13			
Energy Audit Program	Energy Efficiency	Infrastructure services	TBA
Investigate geothermal and district energy (Co-generation/tri-generation)	Energy Efficiency	Infrastructure Services and Community Services (Greenhouse Action Fund)	TBC at end of feasibility studies
Renewable Energy Program Success integrated community facility (99kW)	New Energy Future	Community Services (Capital Works and Grant Funding)	~150 tCO2e
Behaviour change program	New Energy Future	Environmental Services (Operational budget)	~50 tCO2e
Zero Emissions Fleet Program	Offsets	Environmental Services (Operational budget)	~3500 tCO2e
Waste Management Strategy	Waste minimisation	Waste Services (GL budget)	~76,000 tCO2e
Ensure continued improvement in landfill methane gas capture efficiency	Waste minimisation	Waste Services (Operation budget)	TBA
Waste and Recycling Awareness and Education Activities	Waste minimisation	Waste Services (GL and Operation budget)	TBA
Investigate large-scale onsite renewable energy generation for HWRP and other City sites	Renewable Energy Program	Infrastructure Services (Operation budget)	n/a
HWRP Staff Training on de-gassing fridges	Waste minimisation	Waste Services (Operation budget)	TBA
Investigate Carbon Farming Initiative (CFI) opportunities for HWRP	Waste minimisation	Waste Services (Operation budget)	TBA
Report landfill emissions to Federal Government via NGERS.	Waste minimisation	Waste Services (Operation budget)	n/a
Administration Complex Air Conditioning Upgrade	Energy Efficiency	Infrastructure Services (Capital Works budget)	n/a

Project	Focus Area	Responsibility and Funding	Abatement Potential Per annum
2013/14			
Energy Audit Program	Energy Efficiency	Infrastructure services	TBA
Renewable Energy Program Photovoltaic Expansion (additional 99kW)	New Energy Future	Environmental Services (Greenhouse Action Fund)	~150 tCO2e
Zero Emissions Fleet Program	Offsets	Environmental Services	~3500 tCO2e
PV Implementation Plan	New Energy Future	Infrastructure Services	TBA
Outdoor Lighting Energy Efficient Upgrade Implementation Plan	Energy Efficiency	Parks	TBA
Trial Biomass Plant at HWRP	Waste minimisation	Waste Services	TBA
Ensure continued improvement in landfill methane gas capture efficiency	Waste minimisation	Waste Services (Operation budget)	TBA
Waste and Recycling Awareness and Education Activities	Waste minimisation	Waste Services (GL and Operation budget)	TBA
Resource Recovery Targets for HWRP	Waste minimisation	Waste Services (Operation budget)	TBA
Report landfill emissions to Federal Government via NGERS. Continue to improve accuracy of emissions estimation.	Waste minimisation	Waste Services (Operation budget)	TBA
Investigate large-scale onsite renewable energy generation for HWRP and other City sites	Renewable Energy Program	Infrastructure Services (Operation budget)	n/a
Administration Complex Air Conditioning and Lighting Upgrade implementation	Energy Efficiency	Infrastructure Services (Capital Works budget)	438 tCO2e

Within the first three years of this strategy, the Renewable Energy Program and energy efficiency opportunities will deliver 11% of the required emissions savings for electricity and fuel emissions, thus reducing the City's dependence on offsets to meet reduction targets. The Greenhouse Action Fund will provide $900,000 towards implementing this action plan over the first 3 years.

Action 13:

The City will adopt the Action Plan and implement emission reduction initiatives identified.

8. Funding

Funding to implement the abatement and offsetting activities will will be allocated to projects through the Greenhouse Action Fund, departmental operational and capital budgets and from external funding sources where available.

Action 14:

The City will allocate funds through:

- The Greenhouse Action Fund (sourced from Municipal funds)
- Existing operational and capital budgets (sourced from Municipal funds)
- External funding opportunities

The Greenhouse Action Fund

The Greenhouse Action Fund will use funds previously spent on the purchase of Green Power to develop more appropriate and desirable projects aimed at improving energy efficiency, energy independence or addressing waste emissions. By redirecting these funds, the City will increase the value received by investing in infrastructure, staff and the community.

