Corporate Greenhouse Strategy

2013 - 2020
Contents

GLOSSARY 2

1. EXECUTIVE SUMMARY 3

2. INTRODUCTION 4

3. BACKGROUND 5

4. CORPORATE EMISSIONS PROFILE 9

5. GREENHOUSE GAS EMISSIONS REDUCTION ACTIONS 14

6. CARBON OFFSETS 19

7. FINANCIAL RESOURCE MANAGEMENT 22

8. IMPLEMENTATION 23
<table>
<thead>
<tr>
<th><strong>Glossary</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carbon Offset</strong></td>
</tr>
<tr>
<td><strong>Direct Emissions</strong></td>
</tr>
<tr>
<td><strong>Greenhouse Gas</strong></td>
</tr>
<tr>
<td><strong>Green Power</strong></td>
</tr>
<tr>
<td><strong>Indirect Emissions</strong></td>
</tr>
<tr>
<td><strong>Scope 1 Emissions</strong></td>
</tr>
<tr>
<td><strong>Scope 2 Emissions</strong></td>
</tr>
<tr>
<td><strong>Scope 3 Emissions</strong></td>
</tr>
<tr>
<td><strong>Solar Photovoltaic (‘Solar PV’)</strong></td>
</tr>
<tr>
<td><strong>T5 Light Globes</strong></td>
</tr>
<tr>
<td><strong>Tri-Generation</strong></td>
</tr>
<tr>
<td><strong>Zero Net Emissions</strong></td>
</tr>
</tbody>
</table>
Climate Change remains a critical issue for Hobsons Bay City Council. A coastal, low lying and relatively flat municipality, it is in the Council and community’s interests to mitigate the potential impacts of climate change by reducing our greenhouse gas emissions.

The Greenhouse Action Plan 2008 – 2013 (GAP) was first developed by the Council as a response to community concerns about climate change. The purpose of the GAP was to provide a pathway for action to reduce greenhouse gas emissions (emissions) resulting from the Council’s activities.

Significant change has occurred in accounting for, reporting on and reducing the greenhouse gas emissions of organisations. This document, the Corporate Greenhouse Strategy is intended to provide a cost effective way forward for the Council in achieving its zero net greenhouse gas emissions by 2020 target.

This Plan provides the following actions:

**Action 1** The Council will continue to track the greenhouse gas emissions resulting from its activities and provide an annual public report on emissions and activities undertaken to reduce these emissions.

**Action 2** The Council will continue to investigate Scope 3 emissions sources to determine the emissions associated with it, in particular contractors, purchasing and capital works.

**Action 3** The Council will investigate purchasing or creating offsets as an alternative to purchasing Green Power and continue to monitor any changes in the associated federal emissions factor.

**Action 4** The Council will maintain its zero net emissions by 2020 target.

**Action 5** The Council will prioritise the actions outlined in the Greenhouse Action Plan.

**Action 6** The Council will investigate the opportunity for the generation and/or purchasing of carbon offsets.

Actions undertaken that directly reduce greenhouse gas emissions will be considered in light of integrated asset management, the lifecycle management of Council buildings, renewal of assets and the Strategic Resource Management Plan. The costs associated with this Strategy will be provided in part through the reallocation of expenditure and in part through sourcing opportunities for external funding.

Synergies with applicable projects, such as initiatives that will to reduce greenhouse gas emissions and have other benefits, will be explored as will partnership opportunities.
Introduction

The Greenhouse Action Plan 2008 – 2013 was first developed by the Council as a response to community concerns about climate change. The purpose of the Greenhouse Action Plan was to provide a pathway for action to reduce greenhouse gas emissions resulting from the Council’s activities.

Figure 1: Greenhouse gas emitting activities and their Scopes.

Through this Corporate Greenhouse Strategy, the Council seeks to recommit to its zero net greenhouse gas emissions by 2020 target and provide a framework for strategic decision making and action.

Section three provides a background to past greenhouse gas emissions reduction strategy and action. The result of an audit of the Greenhouse Action Plan is provided along with suggestions from internal stakeholders for possible future actions.

Section four analyses the Council’s current greenhouse gas emissions profile. Policy direction is provided on how the Council should approach Scope 3 emissions, Green Power and recommitting to its zero net emissions target.

Section five provides direction about how the Council will approach greenhouse gas emissions reduction actions in the future to achieve its zero net greenhouse gas emissions and save costs.

Section six discusses the possibilities for offsetting the remainder of greenhouse gas emissions in 2020.

Section seven is a detailed, costed implementation plan for each sector and provides designation of responsibility for different actions.
3.1 Policy Context

Federal

Hobsons Bay City Council remains committed to action on climate change. In the years since the Council’s Greenhouse Action Plan 2008 – 2013 was written the policy context has changed significantly. Australia now has a national standard for reporting on emissions, the National Greenhouse and Energy Reporting Act (NGERs). The federal government has also successfully introduced a national emissions reduction target and a carbon price.

