Aspirational Energy Transition Plan 2014–24

Cardinia Shire Council

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1 EXECUTIVE SUMMARY

Climate change and peak oil are dual threats that mean we need to change the way we generate and use energy. These threats present us with a significant opportunity to reshape our energy systems to ensure we have a safe, sustainable and secure energy supply.

Over the next decade or two, the price of oil is anticipated to rise significantly due to the global oil supply being unable to match demand. [1] The price of coal-generated electricity in Cardinia Shire is also expected to rise substantially as network costs escalate.

Cardinia Shire Council and its residents are dependent on electricity and fuel. Rising energy costs and potential shortages leave Cardinia Shire Council and residents vulnerable.

Energy efficiency and fuel switching are key parts of ensuring that we limit the impacts of climate change. From installing more efficient lighting, to supporting renewable energy facilities, Council is committed to addressing the challenge presented by these global issues at the local level.

Improving energy efficiency and investing in clean sources of energy will not only reduce our environmental impact, it will also assist with the affordability and security of our energy supply in coming years.

While some steps are being taken at state and federal levels to address these challenges, much more needs to be done. Council has a unique opportunity to make a real difference in these areas at a local level.

Council has set the aspirational target of achieving zero net emissions for its operations and a 36 per cent reduction in community emissions on a per capita basis by 2024. Making these changes will not only benefit the environment, they will also provide a significant financial benefit by saving the Council and community on energy costs.

This strategy outlines the steps to achieve these goals. Some major actions include the following.

- Environmental upgrades of Council facilities and assets to improve energy efficiency including Cardinia Life, Cardinia Culture Centre, Pakenham Library and Hall, Koo Wee Rup Pool, Beaconsfield Community Complex, and decorative street lighting throughout the Shire.
- Installation of solar electricity systems for Council facilities and the purchase of grid-supplied green power.
- Incorporation of sustainable design assessment into the planning approval process, to improve the design of new developments in the Shire.
- Initiatives to support solar electricity systems for the community.
- Community indigenous plant giveaways.

The development of this strategy and its emission targets are key actions of the *Council Plan 2013–17*. This strategy has been renamed the 'Aspirational Energy Transition Plan' rather than the 'Greenhouse Action Plan' because Council decided to focus the plan on the source of greenhouse gas emissions – energy consumption.

[1] Standing Committee on Rural and Regional Affairs and Transport, The Senate, February 2007, http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Rural_and_Regional_Affairs_and_Transport/Completed_inquiries/2004-07/oil_supply/report/c03

2 INTRODUCTION

2.1 Climate change

The threat we are faced with from climate change has risen in prominence and recognition in the last decade. The impacts of climate change have been seen in recent times, and they are more severe and occurring faster than predicted. [2] Carbon dioxide levels in the atmosphere continue to rise due to human activity.

It is difficult to precisely predict the potential impacts of climate change, as they vary with each region. Best estimates are that by 2030 Australia will face:

- a further 1 degree Celsius of warming in temperatures
- up to 20 per cent more months of drought
- up to 25 per cent increase in days of very high or extreme fire danger
- an increase in storm surges and severe weather events.

As the driest inhabited continent on earth, Australia is vulnerable to the effects of climate change. Australia has many globally important and vulnerable ecological systems. The majority of Australians are coastal dwellers. Climate change presents significant risks to our economy. Negative impacts on public health and food production capacity are linked to climate change. [3]

Climate change increased the severity of the 2012–13 summer in Australia. This summer was the hottest since records began in 1910. [4]

Cardinia Shire has already seen extreme drought, heat, rainfall and flooding due to climate change. These events and their impacts are set to increase in severity unless action is taken to reduce atmospheric carbon dioxide levels.

A safe level of carbon in the atmosphere, that will provide us with a stable climate, is 350 parts per million or less. We exceeded this level of carbon dioxide in the atmosphere in the late 1980s. A recent quote from leading climate scientists outlines the concerns:

> "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO2 will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that… If the present overshoot of this target CO2 is not brief, there is a possibility of seeding irreversible catastrophic effects." (J Hansen et al)[5]

Since the above statement was made in 2008, CO2 levels have now risen to 400ppm and continue to rise.

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[2] WWF, Climate changing faster than scientists expected, October 2008, available from: http://assets.wwf.org.uk/downloads/cc_science_paper_october_2008_1.pdf

[3] Australian Government, Energy Management For Schools, available from: http://www.em.gov.au/sites/schools/Getthefacts/Climatechange/Pages/default.aspx

[4] Professor Will Steffen, Climate Commission, The Angry Summer Report, 2013

[5] J Hansen et al, Target Atmospheric CO2: Where Should Humanity Aim?, 2008, http://www.fws.gov/pacific/climatechange/pdf/boise/burgett/recommended%20reading/hansen_arxiv_preprint.pdf

In January 2007, the International Panel on Climate Change (IPCC) claimed the world has just 10 years to reverse surging carbon emissions or risk runaway climate change that could make many parts of the planet uninhabitable. Richard Betts, leader of a research team at the United Kingdom Met Offices Hadley Centre for Climate Change, said:

> "The next 10 years are crucial, in that decade we have to achieve serious reductions in carbon emissions. After that time the task becomes very much harder." [6]

The costs of addressing climate change are small compared to the consequences and cost of inaction. We need to rapidly reduce our greenhouse gas emissions to ensure a safe and liveable planet for ourselves and future generations. To do this we need to eliminate all major emissions sources on a global scale and work on drawing down carbon that is already in the atmosphere.

2.2 Peak oil

Oil is a key energy source, and reducing our energy consumption and greenhouse gas emissions will reduce our dependence on this source of energy. This is important given concerns around the future supply of oil.