In 2009/10 the City spent $320,000 on Green Power. By shifting this to the Greenhouse Action Fund, the City will be able to purchase offsets for the Zero Emissions Fleet Program, and invest the balance in the renewable energy program, energy efficiency opportunities and effective waste management.

The Greenhouse Action Fund will be an accumulative fund administered by the Manager of Finance. Access to the Fund will require a business case to be approved by the Director of Engineering. Whilst preference will be given to renewable energy or infrastructure projects with GHG abatement potential, all projects that address energy efficiency or waste management will be considered. Additionally, projects with external funding, such as grants, will be viewed favourably.

The Greenhouse Action Fund commenced in 2011/12 with a budget of $300,000 per annum. Council committed to continuing this level of funding for the first three years, after which it will be reviewed, giving consideration to any CPI increases. The Greenhouse Action Fund will be supplemented by any revenue received through the sale of surplus energy generated by the City. The following table shows the expenditure and funding allocations to date.

Year	Funding Allocation	Expenditure	Balance
Opening Balance	315,955	-	315,955
2011/12	214,940	35,000	495,895
2012/13	214,000	450,000	259,895

Figure 9. Greenhouse Gas Action Fund

Action 15:

The City will cease the purchase of Green Power as from 30 June 2011 and redirect that funding to establish a Greenhouse Action Fund as from 1 July 2011

Existing Operational and Capital Budgets

The Greenhouse Action Fund is intended to be additional to existing operational budgets and capital expenditure. As climate change is an organisational responsibility, departments are encouraged to plan and budget for their respective emissions reductions and climate change adaptation activities. As such, the Waste Services is required to contribute financially to reducing waste emissions.

Action 16:

The City will continue current investment in greenhouse gas reduction activities from operating and capital budgets.

External Funding Opportunities and Partnerships

External opportunities for funding greenhouse gas activities are available from time to time. In the past, the City has received funding from the Sustainable Energy Development Office, has partnered with an external organisation to reduce the cost of implementing gas capture at the HWRP.

The City will monitor any opportunities for external funding from Federal or State Government schemes and these will be pursued to assist with the implementation of this strategy.

Examples of external funding opportunities include:

- Community Energy Efficiency Program - CEEP will support local councils and community organisations to cut pollution and reduce their energy costs through energy efficiency upgrades to street lighting, community facilities and council buildings.
- Strategic Waste Initiative Scheme (SWIS) –the SWIS is aimed at providing support and encouragement to business and industry, local government, community groups and individuals in tackling priority waste issues. This program is currently suspended but is expected to be renewed.
- Waste Authority Strategic Partnerships -formal alliances between the Waste Authority and key stakeholders to enable consolidated engagement and/or the building of mutual long-term goals and commitments to waste avoidance and resource recovery.

Action 17:

The City will seek out external funding opportunities

9. Governance

This strategy is a long term plan which is intended to be a 'living' document that is reviewed and adapted to stay up to date with changes in policy, technology and climate change science. This process will also help to monitor progress towards goals, assess the effectiveness of abatement actions and assist in the preparation of annual budgets.

The City commits to reviewing the strategy, its action plan, funding requirements, measuring emissions and reporting on performance against targets through the preparation of an annual report. This process will be coordinated by Environmental Services who will ensure that staff, Councillors and the community are kept informed of the output.

The next review is scheduled for February 2014 and will establish the next 3 year action plan.

Action 18:

The City will review the strategy, undertake greenhouse gas emission inventories and report on performance against targets through an annual report.

Carbon Tax

On 8 November 2011 the Clean Energy Future legislation was introduced by the Australian Federal Government. The legislation placed a fixed price on carbon of $23 a tonne from 1 July 2012, moving to a flexible price after three years. Under the Carbon Price, facilities that emit more than 25,000 tCO2-e each year are liable to pay for every tonne of emissions produced beyond 1 July 2012

There are two main impacts of the carbon price to the City of Cockburn:

- Direct liability for the greenhouse gas emissions of Henderson Waste Recovery Park (HWRP)
- Increase in the cost of energy and services as retailers pass on the costs they have incurred as a result of the carbon price

The most significant implication of the Clean Energy Act 2011 is the application of a carbon price to the City's landfill site at HWRP. In 2011/12 the reported emissions from HWRP were estimated under NGERs to be 22,900 tCO2-e. It is anticipated that HWRP may tip the Carbon Tax threshold of 25,000 tCO2-e in 2012/13.