Australia’s emissions reduction target is a 5% reduction on 2000 emissions levels by 2020 and a 25% reduction on 2000 levels if an international agreement is reached (See Figure 2). The carbon price is Australia’s most comprehensive commitment to climate change action.

Figure 2: The Federal Government’s greenhouse gas emissions reduction target
3 Background

The architecture of the Federal Government’s policy response can be seen in Figure 3. The carbon price will be applied to the top 500 emitting organisations. Whilst some councils have been captured by the carbon price; Hobsons Bay City Council is not required to report under the NGERs legislation.

Local

Environmental Sustainability is important and a priority issue for the Council. This is shown through its commitments in the Council Plan. Strategy 3.5 within the Council Plan states that the Council will:

work towards reducing the Council’s net emissions of greenhouse gases to zero by 2020 and assist the community to achieve zero net emissions by 2030

In adopting the Greenhouse Action Plan, the Council committed to reducing greenhouse gas emissions through two targets:

> zero net corporate emissions by 2020, and;
> zero net community emissions by 2030.

The Greenhouse Action Plan outlined actions to achieve both targets; however the strategies and actions used to achieve these two targets are significantly different. To allow for more targeted, focussed action, the Council has addressed the two targets via two separate strategies. The community target will be addressed within the Community Greenhouse Strategy.

The architecture of the Federal Government’s policy response can be seen in Figure 3. The carbon price will be applied to the top 500 emitting organisations. Whilst some councils have been captured by the carbon price; Hobsons Bay City Council is not required to report under the NGERs legislation.

3.2 Data Management

In the past, tracking and reporting on emissions resulting from the sectors that are under the operational control of the Council has proven difficult. In 2012 the Council sought to better understand its emissions profile through an Environmental Reporting System (ERS). The ERS compiles and produces reports on all greenhouse gas emissions that the organisation is responsible for.

Most of the water, gas and electricity data is sourced directly from the relevant retail providers. However, some of the data that is fed into the ERS system comes from other programs and data capture points across the organisation, including:

> Fleet fuel usage data from City Maintenance and Cleansing
3 Background

- Taxis, pool car fuel, vehicle allowances, volunteer vehicles, vehicle reimbursements from Finance
- Flights data from Governance.

The reports produced for the Council are therefore partly reliant on data owners across the organisation providing correct and timely information.

Tracking and reporting emissions accurately is important. Continued investment in the ERS will ensure that the Council is able to make well informed decisions when undertaking actions and report accurately and transparently in relation to any greenhouse gas emissions reductions targets.

**ACTION 1:** The Council will continue to track the greenhouse gas emissions resulting from its activities and provide an annual public report on emissions and activities undertaken to reduce these emissions.

### 3.3 Greenhouse Action Plan Audit

As part of the review of the Greenhouse Action Plan, an audit was undertaken to determine the efficacy and barriers to action. The audit consisted of four parts: stakeholder identification, document review, workshop with relevant stakeholders, and a final report. The following departments participated in the audit:

- Environmental Planning and Sustainability
- Fleet
- Capital Works and Assets
- Community Development
- Libraries (EnviroCentre)
- Recreation
- Waste
- Parks

Participants were asked to provide feedback on the level of effectiveness and implementation of the individual actions from the Greenhouse Action Plan. Figure 4 shows the distribution of actions according to their perceived level of effectiveness and implementation. It can be noted that the majority the corporate related actions fell into low effectiveness quadrants.

---

**Figure 4:** Greenhouse Action Plan Action Review Workshop Assessment
Participants agreed that the implementation of Actions is heavily dependent on available time & resources, and clearly assigned responsibilities. Similarly, Actions which were not well implemented also lacked a clear measure of success. Many of the Actions which had been well implemented were binary in nature i.e. their success was based on the simplicity of the task and could be answered with a simple “yes” or “no”. When the implementation of an Action was more nuanced or subjective, success was not always clear.

Stakeholders were also asked to prioritise future actions. Figure 5 shows the spread of votes, demonstrating that a focus on maintaining existing infrastructure and gaining the best results from these assets is important.

Other significant insights from the workshop include:

> The document review indicated that those actions which were implemented and perceived to be effective are those which are thought to be under the direct control of a single department or relatively small/tangible.

> Stakeholders also provided a strong indication that the next iteration of the Plan should focus on building-related initiatives and/or initiatives which were clearly measurable and resourced.

![Figure 5: Greenhouse Action Plan – possible future actions](image-url)
4.1 Organisational Boundary


Since moving to reporting in line with NGERs some of the Council's largest emitting sectors are no longer deemed within its organisational reporting boundary. Scope 1 and 2 emissions are within the council's organisational reporting boundary and therefore measurable as Council emissions. Scope 3 emissions are outside of the Council's organisational reporting boundary and therefore not measurable as the Council's emissions. Figure 6 below shows the sectors that make up the Council's full inventory (Scope 1, 2 and 3.)