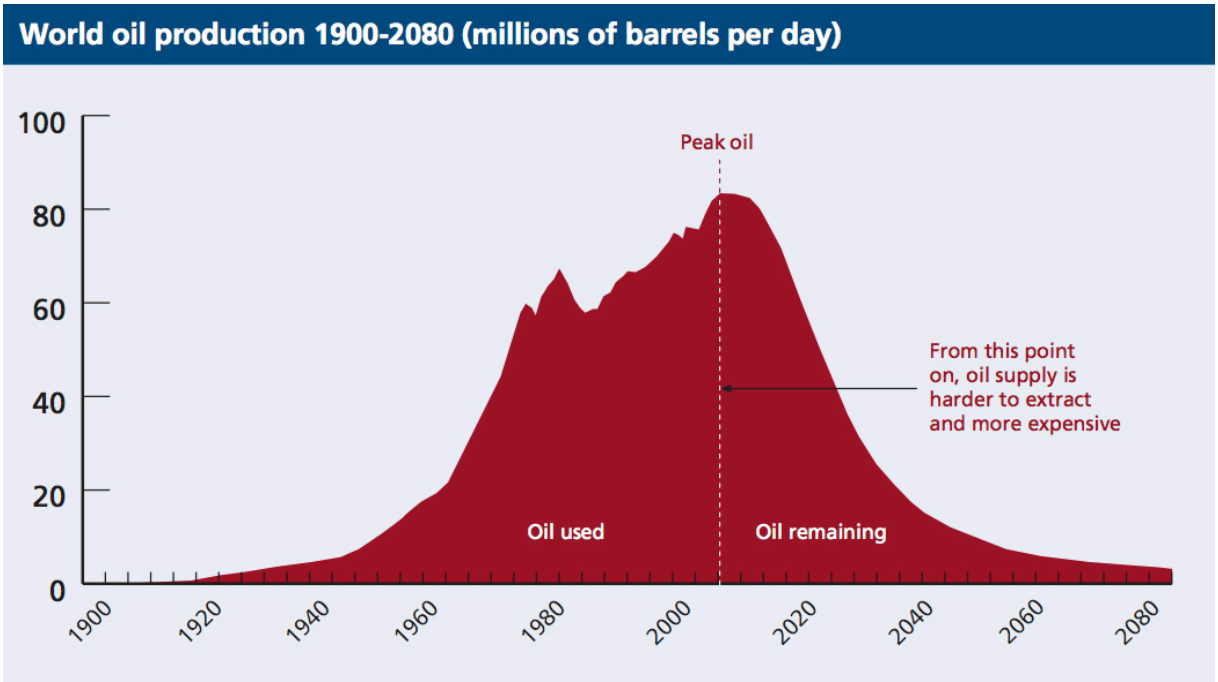
Our current economic systems are based on the availability of plentiful and cheap oil. Oil is used in many parts of our everyday lives including:

- fuel used to power our cars and farm machinery
- asphalt used on our roads
- fuel used to transport our food and products
- fertilisers, herbicides and pesticides used to produce our food
- plastic used to wrap and store food and other items
- fuel used to power mining equipment to dig coal which in turn provides electricity.

Peak oil is defined as the point at which oil demand outstrips supply, after this point it will become harder to access. Some believe that we neared this point in 2008, prior to the global financial crisis. Figure 1 demonstrates historic oil extraction and a predicated future decline in oil availability.

[6] Jonathan Leake, The Australian, Last warning: Ten years to save the world, January 2007, available from: http://www.theaustralian.com.au/news/last-warning-10-years-to-save-world/story-e6frg6n6-1111112901563

Figure 1. World oil production [7]

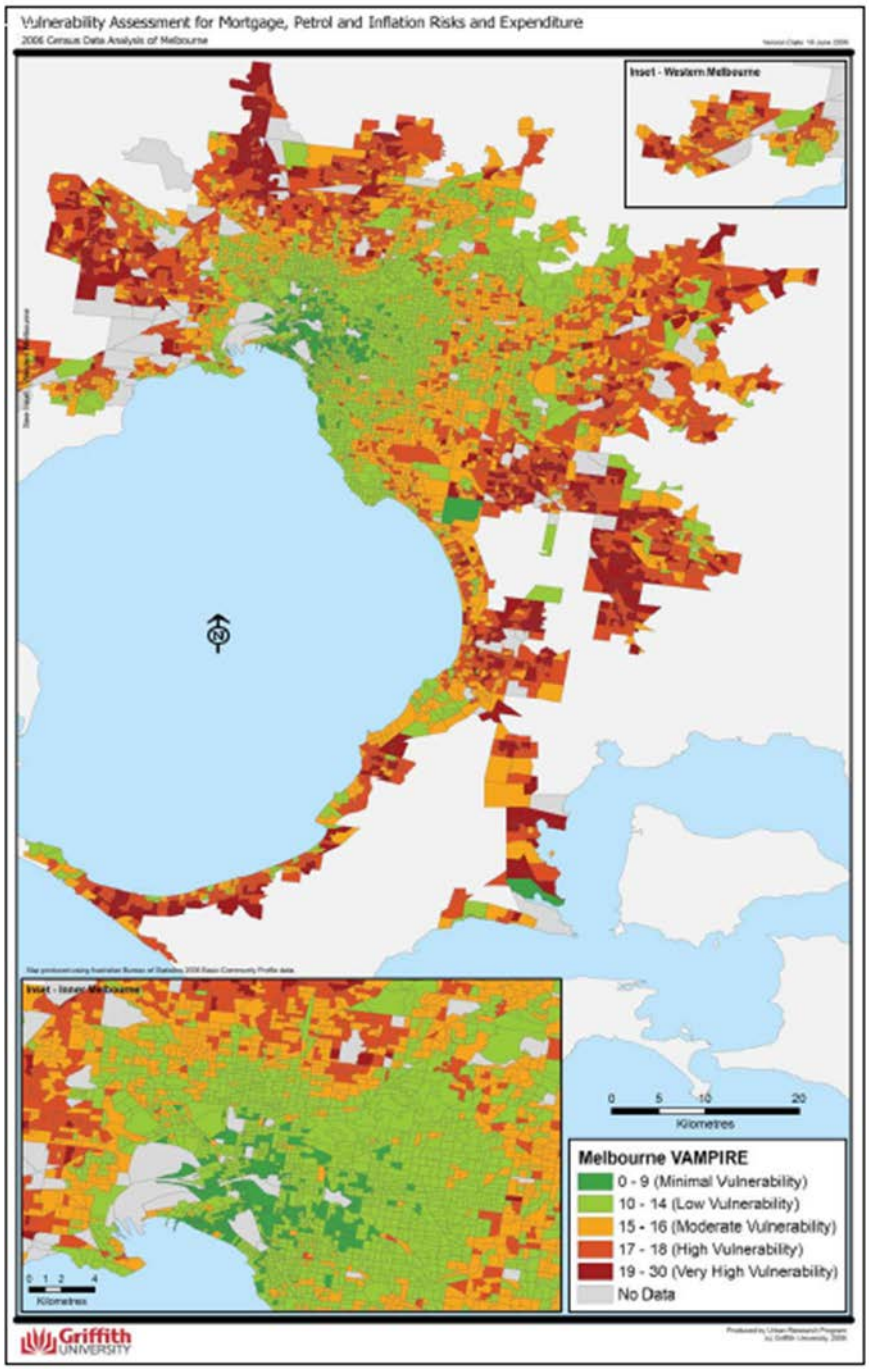


Between 2001 and 2008 a significant spike in the price of oil occurred, the price of oil increased by a multiple of 5. This has been linked to an increasing demand for oil without a matched increase in supply. This spike put pressure on the global economy, which led to a reduction in consumer spending and mortgage repayments, accelerating the impact of the global financial crises.[8]