The City has seen an increase in the price of electricity and gas as energy retailers pass on the costs they incur as a result of the carbon price. This change has had budget implications to the City for each of its electricity and gas accounts.

This increase in energy price has resulted in a positive change to the payback periods for energy efficiency projects, creating an opportunity for projects that may have been dismissed in the past due to not being viable.

The City is managing the impacts of the Carbon Tax on its operations by:

- applying a carbon price gate fee surcharge of $7 tonne at HWRP
- factoring the impact of rising costs in energy and services into its budgeting.
- implementing energy management actions from the Greenhouse Gas emission reduction strategy (this strategy) to reduce energy consumption and associated emissions
- developing a Waste Management Strategy to minimise waste to landfill and associated emissions at HWRP
- reporting landfill emissions to Federal Government under the National Greenhouse and Energy Reporting Act 2007.
- Investigating Carbon Farming Initiative (CFI) opportunities for HWRP
- Continuing to improve accuracy of emissions estimation.

Action 19:

The City will proactively manage the impacts of the Carbon Price .

10. Conclusion

The City of Cockburn has taken a proactive approach to reducing corporate GHG emissions. With the use of Green Power and offset purchases, the City has been able to achieve its reduction targets for electricity and fuel consumption in the past. Despite significant investment in waste recovery and gas capture technologies; the City was unable to meet its over-ambitious waste emissions reduction targets.

Moving forward, the City has set high but achievable emissions reductions targets for 2020 and 2050. These will be met by a shift in methodology from the purchase of Green Power and offsets to providing value-adding abatement through investment in infrastructure for the City, energy efficiency programs, waste diversion and addressing legacy waste emissions. This additional value will be delivered concurrently with the purchase of more cost effective offsets to ensure that the City continues to meet its GHG reduction targets.

By endorsing this Strategy, the City continues to demonstrate leadership to the community through its response to climate change. However, reducing greenhouse gas emissions is just one step in the broader climate change challenge. The City will continue its broad reaching activities in community action and climate change adaptation in conjunction with this strategy.

11. Glossary

Definitions of many of key terms included in this strategy are provided below:

Abatement	Activities that reduce greenhouse gas emissions
Adaptation	Finding new ways to live and work in the context of climate changes
Carbon Farming Initiative	A carbon offsets scheme which will allow for the reporting of reduced emissions from legacy waste in landfill
Cities for Climate Protection	An international program helping local governments to respond to climate change
CO_2e	Carbon Dioxide equivalent. Commonly used to represent greenhouse gas emissions from a variety of different greenhouse gases to account for their different warming effects
Cogeneration	The use of a heat engine or power station to produce both electricity and useful heat at the same time. Also known as Combined Heat Power (CHP)
District Energy	The use of alternative energy generation sources to provide distributed electricity or heating within a small geographical region, avoiding the need to use centralised energy generation
Geothermal Energy	The use of high temperatures within the earth's crust to heat water or generate electricity
Greenhouse Gas (GHG)	Gases in the earth's atmosphere that absorb and re-emit infra-red radiation. The Kyoto Protocol lists six main gases: Carbon Dioxide (CO2), Methane (CH4), Nitrous Oxide (N20), Hydro Fluorocarbons (HFC's), Per Fluorocarbons (PFC's) and Sulphur Hexafluoride (SF6)
Green Power	An upgrade for purchased electricity enabling the consumer to purchase electricity sourced from renewable energy
HWRP	The Henderson Waste Recovery Park
Landfill Gas	Methane and other gases released as organic content in landfill breaks down
Legacy emissions	Emissions from waste already deposited in landfill
New Energy Future	The shift in energy generation from traditional coal and gas-fired electricity to renewable and sustainable energies such as renewable energy, landfill gas energy and co/tri-generation
Offset	A voluntary action that removes greenhouse gases from the atmosphere.
Renewable Energy	Energy generated from sources rapidly replaced by natural processes.
Trigeneration	Similar to cogeneration, with the added generation of useful cooling at the same time as heating and electricity