The organisational reporting boundary of facilities and assets is important in determining those sectors that fall within Scope 1 and 2. The Council is currently working to clarify those assets that are deemed outside of its operational control.

4.2 Greenhouse Gas Emissions Profile

Figure 7 (Scopes 1, 2 and 3) below shows the Council's emissions profile over three consecutive years. Across all Scopes the Council is responsible for **34,783 tonnes of CO2-e** (2010/11). The year 2010/11 shows a considerable increase in emissions. This was mostly due to a significant increase in household community waste (garbage), perhaps due to a particularly wet year resulting in increased

<table>
<thead>
<tr>
<th>Scope</th>
<th>Emission Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fuel Consumption - Employee Vehicles (Allowance)</td>
</tr>
<tr>
<td></td>
<td>Fuel Consumption - Corporate</td>
</tr>
<tr>
<td></td>
<td>Fuel Consumption - Fleet (Biodiesel)</td>
</tr>
<tr>
<td></td>
<td>Fuel Consumption - Fleet (Diesel)</td>
</tr>
<tr>
<td></td>
<td>Fuel Consumption - Fleet (Petrol)</td>
</tr>
<tr>
<td></td>
<td>Fuel Consumption - Employee Vehicles (Reimbursements)</td>
</tr>
<tr>
<td></td>
<td>Natural Gas</td>
</tr>
<tr>
<td></td>
<td>Refrigerant Gas - Fridges and Vending Machines</td>
</tr>
<tr>
<td></td>
<td>Fuel Consumption - Volunteer Vehicles</td>
</tr>
<tr>
<td>2</td>
<td>Electricity (Buildings and Public Lighting)</td>
</tr>
<tr>
<td></td>
<td>Community Waste - Household Waste</td>
</tr>
<tr>
<td></td>
<td>Community Waste - Green Waste</td>
</tr>
<tr>
<td></td>
<td>Electricity (Street Lighting)</td>
</tr>
<tr>
<td></td>
<td>Corporate Waste - Municipal</td>
</tr>
<tr>
<td></td>
<td>Corporate Waste - Green</td>
</tr>
<tr>
<td>3</td>
<td>Extraction, Production and Transportation of Energy for Electricity</td>
</tr>
<tr>
<td></td>
<td>Extraction, Production and Transportation of Energy for Fuels</td>
</tr>
<tr>
<td></td>
<td>Extraction, Production and Transportation of Energy for Natural Gas</td>
</tr>
<tr>
<td></td>
<td>Air Travel</td>
</tr>
<tr>
<td></td>
<td>Taxi Travel</td>
</tr>
<tr>
<td></td>
<td>Paper</td>
</tr>
</tbody>
</table>

**Figure 6:** The activities undertaken by the Council that result in greenhouse gas emissions
**4 Hobsons Bay City Council Emissions Profile**

**Figure 7:** Scopes 1, 2, and 3 greenhouse gas inventories (for the Council for 2008/09, 2009/10 and 2010/11.)
4 Hobsons Bay City Council Emissions Profile

Figure 8 identifies the Council’s emissions resulting from Scope 1 and 2 sectors only. This demonstrates the considerable difference community waste and streetlights (Scope 3 emissions) makes to the Council’s emissions profile. Within the Council’s organisational boundary of Scope 1 and 2, it is responsible for 4,290 tonnes of CO2-e (2010/11).

The majority of emissions within the Council’s organisational boundary (roughly two thirds) are a result of electricity and natural gas consumption in buildings and metered lighting. The second largest sector is fuel consumption in fleet. Ideally future emissions reductions actions should be targeted at the buildings, metered lighting (Council owned) and fleet sectors. This will be explored further in Section 5.

4.3 Scope 3

Under NGERs, only Scope 1 and 2 emissions are required to be reported. However, tracking and reporting Scope 3 emissions is considered international best practice. For this reason, and that Scope 3 emissions are a large proportion of the Council’s inventory, Scope 3 emissions related information continues to be collected and knowledge improved.

The federal government’s National Carbon Offset Standard (NCOS) has recommended that organisations whose Scope 3 emission are believed to be large in comparison to Scope 1 and

vegetation growth.
4 Hobsons Bay City Council Emissions Profile

ACTION 3: The Council will investigate purchasing or creating offsets as an alternative to purchasing Green Power and continue to monitor any changes in the associated federal emissions factor.

4.5 Greenhouse Gas Emission Reduction Targets

As mentioned in Section 3.1 as part of the previous Greenhouse Action Plan, the Council adopted a corporate emissions reduction target:

> Zero net corporate emissions by 2020

Climate change science advises that, globally, emissions must peak by the end of this decade to avoid the possibility of more than two degrees of warming. Emissions reduction targets are common in both the public and private sectors.