The Vulnerability Assessment for Mortgage, Petrol and Inflation Risks and Expenditure (VAMPIRE) Index looks at those who will be at risk in Australian cities during times of economic hardship and increased oil costs due to a reliance on petrol and bank finance. This index was updated by Griffith University in 2006. Figure 2 shows significant risk for areas of the urban growth boundary of Cardinia Shire that have been modelled. If steps are not taken to address this vulnerability, peak oil's impacts will be magnified in the Shire. [9]

[7] Reproduced with permission from Farm Credit Canada. From Knowledge Insider: Energy, Winter 2009 edition. (For sources of original quantitative data, see page 48).
[8] Tom Whipple, The Post Carbon Reader Series: Energy, Peak Oil and the Great Recession, available from: http://www.postcarbon.org/Reader/PCReader-Whipple-Oil.pdf.
[9] Jago Dodson and Neil Sipe, Unsettling Suburbia: The New Landscape of Oil and Mortgage Vulnerability in Australian Cities, Griffith University, 2008, available from: http://www.griffith.edu.au/__data/assets/pdf_file/0003/88851/urp-rp17-dodson-sipe-2008.pdf

Figure 2. VAMPIRE Index, Melbourne 2006 [10]



Due to peak oil concerns, reliance on this fuel source should be reduced, as it is likely that prices will spike in the future or oil will become unavailable. Council's response to this risk is outlined in Section 5 Community emissions.

[10] ibid

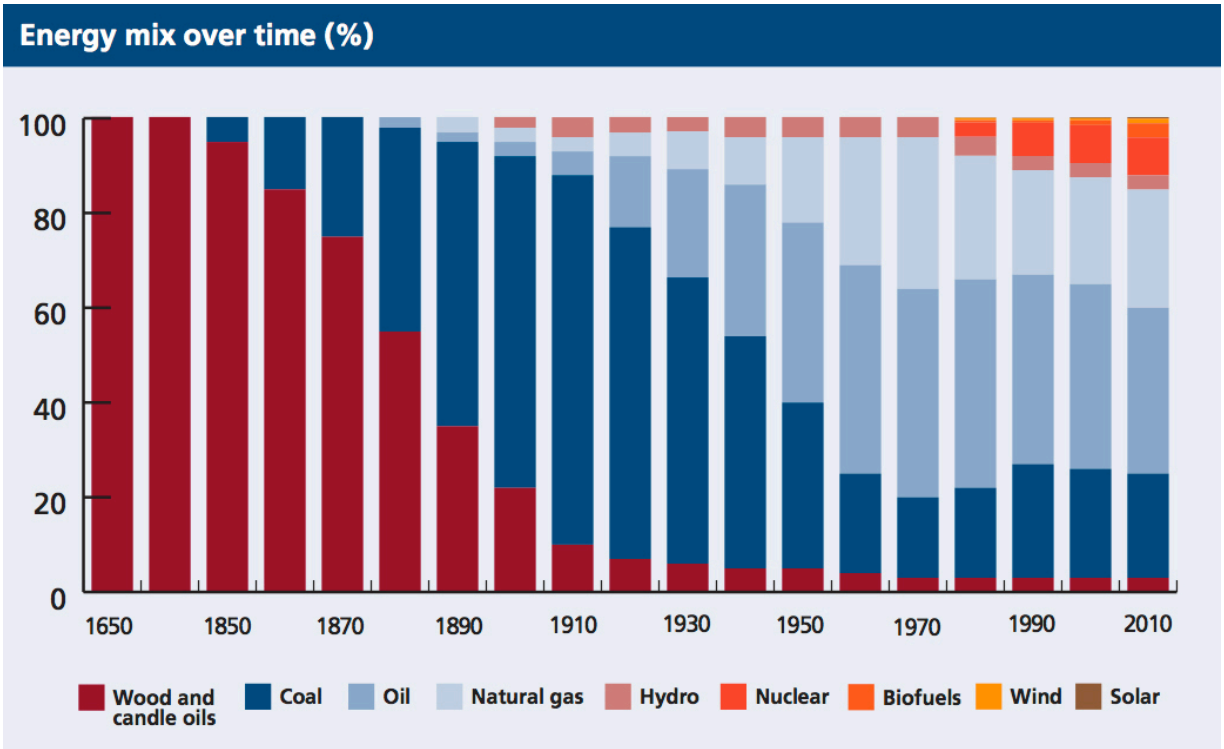
2.3 Energy transition

For hundreds of years global energy came from wood and candle oils. Once wood supplies in Europe became depleted, a denser form of energy was accessed – coal.

Between 1850 and 1900, a transition from wood and candle oil-based energy systems to a coal-based system occurred. A further shift occurred in the mid-20th century as communities moved to oil and gas-based energy systems. These transitions improved quality of life and living standards.

Figure 3 shows the changing nature of global energy supply over the past 360 years.

Figure 3. Energy mix over time (percentage) [11]



This graph also shows the beginning of another transition; the start of a move to renewable energy systems such as hydro, biofuels, wind and solar. This transition will improve our standard of living and quality of life and reduce our impact on the planet. Since the nuclear accident that occurred after the Japanese tsunami in 2011, the move to nuclear energy has slowed and renewables form the most rapidly accelerating form of new energy.

Decisions made today will shape how the graph shown in Figure 3 will look into the future and the type of world we live in. Cardinia Shire Council seeks to be a positive part of this change by developing and implementing this strategy.

[11] Reproduced with permission from Farm Credit Canada. From Knowledge Insider: Energy, Winter 2009 edition. (For sources of original quantitative data, see page 48).

2.4 International response

The Kyoto Protocol, an international agreement on climate change, was made in 1997 and provided binding emissions targets for all signatories. Targets differed from country to country; the aim was for developed countries to achieve "a collective average of at least 5 per cent below the 1990 emissions levels for the commitment period 2008–2012". [12]

While many signatory nations achieved their target, the rapidly rising emissions from developing nations such as China and India and ongoing emissions from developed nations mean that CO2e levels continue to rise. Emissions are being released much faster than they can be absorbed and are cumulating in the atmosphere.