Appendix A – Past Actions Completed to Date

CORPORATE Actions	Year
Green Power	
Electricity for Buildings - Natural Power Admin and Library on 100% since July 07 All accounts (except SLLC) 100% since 2008	2007 - 2011
Electricity for Streetlights - Natural Power	50% since August 2008
Parks	
10 year program to replace inefficient irrigation systems	2008
Buildings - Energy Efficiency Initiatives	
Administration Building	
Lighting retrofits, de-lamping, and sensors	2001, 2003, 2008, 2010
Energy Audits	2005, 2008
Equipment upgrades (computers)	2008
Hot water upgrades	2009
Block out blinds	2009
Bike lockers	2010
Energy Monitoring (Greensense)	2010
Auto computer shut-down	2011
10kW Windpods Wind Turbine System	2012
Spearwood Library	
Energy Audits	2005, 2008
Lighting retrofits and sensors	2008
Sub meter	2009
10.5 kW Solar photovoltaic system	2010
Energy Monitoring (Greensense)	2010

CORPORATE Actions	Year
LED tube lighting retrofit (stage 1) LED tube lighting retrofit (stage 1)	2011 2012
Seniors Centre Building Hot water system upgrade Lighting retrofit and sensors Block out blinds Energy Monitoring (Greensense) 9kW Solar PV	 2005 2011 2009 2010 2012
Atwell Community Centre Energy Audit Lighting sensors 3 kW Solar photovoltaic system Energy Monitoring (Greensense)	 2009 2005 2010 2010
AzeliaLey Museum Lighting retrofit	 2007, 2009
Henderson Waste Recovery Park Lighting retrofits, timers Eco-vents 3.6 kW Solar photovoltaic system	 2007,2010 2009 2010
South Lake Leisure Centre Lighting retrofit and timers Pool and Spa Blankets sub meter (outdoor pool)	 2007 2007, 2011 2011
Cockburn Wetlands Education Centre Extensive retrofit including: extension of north facing windows, curtains, insulation, rainwater tank, e-vents, thermal tiling, solar pergola Sensor lights Energy monitoring (Greensense)	 2009, 2010 2011 2010

CORPORATE Actions	Year
Youth Centre	
Energy Audit	2009
Lighting upgrade and sensors	2009
5.25 kW Solar photovoltaic system	2009
Energy Monitoring (Greensense)	2010
LED Lighting Retrofit	2011
Jean Willis Centre	
Energy Audit	2010
Lighting upgrade and sensors	2005, 2010
3 kW Solar photovoltaic system	2010
Energy Monitoring (Greensense)	2010
Depot /Operations Centre	
Lighting retrofit and skylights	2005, 2008
Success Regional Sporting Facility 8 kW solar photovoltaic system	2012
Coolbellup Community Hub	2009
Energy efficient retrofit	2010
9.9 kW solar photovoltaic system	2012
8 kW solar photovoltaic system	2012
Energy Monitoring (Greensense)	
Other	
Nicholson Reserve (Hot water system and lighting upgrade)	2005, 2008
Yangebup Hall (motion sensors)	2005
Enright Reserve (lighting retrofit)	2008
Naval Base Shacks(Hot water system upgrade)	2008
Coogee Beach (lighting retrofit)	2008
Anning Park Hall (lighting retrofit)	2008

CORPORATE Actions	Year
Public Lighting	
Lobby Western Power to change to energy efficient streetlights	ongoing
Natural Power for streetlights	50% since August 2008
Sustainable Public Lighting Action Plan	2008
6 Solar LED Leaf shaped lights Market Garden Swamp	2012
Hybrid Solar Wind Turbine Coogee Beach 0.5 kW	2012
Carbon Sinks	
Revegetation- carbon storage	Since 1996
Waste - Henderson Waste Recovery Park	
Methane Flaring	2003 onwards
Domestic Transfer Station	2008
Recycling Shop	2009
Weekly Recycling	2011
Wood waste diversion	2009
Improvement in methane gas capture with extensive pipework	2008
NGERS Reporting	2009
Waste education in primary schools	2009
Collection points for E-waste and hazardous waste	2009
Waste and Recycling Education and Awareness Activities	2010
Marketing compaign for Waste Education eg billboards, signage on trucks	2011
Waste-wise event management including signage, recycling bins, audits, survey's, vender engagement, information on community events booklet	2011
Waste Education Officer employed	2012