The Council is therefore maintaining its zero net emissions by 2020 target. This target aligns with current climate change science and further demonstrates the Council’s commitment to corporate social responsibility.

This target is applicable to Scope 1 and 2 emissions. Figure 9 demonstrates the emissions reduction potential from actions by 2020 (50%) in the different sectors. It also demonstrates the residual emissions (50%) that will need to be offset to achieve the corporate target (based on the 2010-2011 baseline).

ACTION 2: The Council will continue to investigate Scope 3 emissions sources to determine the emissions associated with it, in particular contractors, purchasing and capital works.

4.4 Green Power

In the past it has been common for organisations to partly achieve ‘carbon neutrality’ status through the purchase of the GreenPower product for electricity used in assets. GreenPower is a renewable energy product sold by electricity retailers. Renewable Energy Certificates are purchased on behalf of the customer by the retailer supplying the GreenPower product.

In 2008 it became more widely understood that, nationally, GreenPower purchases were incorporated into the National Greenhouse Accounts Workbook emissions factor for grid electricity. This means that the emissions reduction benefit associated with GreenPower (as GreenPower comes from renewable energy, no greenhouse gas emissions are associated with the product) is already claimed by any organisation or individual using the grid electricity emissions factor.

This information has resulted in some organisations opting to purchase greenhouse gas emissions offsets instead of the GreenPower product. Should the federal government change the emissions factor to reflect the difference, this practice may change.

It should be noted that the Council does not currently purchase Greenpower or offsets. This approach is in close alignment with the reduction hierarchy discussed in Section 5.
Figure 10 indicates Council’s overall greenhouse gas emissions as measured in the baseline year of 2010 – 2011. It further indicates the proposed reductions of greenhouse gas emissions reductions of 50% by 2020 through appropriate action. It also illustrates the purchases of offsets for the remaining 50% of the Council’s emissions post 2020.

**ACTION 4**: The Council will maintain its zero net emissions by 2020 target.

---

**Figure 10**: Zero net emissions reduction 2010-2011 to 2020
5.1 Greenhouse Gas Emissions Reduction Hierarchy

It is considered best practice to prioritise emissions reduction actions according to the carbon management hierarchy. Figure 11 steps out the different categories within the hierarchy. Avoiding and reducing emissions, prior to switching and offsetting, are likely to be longer lasting. This is because to avoid and reduce often involves changing infrastructure or a behavior, resulting in a more permanent reduction. Avoiding and reducing emissions are also generally more cost effective actions.

It should be noted that in accordance with this hierarchy, and in alignment with its targets, Council will not offset its residual emissions until 2020.

Figure 11: The greenhouse gas emissions reduction hierarchy.

5.2 Marginal Abatement Cost Curves

The potential emissions reduction actions the Council can undertake to achieve its target have been presented in the form of a Marginal Abatement Cost Curve. The curve describes actions and their relative cost of emissions abatement, as well as the total estimated emissions reduced in a year.

The example curve provided in Figure 11 should be interpreted as follows:

- The vertical axis represents the cost of reducing emissions. If the cost is negative, this indicates financial loss reductions associated with reducing emissions (for example, reducing electricity reduces energy costs, as well as emissions).

- The horizontal axis represents the amount of emissions that can be reduced by implementing an action across one year, in tonnes of CO$_2$e.

The most cost effective actions are those below the horizontal axis of the graph with the greatest width. These actions indicate the greatest financial benefit, and have the largest potential reduction in emissions.
5 Greenhouse Gas Emissions Reduction Actions

Cost of abatement in $ / tonne of CO₂e (where negative values indicate cost savings)

Adopt LPG Vehicles
Purchase fuel efficient cars
Vehicle replacements
Undertake electric vehicle trial
Purchase hybrid vehicle replacements

Figure 12: An example Marginal Abatement Cost Curve.
5 Greenhouse Gas Emissions Reduction Actions

Figure 13 is the Marginal Abatement Cost Curve developed for emissions reductions actions addressing vehicle management and all building types. A detailed breakdown is provided in Section 8 'Implementation'.

It can be noted that there are seven actions beneath the horizontal axis that reduce financial losses by 2020. Thirteen actions will cost less than $500/tonne and eight greater than $500/tonne by 2020.

Figure 13: Cost effectiveness of greenhouse gas emissions abatement actions - Marginal Abatement Cost Curve.
Greenhouse Gas Emissions Reduction Actions

Figure 14 provides a wedge graph demonstrating the greenhouse gas emissions abatement potential from each proposed action. Several actions, such as installing Solar PV on small and large sites, highly reflective paint, sensor lighting and lighting upgrades are indicated to have potential for significant greenhouse gas emission reductions.