The Kyoto protocol is still the current binding international agreement on greenhouse gas emissions; it is in its second commitment period that expires in 2020. Negotiations will commence in 2015 for a new international emissions agreement to take effect from 2020. The new agreement is anticipated to include legally binding targets for developed and developing nations. [13]

Around the world, local action is taking place and more and more towns and cities are becoming sustainable. Feldheim in Germany is one example, a small town that is powered by 100 per cent renewable energy. "Feldheim is powered by a mix of 43 wind turbines, a woodchip-fired heating plant and a biogas plant that uses cattle and pig slurry as well as maize silage".[14]

No coordinated international response to peak oil exists; although the oil issues we are all facing have resulted in an increased pattern of conflicts and international involvement by oil-rich nations. Some nations have also established 'strategic petroleum reserves'.

The United States reserve currently contains 696 million barrels, a 36-day supply for the nation based on current consumption levels. [15] The US is also developing biofuels that can be used in military jets during oil shortages. [16]

2.5 National response

The Australian Government ratified the Kyoto Protocol in 2007. However, the targets set for Australia allowed for a significant increase in greenhouse gas emissions. The international community provided these concessions to Australia in order to keep our representatives engaged in the Kyoto process.

Australian emissions have continued to rise. The Australian Government's recent reporting on emissions states:

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[12] Parliament of Australia, The Kyoto Protocol, July 2010, available from: http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Browse_by_Topic/ClimateChange/Governance/International/theKyoto

[13] Michael Jacobs, the Guardian, What is the State of International Climate Change Talks, February 2013, available from: http://www.guardian.co.uk/environment/2012/sep/17/internattional-climate-talks-faq

[14] Christoph Steitz, German village offers blueprint for rural green energy, Reuters, 2013, available from: http://www.reuters.com/article/2013/03/26/us-germany-energy-idUSBRE92O0P820130326

[15] United States Department of Energy, Strategic Petroleum Reserve Inventory, available from: http://www.spr.doe.gov/dir/dir.html.

[16] United States Department of Energy, Energy Department Announces New Innovative Projects to Develop Advanced Drop-in Biofuels for Military Jets and Ships, April 2013, available from: http://energy.gov/articles/energy-department-announces-new-innovative-projects-develop-advanced-drop-biofuels-military

> "Since 1990, the National Greenhouse Gas Inventory (excluding Land Use, Land Use Change and Forestry (LULUCF) has grown by 32.1%, reaching 551.9 Mt CO_2-e in the year to December 2012, compared with 417.7 Mt CO2e in the 1990 base year (year to June)." [17]

Including emissions from LULUCF, Australia's emissions have risen by 5 per cent on 1990 levels. [18]

The Australian Government has set a target of reducing emissions by 5 per cent on the year 2000 levels by the year 2020, and 80 per cent of the year 2000 levels by the year 2050. It will also aim for a 25 per cent reduction target by the year 2020 if an international agreement to keep carbon dioxide levels below 450 ppm is reached. [19] A renewable energy target has also been introduced; the target is for 20 per cent of Australia's electricity production to come from renewable sources by 2020.

In September 2013, a new federal government was elected. This government has repealed the carbon pricing legislation and intends on replacing it with a direct action policy. The direct action policy will provide funding for those who can reduce emissions for the lowest cost, and is intended to meet Australia's greenhouse emissions reduction targets.

A senate committee on regional affairs and transport submitted a paper to the Australian Government in 2012 on 'Australia's future oil supply and alternative transport fuels'. The Australian Government response briefly outlined the steps being taken to address peak oil concerns, which included:

- supporting research into biofuels
- increasing fuel efficiency standards for vehicles
- support for renewable energy
- removal of incentives under the fringe benefit tax that encourage the overuse of work vehicles. [20]

2.6 Victorian response

The Victorian Government believes emission reduction targets are best handled at a federal level and not duplicated at the state level. [21] There is no policy response to peak oil from the Victorian Government.

The Victorian Government continues to run some programs to improve energy efficiency.For example, it has launched the 'Switch On' education campaign to encourage energy efficiency (see: www.switchon.vic.gov.au). [22]

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[17] Australian Government Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education, Quarterly Update of Australia's National Greenhouse Gas Inventory, December 2012, available from: http://www.climatechange.gov.au/sites/climatechange/files/documents/05_2013/NGGI-Quartery-Dec-2012.pdf

[18] ibid

[19] Australian Government Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education, Australia's Emission Reduction Targets, available from: http://www.climatechange.gov.au/climate-change/greenhouse-gas-measurement-and-reporting/australias-emissions-projections/australias

[20] Australian Government, Response to Senate Committee Report into Australia's future oil supply and http://www.aph.gov.au/~/media/wopapub/senate/committee/rrat_ctte/completed_inquiries/2004_07/oil_supply/gov_response/govt_response_pdf.ashx

[21] Josh Gordon and Tom Arup, The Age, Carbon Target Scrapped, March 2012, available from: http://www.theage.com.au/opinion/political-news/carbon-target-scrapped-20120326-1vust.html

2.7 Summary

Climate change and peak oil are significant challenges to overcome. While some actions are taking place on an international, national and state level, an opportunity exists for leadership at the local level. Council's action will not only address these important issues, but also ensure our community is resilient and sustainable through the challenges ahead.

3 REVIEW OF SUSTAINABLE DEVELOPMENT AND GREENHOUSE REDUCTION STRATEGY

3.1 Council actions and targets

In 2006, Council released its Sustainable Development and Greenhouse Reduction Strategy. The strategy provided a variety of actions to reduce Council and community emissions. Table 1 demonstrates Council's progress towards meeting Council reduction actions.

Table 1. Progress against Council reduction actions

Action	Progress
Increase to a higher percentage of 'green power' (30%) for all street lighting; with a vision to increase the percentage purchased by 20% every financial year.	Decision made not to purchase green power but to upgrade standard street lighting with energy efficient lighting.
Develop a public street lighting policy	Achieved - this policy was developed in March 2007.
Council to investigate a replacement street lighting program.	Achieved - a major street lighting upgrade has taken place.
Reassess the current fleet car policy with vision to specify high fuel efficiency standards for each class of vehicle.	Achieved - this has occurred, with efficient vehicles from each class now being used.
Develop a Green Motoring Policy for council's vehicle fleet and heavy machinery.	Achieved – Council now purchases the most fuel-efficient vehicles of each class (see Section 4.4).
As part of the investigation, carry out ongoing research and quantify the exchange to alternative fuelled vehicles, including investigating the future purchase of an electric/gasoline car.	Achieved - Council has trialled a full electric vehicle and now owns a Toyota Camry Hybrid as part of the fleet.
Encourage and provide incentives for staff to use alternative transport methods and car-pooling in work hours.	Achieved – provision of extensive shared bicycle/pedestrian paths. A bike is available for staff at Rogers Street to use for local commuting. Reimbursements are available for staff who use public transport for work travel. Council's new office will be located next to the Officer train station increasing the accessibility of public transport. New offices will provide cyclists with bicycle storage and showers.
Conduct energy audit of three high energy consumption Council buildings.	Achieved – Many energy audits have been conducted

[22] Switch On, Victorian Government, see www.switchon.vic.gov.au.