CORPORATE Actions	Year
New workshops for improved resource recovery of metal	2012
Staff Training in degassing	2012
Investigate large-scale onsite renewable energy generation for HWRP and other City sites	2012
Compost and Worm Farm workshops and Subsidies	2012
Partnership with Central Institute Technology – Renewable Energy Art	2013
Waste Management Strategy draft WasteWise Events Guidelines Draft	2013
Governance	
Sustainable Purchasing Policy	Adopted 2007
Monitoring and reporting of emissions	Since 1999
Joined WALGA Greensense Emissions Reporting Platform	2011
Corporate Awareness Raising	
Living Smart in the workplace	2009
Staff visits to SMRC and HWRP	2009, 2010
Sustainability Committee established	2009
Small Wind Turbine Facility partnership	2009
Small Scale Wind regional workshop	2009
Statement on sustainability included in job descriptions	2010
Days of Change program and Staff Challenge	2010
Educational displays and staff information sessions	2009, 2010, 2011
Fleet	
Bio fuel purchase	2008 - 2010
Hybrid cars incorporated into fleet	2008, 2009, 2010, 2011

CORPORATE Actions	Year
Minimum Vehicle Green Star rating - Light Vehicle Purchasing Guidelines	2009
Zero Emissions Fleet Program	2012
Offsets	
1000 tonnes purchased from SMRC (retired 2008/09)	2009
1815 tonnes purchased from SMRC (retired 2010/11)	2010/11
9257 tonnes purchased from SMRC (retired 2011/12)	2011/12

Appendix B – Solar Photovoltaic and Wind Turbine Installations to date 1/1/2013

Building	Energy Usage kWh/year	Renewable Energy kWh/year	Renewable energy %
Spearwood Library 10.5kW PV (2010)	94,323	16,863	17%
Youth Centre 5.25kW PV (2009)	170,471	8431	5%
Jean Willis Community Centre 3.04kW PV (2010)	43,773	4745	11%
Atwell Community Centre 3.04kW PV (2010)	44,122	4745	11%
Henderson Waste Recovery Park 3.6kW PV (2010)	46,249	6022	13%
Coolbellup Community Hub 9.9kW plus 8kW = 17.9kW PV(2010 & 2012)	193,732	30,952	16%
Cockburn Wetlands Education Centre 3.3kW PV (2011)	11,892	4855	40%
Seniors Centre 9kW PV (2012)	151,084	15,877	9.5%
Success Regional Sporting Facility 8kW PV (2012)	127,977	13,687	11%
Emergency Services Volunteer HQ 20kW PV (2012)	TBA (new facility)	32,120	TBA

Building	Energy Usage kWh/year	Renewable Energy kWh/year	Renewable energy %
Administration Building 11kW Wind Turbine (2012)	707,817	4,500	0.6%
Coogee Beach, Poore Grove 600W Wind Turbine	n/a	unmetered	n/a
Total	1,591,440	142,798	9%

Progress to Renewable Energy Target

Building	Energy Usage kWh/year	Renewable Energy kWh/year	Renewable energy %
All Council Buildings	~ 4,500,000		3.2%

Appendix C – Other relevant documents

Other documents referred to in the Strategy or relevant to its development are listed below:

- City of Cockburn Community Strategic Plan *2012 – 2022*
- City of Cockburn Sustainability Strategy
- City of Cockburn Adaptation Action Plan
- City of Cockburn Climate Change Community Awareness Strategy
- City of Cockburn Greenhouse Gas Multi Criteria Abatement
- City of Cockburn Emissions Forecast 2009-2050
- Administration Site Prefeasibility Study for District Energy 2010