This information provides direction for prioritising actions. Prioritisation of actions will be guided by those actions that are most cost effective coupled with those that reduce the most emissions by 2020. It should be noted that other emissions reduction options may arise over time and should be assessed in light of situational circumstances.

Figure 14: Greenhouse gas emissions abatement potential from each proposed action.
5.3 Environmental Engagement Strategy and Implementation Plan

Another aspect to achieving emissions reductions is through influencing people’s behaviour. The Environmental Engagement Strategy mostly focuses on engaging audiences in the community. However, in relation to the Council’s emissions reduction target, it is also important to influence staff and users of the Council’s assets to behave in a more environmentally friendly way. The Environmental Engagement Strategy Implementation Plan may provide opportunities for staff to engage in more energy efficient ways through both the Hobsons Bay Environment Action Team (HEAT) and other opportunities as they arise.

5.4 Hobsons Bay Environment Action Team (HEAT)

The HEAT is a staff volunteer program that enables interested individuals to participate in environmentally friendly programs and actions. Some of the activities that HEAT has been involved in include:

- PC and monitor energy saving program – at the conclusion of the working day, volunteers check their colleagues monitors and computers to check that they have been switched off. Those who have switched off receive a token reward.

- Office composting - Installation of food scraps bins around the office have provided the opportunity to feed five worm farms in the office courtyard. Castings are universally available for keen staff gardeners.

- Staff vegetable garden bed – Volunteers aided in the installation and the ongoing upkeep of a low maintenance, water efficient ‘wicking’ vegetable garden bed.

The HEAT will actively promote emissions reductions messages and seek to undertake projects that reduce greenhouse gas emissions.
Carbon Offsets are projects that indirectly compensate for emissions by:

> Investing in emissions avoidance or reductions elsewhere; or

> Removing carbon from the atmosphere, usually by storing in trees or soils.

### 6.1 Generation

Carbon offsets are not considered equal, with some offset products considered superior to other products. The generation of offsets that meet the criteria of the different standards illustrated in Figure 15 is complicated. The Council does, however, have two potential opportunities for creating carbon offsets through the recently introduced Carbon Farming Initiative (CFI):

> Through the destruction of methane from legacy landfill emissions

> Through environmental plantings of native species.

Methodologies for calculating the emissions reduction potential from these actions has been determined by the CFI. Further investigation is needed to establish if potential council projects are eligible.

### 6.2 Purchasing

Offsets can be purchased from Voluntary or Mandatory markets. Figure 14 below outlines the steps the Council should go through in purchasing offsets.

**Figure 15: The decision making process for the purchase of offsets**

1. **Standard of Accreditation**

Projects which generate offsets may be accredited to various standards. Each standard has its own principles and requirements that must be addressed for a particular project to achieve accreditation.

The Council should select a standard which aligns with its own organisational principles. Figure 16 provides a summary of offset standards.

2. **Project Types**

As seen in Figure 17, there are a range of project types available for purchase. The Council should preference projects that align with the top of the emissions reduction hierarchy (see Section 5.1) over those which are located at the lower end of the hierarchy.
### Standard Features

<table>
<thead>
<tr>
<th>Standard</th>
<th>Features</th>
<th>Principles</th>
<th>Recognised Project Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Gold Standard</td>
<td>The Gold Standard Foundation recognises projects which reduce emissions and are also underpinned by a social and environmental focus.</td>
<td>- ‘Do no harm’&lt;br&gt;- Stakeholder consultation&lt;br&gt;- Additionality&lt;br&gt;- Positively impact on the economy, health, welfare and environment of the hosting community.&lt;br&gt;- Independently verified</td>
<td>Energy efficiency&lt;br&gt;Renewable energy projects.</td>
</tr>
<tr>
<td>Voluntary Carbon Standard</td>
<td>The Voluntary Carbon Standard is an international standard, widely used for projects issuing credits onto the voluntary market. The Standard recognises projects which feature approved methodologies within a wide range of areas.</td>
<td>- Real, measureable and conservative&lt;br&gt;- Additionality&lt;br&gt;- Permanent&lt;br&gt;- Independently verified&lt;br&gt;- Registered.</td>
<td>Energy (renewable / non-renewable)&lt;br&gt;Energy distribution&lt;br&gt;Mining/ mining production&lt;br&gt;Agriculture, forestry and land use</td>
</tr>
<tr>
<td>National Carbon Offset Standard</td>
<td>The NCOS establishes a national standard for domestic offsets projects in Australia. Offsets generated under this standard must meet established criterion of additionality, permanency, measurability, transparency, registered and independent verification.</td>
<td>- Additional&lt;br&gt;- Permanent&lt;br&gt;- Measureable&lt;br&gt;- Transparent&lt;br&gt;- Demonstrable&lt;br&gt;- Independently audited&lt;br&gt;- Registered</td>
<td>Domestic offset projects</td>
</tr>
<tr>
<td>Joint Implementation (JI) Scheme</td>
<td>The JI is a project-based mechanism which has been established under the Kyoto Protocol. The JI can be applied between industrialised countries and those with economies in transition (EIT).</td>
<td>- Net climate change benefits&lt;br&gt;- Environmental and social co-benefits&lt;br&gt;- Promote capacity building in host country&lt;br&gt;- Transparency&lt;br&gt;- Public participation</td>
<td>Forest, cropland and grazing management&lt;br&gt;Reforestation and afforestation.</td>
</tr>
<tr>
<td>Clean Development Mechanism</td>
<td>The CDM is another mechanism option under the Kyoto Protocol. As with the Joint Implementation Scheme offsets projects under the scheme can be used to meet international obligations under the Kyoto Protocol.</td>
<td>- Additional&lt;br&gt;- Contribute to sustainable development&lt;br&gt;- Real, measurable and long-term carbon reductions.</td>
<td>Renewable energy&lt;br&gt;Methane recovery&lt;br&gt;Electricity generation.</td>
</tr>
</tbody>
</table>