Action	Progress
Develop 'Sustainable Building Standard and Guidelines' for Council buildings.	Achieved - these were finalised in June 2013 and are now in use.
Gradually replace existing electricity-boosted hot water systems on Council owned buildings with either 5-star natural gas hot water units, or solar hot water systems.	Achieved - this is taking place as appropriate. Solar or instantaneous gas units are being used. Three hot water systems including one electric unit have been replaced at the Cardinia Cultural Centre with a commercial solar system.
Purchase flat screen energy efficient computers and monitors for all Council staff.	Achieved - this has occurred and energy efficient laptops have now also been provided to staff.
Ensure the future purchase of energy star compatible equipment and activate all energy reduction facilities on existing office equipment.	Ongoing - some energy reduction settings are set by users (i.e. laptop settings) and advocacy for the implementation of power-saving features continues.
Develop the new 5-star energy efficient Council building into a regional demonstration model of energy efficiency design and construction.	Achieved - this has been achieved with the new Council office in Officer.
Develop and trial a food waste program within Council's main administration building.	Achieved - an organics system is available in Council's main administration building (a worm farm).
Place timers or energy efficient devices on all urns within Council administration buildings	Achieved - timers have been placed on urns.

Significant progress has been made in achieving the above actions.

Council's emissions reduction target under the Greenhouse Reduction Strategy (20% by 2010 on 1996 levels) was not met, as emissions have risen from 3,976 tonnes of CO2e in 1996 to 9,064 of CO2e tonnes (a 56% increase, 76% above the target). This occurred due to the rapid population growth in the Shire and the provision of services to a growing community.

In 1996, the population in the Shire was 43,232 [23], in 2014 it is 84,979. [24] This is a population increase of 41 per cent. Table 2 shows Council emissions levels per resident serviced in 1996 and 2012.

Table 2. Council emissions per resident served

Calendar year	Population	Emissions (tonnes CO2e)	Emissions per resident (tonnes CO2e)
1996	43,232	3,976	0.092
2012	84,979	9,064	0.11

[23] Australian Bureau of Statistics, Regional Population Growth, 1996-97, available from: http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/CA25687100069892CA2568890028D7A6/$File/32180_1996-97.pdf

[24] Cardinia Shire Council, Cardinia Shire Population Forecast, available from: http://forecast2.id.com.au/Default.aspx?id=213&pg=5000.

Council emissions have risen by 16 per cent per resident over the past 16 years, showing the key need for action to reduce the emissions. Recent financial year analysis shows a slight decrease in emissions from 201112 (0.107 tonnesCO2e/resident) to 2012-13 (0.101 tonnesCO2e/resident). This reduction has been achieved by Council maintaining its emissions levels, while servicing a larger population.

3.2 Community actions and targets

Table 3 demonstrates Council's progress towards meeting community reduction actions.

Table 3. Community actions and targets

Action	Progress
Develop a sustainable energy education, awareness and marketing campaign for the community with particular focus on the residential, industrial and commercial sectors within Cardinia Shire.	Achieved – some progress with the Sustainable Homes program and agricultural emissions reduction program. Sustainability Expo delivered in 2010, 2011 and 2013. The provision of the planet savers schools program and regular information in *Connect*.
Develop and implement a school education program on greenhouse gas issues that promotes long-term behavioural change.	Achieved – the Planet Savers program was run through South East Councils Climate Change Alliance (SECCCA), and is now being managed by Sustainability Victoria.
Organise and provide a dedicated sustainability website.	Achieved – the sustainability section of Council's website is live and updated regularly.
Develop a policy document that clearly sets energy and water efficient standards for both commercial and industrial permits.	This is proposed to be implemented through the Sustainable Design Assessment in the Planning Process (SDAPP) model (see Section 5.7).
Support the provision of natural gas to rural townships in the municipality.	Achieved – Council has continued to support the provision of natural gas delivery to rural townships in the Shire.
Support and promote to farmers the five objectives from the National Plan for Greenhouse and Agriculture in collaboration with the Australian Greenhouse Office (AGO) and the Sustainable Energy Authority, including improved information on agriculture emissions and implications of greenhouse, climate change and appropriate adaptive responses.	Achieved – the agricultural efficiency project was run through SECCCA. Fifty farms in Cardinia and Bass Coast were involved in the project. This project improved farm productivity and reduced greenhouse gas emissions for farms involved.
Participate in the AGO 'Greenhouse Challenge' or similar program with a particular focus on local industries.	The Greenhouse Challenge program is no longer running.
Work with Council's Economic Development Unit and other relevant energy bodies to promote Cardinia Shire as an investment location to attract energy efficient or renewable energy markets/industries.	Achieved – Council's Economic Development Unit continues to work to attract businesses to the Shire, including those in the energy efficient or renewable energy markets.
Develop and implement an Integrated Sustainable Transport Strategy for Cardinia Shire.	Not Achieved – this has not been a key focus and no budget was available for this.

Action	Progress
Economically support and promote the implementation of the regional multi-use trail and Cardinia Shire Council Pedestrian and Bicycle Strategy.	Achieved – a pedestrian and bicycle strategy is being developed and a stage of the South Gippsland Rail Trail has been completed in Koo Wee Rup.
Economically support and promote an ongoing tree planting and revegetation program within the Shire to assist in sequestering growth in transport emissions. For example, the establishment of a Community Greenhouse Reduction Corridor along Toomuc Valley Creek, Pakenham.	Achieved – this has occurred with the establishment of the corridor along the Toomuc Creek and the Bunyip carbon sink planting.
Promote bicycle safety to school students in the municipality through supporting action of the Road Safety Strategy (2003) which seeks to implement a bicycle safety program for schools through VicRoads.	Achieved – this has occurred, the Streets Ahead program is supported by Council's health promotion staff.
Support and promote the 'Walking School Bus' program and assist in developing the program for availability to all interested primary schools in the municipality.	Achieved – Council has supported this program since 2003 and promoted the opportunity broadly.
Run a series of green plumber seminar workshops for local tradesman and community members in the municipality.	Achieved – Sustainable Homes Workshops have been provided alternatively.
Training for Development Services staff in sub-division design to meet current and future energy efficiency standards. i.e. Rescode multi-unit developments.	This will be part of the SDAPP rollout referred to in Section 5.7.
Introduction and training for Council staff in using the 'First Rate Program' developed by the Sustainable Energy Authority to assess building and planning applications for their energy efficiency rating.	Alternative and improved software (e.g. the STEPS tool) is proposed later in this strategy.
Encourage and promote sustainable residential development in Cardinia Shire by supporting an energy-efficient display home.	Achieved – an energy efficient display home has been developed through SECCCA in the City of Casey, and Council is looking for partnerships to develop one in Cardinia.
Promote and support both the Solar Hot Water Rebate Program and Natural Gas Hot Water Systems through assistance from the SEAV and AGA	Achieved - this has taken place in partnership with the energy innovation cooperative as part of itssolar bulk buy initiative.
Support and adopt the introduction of the Sustainable Neighbourhood Code from Melbourne 2030 and the new mandatory 5-Star Energy Efficient Building Code for rating new homes.	Achieved – Council has advocated for these items and a 6-star Energy Efficient rating has been introduced.

Action	Progress
Establish a demonstration model (case study) of energy-efficient precincts/businesses in the Shire through media releases and *Connect*.	Achieved - a sustainable home in the Shire was featured in *Connect*, the sustainable display home at Selandra Rise has been promoted and the opportunity to participate in a tour of the Mornington Peninsula Ecohouse was organised for Cardinia residents.
Generate awareness about organic waste recycling.	Achieved – this has occurred through the compost bin rebate program.
Increase Council's purchase percentage of environmentally sustainable products as part of the Waste Wise Purchasing Policy. A price preference of 10% can be given for these products. As part of this, develop a list of preferred distributors of sustainable products.	Achieved – sustainable product purchasing continues to progress.
Increase frequency of green waste collection service in Cardinia Shire.	Achieved – collections are now more frequent and widespread.
Participate in the Waste Wise Schools Program run by Eco Recycle Victoria and the Gould League.	Achieved – Council supported this program in the Shire, resulting in two schools being certified as Waste Wise.

The previous strategy set a target to reduce community emissions by 10 per cent per capita by 2010, from 1996 levels. In 1996, community emissions were 510,909 tonnes of CO2e per annum, they are now 750,785 tonnes of CO2e per annum.

In 1996, the population in the Shire was 43,232[25], in 2014 it is 84,979[26]. This is a population increase of 41 per cent. Table 4 shows the Shire's emissions levels per resident in 1996 and 2012.

Table 4. Community emissions per shire resident

Year	Population	Emissions (tonnes CO2e)	Emissions per resident (tonnes CO2e)
1996	43,232	521,127	12.1
2012	84,979	750,785	8.8

Cardinia Shire's emission levels per resident have dropped by 27 per cent, although the overall emissions continue to rise. The 10 per cent per capita reduction target has been achieved as efficiencies have been gained via improved technology, the use of renewable energy and an increase in population density.

[25] Australian Bureau of Statistics, Regional Population Growth, 1996-97, available from: http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/CA25687100069892CA2568890028D7A6/$File/32180_1996-97.pdf.

[26] Cardinia Shire Council, Cardinia Shire Population Forecast, available from: http://forecast2.id.com.au/Default.aspx?id=213&pg=5000.

4 COUNCIL EMISSIONS

4.1 Emissions summary

Council's greenhouse gas emissions come from a variety of sources. Figure 4 provides a breakdown of Council's emissions in 2012. Table 5 provides a more detailed breakdown of Council's main sources of emissions.

Figure 4. Council greenhouse gas emissions

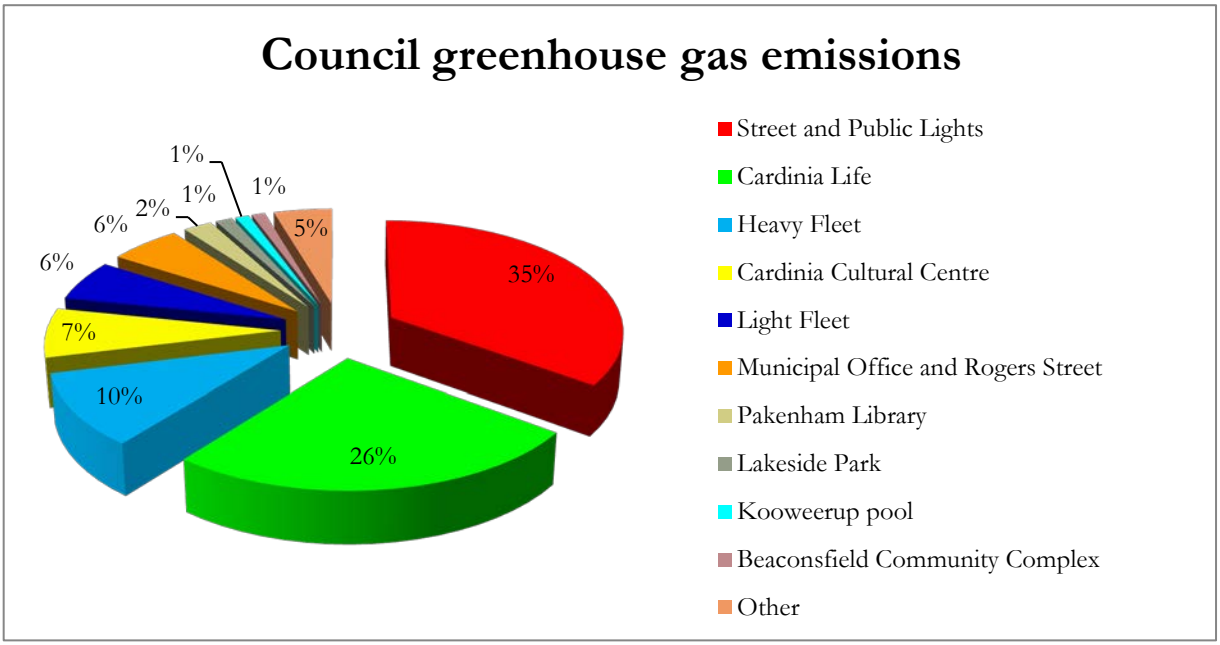


Table 5. Emissions breakdown

Emissions source	Total GHG emissions (tonnes CO2e)	Percentage
Street and public lights	3175	35
Cardinia Life	2325	26
Heavy fleet	948	10
Cardinia Cultural Centre	644	7
Light fleet	534	6
Municipal office and Rogers Street	511	6
Pakenham Library	204	2
Lakeside park	119	1
Koo Wee Rup pool	97	1
Beaconsfield community complex	94	1
Other	413	5
Total	**9064**	**100**

Council's service provision to the community involves a broad range of activities that all have their own energy requirements. Street lighting, vehicles and the provision of community facilities are key emission sources.