Figure 16: The different standards of accreditation for offsets
**3. Location**

Projects may be located within Australia or internationally. Many companies prefer Australian-based projects however, due to the limited availability of offset projects within Australia; this will likely reduce the choice of project types and standards.

**4. Cost**

There are cost implications for each of the preferences discussed above. For example, gold standard accredited projects are often more costly than those accredited under the Voluntary Carbon Standard. Local, Australian sourced offsets are similarly more expensive per tonne of carbon abated than those located in developing countries.

**5. Social and Environmental Implications**

Each project will have its own set of social and environmental advantages and disadvantages which need to be carefully examined before the selection of a final offset. The Council should seek careful and specific information on these components from their offset provider/broker.

The Council must also consider whether any projects would be of concern to their internal and external stakeholders.

**ACTION 6: The Council will investigate the opportunity for generation and/or purchasing of carbon offsets.**

---

**Project Categories | Description**

| Energy Efficiency | Energy efficiency offsets are generated through the implementation of technology to improve energy efficiency and reduce energy consumption. An example of an energy efficiency project could be the installation of energy efficient light bulbs within homes, or the major upgrade of a manufacturing process.

A number of co-benefits can also be generated through these projects, particularly in the areas of education and long-term behaviour change. Disadvantages can arise from weak permeability, as efficiencies can be eliminated by increases in production. Uncertainties also exist around baseline calculations.

| Methane | A number of projects are today available to remove methane from the air. These include projects like methane capture, flaring from landfill / coal mines or the conversion of landfill waste to compost waste.

The Carbon Farming Initiative is likely to encourage the development of offsets projects within these categories, as approved methodologies exist within this area.

| Renewable Energy | Offsets are commonly generated from renewable energy projects such as wind, solar, biomass and other renewable sources, which help reduce reliance on carbon intensive fossil fuels.

The use of renewable energy can play an important part in a carbon management strategy. However careful attention must be paid as to whether renewable energy offset products meet the criteria of additionality.

| Forestation / Sequestration | Trees sequester carbon as they grow, reducing the quantity of greenhouse gases in the atmosphere in a measurable way. Forestry and other forms of bio-sequestration are therefore a popular form of offsets in the voluntary market.

When properly accredited, these projects can have a number of co-benefits such as improved biodiversity, reduction of salinity and the creation of new job opportunities. Careful attention needs to be paid to ensure the permeability of captured carbon.

Figure 17: The project categories for offsets.
7 Financial Resource Management

7.1 Current Resources

The Council currently allocates a capital budget of $400,000 a year to the Greenhouse Action Plan. Roughly half of this is used to changeover streetlights from 80W MV to 32 W CFL. As discussed in Section 4, streetlight emissions are no longer directly accountable to the Council.

7.2 Proposed Resources

The cost of implementing all of the actions in this Plan is $7,213,000 over eight years. A capital budget of approximately $900,000 each year until 2020 would provide for the Council to achieve a 50% emissions reduction as shown in Figure 9 and 10. The estimated cost of each action type can be found in Section 8 ‘Implementation’.

As previously identified, streetlight replacement is no longer within the Scope 1 or 2 emissions. However, streetlight replacement has both broader community and long term financial benefits and will be continued outside of the allocation of funding for the Greenhouse Action Plan.

Actions undertaken that directly reduce greenhouse gas emissions will be integrated into the asset management system, the lifecycle management of Council buildings, seeking continuous improvement in the management of and renewal of assets and the Strategic Resource Management Plan. The costs associated with this Strategy will be provided in part through the reallocation of expenditure and in part through sourcing opportunities for external funding.

Relevant initiatives to reduce greenhouse gas emissions will be explored as will partnership opportunities. In addition, synergies with applicable projects will also be sought.