Ninety per cent of Council's emissions come from six sources and proposed actions for each of these sources are outlined below. The remaining 10 per cent of Council's emissions are associated with smaller facilities, such as pools, parks, community centres, libraries, public toilets and barbecues. Green energy is currently purchased for 46 of Council's facilities, reducing emissions by 559 tonnes of CO2e per annum (6%). Only facilities that Council has operational control over have been included in this analysis.

4.2 Street and public lighting

Street and public lighting is the largest source of greenhouse gas emissions for the Shire. Energy used to power street and public lighting accounts for 35 per cent of Council's greenhouse gas emissions, 3175 tonnes of CO2e.

The community expects that Council will provide street and public lighting and Council needs to meet the Australian Standards for street lighting in the most efficient way possible.

In July 2011, a review of Council's street and public lighting confirmed that:

- Council has 6,730 street and public lights (at the time of the review)
- 35 per cent of these lights are using energy efficient compact florescent globes.

Between 2009 and 2011, all Council's 2,000 standard 80-watt and 50-watt street lights were upgraded to energy-efficient models, and energy-efficient technology is used for all street lighting installed in new development areas. The standard lighting upgrade resulted in a 7 per cent reduction in Council's overall emissions.

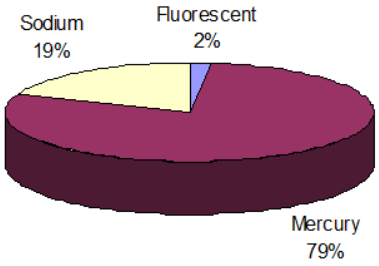
Figure 5 shows the change in lighting and energy consumption before and after the lighting upgrade. The efficiency of the fluorescent globes can be seen in 2011. Even though fluorescents represented 35 per cent of Council's globes at this time, they only consumed 13 per cent of Council's lighting energy due to their efficiency.

Council's next action for street and public lighting is to upgrade decorative street lights with energy-efficient models, as the efficient technology becomes approved. Decorative lights can be found in residential streets in the Shire especially around newer estates in Pakenham and these have a unique artistic look compared to standard lights.

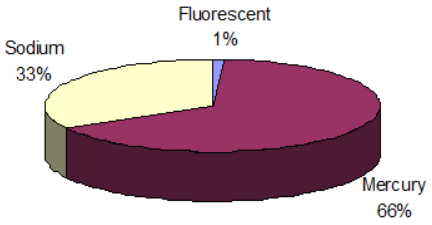
Figure 5. Lighting types and energy use

July 2009 lighting energy

Proportional lamp type

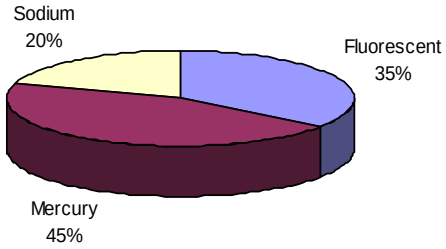


Percentage total energy use per lamp type

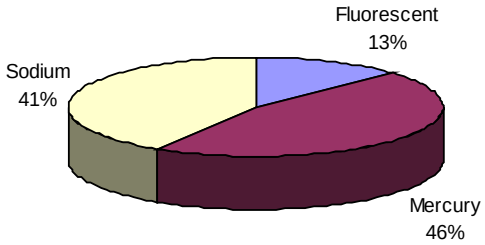


July 2011 lighting energy

Proportional lamp type



Percentage total energy use per lamp type



Only energy-efficient globes approved by the distribution business (AusNet Services) can be installed to upgrade street lighting. A variety of decorative lights exist in the Shire and replacement technology has only been approved for some of the decorative lights that are using the older less efficient technology. These 80-watt mercury vapour lights can be replaced with 42-watt compact florescent globes. Council anticipates more lamps gaining approval for replacement in the coming years and estimates by the time of the next replacement program at least 1,330 globes will be ready for replacement. Council has scheduled 500 globes for changeover in 2015-16, 500 for 2016-17 and 330 for 2018-19 in anticipation of additional replacement approvals.

The cost based on this assumption will be:

- approximately $300 per fitting
- approximately $400,000 for the 1,330 globes based on 2013 prices.

Cost savings will be achieved by purchasing and undertaking the changeover in bulk. This upgrade will:

- reduce overall Council emissions by 254 tonnes of CO2e (2.8%)
- reduce street and public lighting emissions by 8 per cent
- save $41,700 per year in energy costs.

Council will continue to advocate for the approval of replacement technology for the remainder of the street lighting, including the remaining 80-watt mercury vapour decorative and the higher intensity high pressure sodium lights. Council will also work towards sourcing renewable energy for street lighting as outlined in the renewable energy section of this plan (Section 4.14), and investigate efficient street lighting technology as it emerges, including control technology.

4.3 Cardinia Life

Cardinia Life is the premier health and recreational facility in Cardinia Shire. Cardinia Life is a 10,000 m2 facility and has a variety of programs, services and facilities to suit the needs of the community.

The facilities on offer at Cardinia Life include:

- fully equipped health club
- group fitness rooms
- 25-metre 8-lane indoor swimming pool
- warm water program pool
- leisure pool with interactive water features
- eight-court stadium
- creche facilities
- cafe.

The facility is visited more than 920,000 times per year. It is also the second largest source of greenhouse gas emissions for the Shire. In 2012 it represented 26 per cent of emissions, 2,325 tonnes of CO2e.

A successful funding application was made to the Australian Government's Community Energy Efficiency Program to undertake an environmental upgrade of the facility. The entire project is valued at $740,000 and 50 per cent of the funding is being provided by the Australian Government.

The project is anticipated to save up to:

- $111,800 per year in energy costs per annum
- 1,224 tonnes in CO2e emissions.

About 1,224 tonnes of CO2e represents a reduction of 53 per cent of the emissions of Cardinia Life and 14 per cent of Council's overall emissions. The upgrade activities are shown in Table 6.

Table 6. Cardinia Life upgrade activities

Activity	Upfront cost	Savings per annum	GHG emissions savings (tonnes CO2e)	Payback period (years)
Lighting	$190,000	$33,000	269	5.76
Cogeneration	$360,000	$65,900	850	5.46
Dehumidification control and tuning	$60,000	$6,700	76	8.91

Activity	Upfront cost	Savings per annum	GHG emissions savings (tonnes CO2e)	Payback period (years)
Packaged air conditioning units improvement	$4,000	$1,100	13	3.64
Instantaneous hot water	$6,200	$1,400	16	4.43
Power factor correction	$12,000	$3,700	–	3.27
Project management and communication	$107,800	N/A	N/A	N/A
Total	**$740,000**	**$111,800**	**1,224**	**6.6**

No emissions savings are shown in relation to the power factor correction work, as emissions savings for this work cannot be accurately calculated. The power factor correction will improve the way the facility interacts with the electricity grid, improving the electricity delivery to the site and reducing network losses and infrastructure upgrade requirements. This will also save Council money, as Council will avoid a penalty charge on its electricity bill for having a poor power factor at the facility.