The cost of offsetting residual emissions is highly dependent on the type of project chosen. This will be explored further and budget allocated as necessary.
Figures 18 to 27 provide a pathway for achieving the actions outlined in Section 5 over an eight year time frame for each sector of organisational activity. Actions were prioritised by the amount of greenhouse gas emissions they abate and their relative cost effectiveness.

The costs provided are estimated based on best available information and present value. In practice, works will be primarily undertaken building-by-building and through fleet policy review and implementation, rather than ‘action-by-action’ as broken down in this section. This permits the specific circumstantial analysis of each asset and organisational needs. This may result in some actions being undertaken that, because of particular circumstance e.g. building configuration or construction, have been estimated to deliver higher returns than provided for in the following tables.

This will occur following a strategic analysis of buildings to determine those that are most appropriate for greenhouse gas emission retrofit reduction action. Criterion for this strategic analysis, and building selection, will also consider the outcomes of any capital assets management review.

Following the implementation of these actions the Council should enact its guideline for generating/purchasing offsets to achieve its zero net emissions reduction target in 2020 and beyond.

### 8.1 Building Actions

![Figure 18: Building actions to achieve the zero net emissions by 2020 target – Marginal Abatement Cost Curve.](image-url)
## Implementation

<table>
<thead>
<tr>
<th>Priority</th>
<th>Emissions Reduction Action</th>
<th>Cost ($/tonne)</th>
<th>Emissions Reduction Potential (tCO2-e/year)</th>
<th>Capital Cost</th>
<th>Capital Cost per Year</th>
<th>Building Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Solar PV - Small sites</td>
<td>$203</td>
<td>369</td>
<td>$1,327,887</td>
<td>$165,985</td>
<td>small sites</td>
</tr>
<tr>
<td>2.</td>
<td>Solar PV - Large sites</td>
<td>$203</td>
<td>232</td>
<td>$834,651</td>
<td>$104,331</td>
<td>large sites</td>
</tr>
<tr>
<td>3.</td>
<td>Lighting upgrades (buildings)</td>
<td>-$95</td>
<td>228</td>
<td>$237,000</td>
<td>$29,625</td>
<td>all</td>
</tr>
<tr>
<td>4.</td>
<td>Sensor lighting</td>
<td>-$13</td>
<td>136</td>
<td>$237,000</td>
<td>$29,625</td>
<td>all</td>
</tr>
<tr>
<td>5.</td>
<td>Highly reflective paint - Large sites</td>
<td>$68</td>
<td>111</td>
<td>$270,375</td>
<td>$33,796</td>
<td>large sites</td>
</tr>
<tr>
<td>6.</td>
<td>Gas heating (Split system air-conditioner replacement)</td>
<td>-$35</td>
<td>105</td>
<td>$81,596</td>
<td>$10,199</td>
<td>all</td>
</tr>
<tr>
<td>7.</td>
<td>Solar hot water (Sites with Electric Heating)</td>
<td>$779</td>
<td>96</td>
<td>$819,256</td>
<td>$102,407</td>
<td>electricity only</td>
</tr>
<tr>
<td>8.</td>
<td>Hot Water Heat Pumps - Pavilions</td>
<td>$252</td>
<td>52</td>
<td>$214,570</td>
<td>$26,821</td>
<td>pavilions</td>
</tr>
<tr>
<td>9.</td>
<td>Wall insulation - Small sites</td>
<td>$4</td>
<td>47</td>
<td>$84,372</td>
<td>$10,546</td>
<td>small sites</td>
</tr>
<tr>
<td>10.</td>
<td>Roof insulation - Small sites</td>
<td>$84</td>
<td>47</td>
<td>$116,925</td>
<td>$14,615</td>
<td>small sites</td>
</tr>
<tr>
<td>11.</td>
<td>Switch to energy efficient refrigerators</td>
<td>$2,225</td>
<td>24</td>
<td>$510,916</td>
<td>$63,864</td>
<td>all</td>
</tr>
<tr>
<td>12.</td>
<td>Solar hot water (Sites with Gas Heating)</td>
<td>$1,980</td>
<td>21</td>
<td>$396,480</td>
<td>$49,560</td>
<td>gas only</td>
</tr>
<tr>
<td>13.</td>
<td>Wall insulation - Large sites</td>
<td>-$159</td>
<td>20</td>
<td>$6,672</td>
<td>$834</td>
<td>large sites</td>
</tr>
<tr>
<td>14.</td>
<td>Roof insulation - Large sites</td>
<td>$171</td>
<td>13</td>
<td>$36,050</td>
<td>$4,506</td>
<td>large sites</td>
</tr>
<tr>
<td>15.</td>
<td>High Performance Glazing (Double-Glazing) - Large sites</td>
<td>$428</td>
<td>40</td>
<td>$213,921</td>
<td>$26,740</td>
<td>large sites</td>
</tr>
<tr>
<td>16.</td>
<td>High Performance Glazing (Double-Glazing) - Small sites</td>
<td>$3,073</td>
<td>25</td>
<td>$693,833</td>
<td>$86,729</td>
<td>small sites</td>
</tr>
<tr>
<td>17.</td>
<td>Mechanical building management system (MBMS) - Large sites</td>
<td>$940</td>
<td>25</td>
<td>$37,156</td>
<td>$4,644</td>
<td>large sites</td>
</tr>
<tr>
<td>18.</td>
<td>Photocells</td>
<td>$1,417</td>
<td>1</td>
<td>$16,008</td>
<td>$2,001</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$6,134,668</strong></td>
<td><strong>$494,551</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 19:** Priority building actions
8 Implementation

8.2 Corporate Fleet Actions

<table>
<thead>
<tr>
<th>Priority</th>
<th>Emissions Reduction Action</th>
<th>Cost ($/tonne)</th>
<th>Emissions Reduction Potential (tCO2-e/year)</th>
<th>Capital Cost</th>
<th>Capital Cost per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Purchase fuel efficient vehicle replacements</td>
<td>$882</td>
<td>60</td>
<td>$71,985</td>
<td>$8,998</td>
</tr>
<tr>
<td>2.</td>
<td>Adopt LPG vehicles</td>
<td>$2,244</td>
<td>42</td>
<td>$77,601</td>
<td>$9,700</td>
</tr>
<tr>
<td>3.</td>
<td>Purchase hybrid vehicle replacements</td>
<td>$397</td>
<td>39</td>
<td>$129,713</td>
<td>$16,214</td>
</tr>
<tr>
<td>4.</td>
<td>Undertake electric vehicle trial</td>
<td>$137</td>
<td>27</td>
<td>$417,236</td>
<td>$52,154</td>
</tr>
</tbody>
</table>

Figure 20: Corporate fleet actions - Marginal Abatement Cost Curve.

Figure 21: Priority corporate fleet actions
8.3 Heavy Fleet Actions

![Marginal Abatement Cost Curve](image)

**Figure 22:** Heavy fleet actions - Marginal Abatement Cost Curve.

<table>
<thead>
<tr>
<th>Priority</th>
<th>Emissions Reduction Action</th>
<th>Cost ($/tonne)</th>
<th>Emissions Reduction Potential (tCO2-e/year)</th>
<th>Capital Cost</th>
<th>Capital Cost per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Purchase B100 biodiesel fuel</td>
<td>$879</td>
<td>75</td>
<td>$44,125</td>
<td>$5,515</td>
</tr>
<tr>
<td>2.</td>
<td>Hybrid truck replacement</td>
<td>$245</td>
<td>60</td>
<td>$183,812</td>
<td>$22,976</td>
</tr>
</tbody>
</table>

**Figure 23:** Priority heavy fleet actions
8.4 Metered Lighting Actions

Figure 24: Metered Lighting Actions - Marginal Abatement Cost Curve.

<table>
<thead>
<tr>
<th>Priority</th>
<th>Emissions Reduction Action</th>
<th>Cost ($/tonne)</th>
<th>Emissions Reduction Potential (tCO2-e/year)</th>
<th>Capital Cost</th>
<th>Capital Cost per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lighting upgrades - T5 14W</td>
<td>$121</td>
<td>9</td>
<td>$6,348</td>
<td>$793</td>
</tr>
<tr>
<td>2.</td>
<td>100W LED lighting replacement</td>
<td>$1,697</td>
<td>7</td>
<td>$111,909</td>
<td>$13,988</td>
</tr>
</tbody>
</table>

Figure 25: Priority metered lighting actions
8.5 Corporate Waste Actions

<table>
<thead>
<tr>
<th>Priority</th>
<th>Emissions Reduction Action</th>
<th>Cost ($/tonne)</th>
<th>Emissions Reduction Potential (tCO2-e/year)</th>
<th>Capital Cost</th>
<th>Capital Cost per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Waste audit</td>
<td>$19</td>
<td>39</td>
<td>$6,000</td>
<td>$750</td>
</tr>
<tr>
<td>2.</td>
<td>Recycling education presentations</td>
<td>$9</td>
<td>39</td>
<td>$2,775</td>
<td>$346</td>
</tr>
<tr>
<td>3.</td>
<td>Centralised waste bins</td>
<td>$-</td>
<td>39</td>
<td>$-</td>
<td>$-</td>
</tr>
<tr>
<td>4.</td>
<td>Waste information updates</td>
<td>$430</td>
<td>7</td>
<td>$27,000</td>
<td>$337</td>
</tr>
</tbody>
</table>

**Figure 26:** Corporate waste actions - Marginal Abatement Cost Curve.

**Figure 25:** Priority metered lighting actions