The project is currently in the stage of implementation and is due for completion in late-2014. Cardinia Life will remain a major emissions source for Council following the upgrade works. Council will also include the facility in any renewable energy agreement formed, as referred to in the renewable energy section (4.14), and consider future upgrades as new technology becomes cost effective.

4.4 Heavy and light fleet

Council's heavy fleet includes buses, earthmoving equipment, trucks, street sweepers and tractors, and represents 10 per cent of emissions; 904 tonnes of CO2e per year. These vehicles are used for providing services and maintaining assets for the community.

Emissions from Council's light fleet (cars) represent 6 per cent of greenhouse gas emissions; 534 tonnes of CO2e per year. Council has continually worked on sourcing the most fuel efficient vehicles in each vehicle class, which has achieved a 30 per cent improvement in vehicle efficiency in recent years. Council will continue to source efficient vehicles for its fleet.

Training on efficient driving has been shown to reduce fuel usage by 5–25 per cent. Council anticipates rolling out 'eco driver' training to the majority of Council drivers from 2014, through SECCCA.

The training is conservatively estimated to achieve:

- a 5 per cent reduction in fleet greenhouse gas emissions
- a reduction of 41 tonnes of CO2e emissions per annum for the heavy fleet
- a reduction of 44 tonnes of CO2e emissions per annum for the light fleet
- a 1 per cent reduction in Councils overall greenhouse gas emissions.

Ongoing monitoring will take place to assess the effect of the driver training.

In addition to the eco driver training, Council will purchase offsets for 686 tonnes of CO2e emissions from the heavy fleet per year from 2015-16. This will:

- reduce heavy fleet emissions by 76 per cent
- provide experience in purchasing offsets.

With the challenge of peak oil Council will continue to investigate alternative methods to fuel its fleet. Council has recently purchased a Hybrid Camry as part of this shift. Council will purchase additional offsets for vehicle emissions from 2023 as discussed in Section 4.15 of this plan.

4.5 Cardinia Cultural Centre

Cardinia Cultural Centre is the largest arts and cultural centre in the Shire. It is visited more than 69,000 times per year by a broad cross-section of the community including school and community groups. The facility represents:

- 7 per cent of Council's greenhouse gas emissions
- 644 tonnes of CO2e emissions per year.

A solar hot water system has been installed recently, replacing two gas storage hot water units and one electric storage unit with 60 evacuated tube solar collectors, a storage tank and an instantaneous gas booster. This project has been partly funded by the Local Government Energy Efficiency Program through the Australian Government. The $30,000 project is anticipated to save 7.3 tonnes of CO2e per year.

A detailed audit of Cardinia Cultural Centre was commissioned in May 2013 to identify further upgrade opportunities at the centre. Table 7 provides a summary of the audit's recommendations.

Upgrade activities are anticipated to save at least an additional 223 tonnes per year of CO2e. Combined with the solar hot water project, the results will be a:

- 36 per cent reduction in the facilities emissions
- 2.6 per cent reduction in Councils overall emissions.

Council will also work towards sourcing renewable energy for the centre, as discussed in the renewable energy section of this report (4.14).

Table 7. Cardinia Cultural Centre environmental upgrade

Activity	Cost	Energy savings (kWh pa)	Cost savings (pa)	GHG savings (t/co2e/pa)	Payback period (years)
Isolate kitchen heating system and fine tune air handling units controls	$10,500	85,000 kWh pa (electricity) 332 gj pa (gas)	$18,500	96.7	0.6
Reprogram building management system to correct observed deficiencies	$3,500	13,500	$2,500	16.5	1.4

Activity	Cost	Energy savings (kWh pa)	Cost savings (pa)	GHG savings (t/co2e/pa)	Payback period (years)
Install variable speed drive on chilled water circulating pump	$6,000	10,000	$1,900	9.2	3.2
Upgrade down lights to light emitting diodes (LEDs)	$5,500	17,600	$4,700	16.2	1.2
Convert T8 fluorescent lights to more efficient T5s (or LEDs)	$5,000	13,400	$3,200	12.3	1.6
Upgrade 300W tungsten lamps to 230W versions	$700	11,600	$2,700	10.7	0.3
Upgrade liner incandescent lighting to 7W LEDs	$2,700	3,800	$1,000	3.5	2.7
Install 35Kw solar photovoltaic system	$86,300	47,250	$10,400	57.6	8.3
Total	**$120,200**	**202,150 kWh (electricity)** **322 gj (gas)**	**$44,900**	**223**	**2.7**

4.6 Council's office space

Council's current office spaces in Henty Way and Roger Street Pakenham are the fifth highest source of emissions. Combined they represent:

- 6 per cent of our greenhouse gas emissions
- 511 tonnes of CO2e emissions per annum.

Cardinia Shire Council partnered with Places Victoria to build a civic centre in the heart of the new Officer town centre to replace these office spaces. This building will be the first 'green star' accredited building in Melbourne's south east urban growth corridor and act as a catalyst for sustainable design in the region. The facility will incorporate passive design principles to minimise energy requirements.

The development will achieve 5-star 'Office Design' and 'As Built' ratings using the 'Green Star' rating tool. Under the National Australian Built Environment Rating System (NABERS), the facility will be operated to achieve 5.5-star energy and 6-star water 'whole building' ratings (6-star is the highest rating on the NABERS scale).

The facility will:

- save 138 tonnes of CO2e emissions per year compared to Council's current office space
- reduce emissions associated with Council's office space by 27 per cent per year
- reduce Council's overall emissions by 1.5 per cent
- save 563 tonnes of CO2e emissions per year and $89,700 in energy costs, when compared to Council occupying an average commercial building of the same size.

Council will be moving to the new office in 2014. Council will consider signing up to the 'CitySwitch' green office program to coincide with the move. CitySwitch is a national energy management program for office occupants run in partnership between capital city councils and state government departments.

4.7 Pakenham Hall, Library and U3A

The Pakenham Library, Hall and U3A was opened in June 2011. The facility contains many sustainable design features such as energy-efficient lighting and orientation to improve solar gain in winter and provide protection from the summer sun. The facility is located in central Pakenham and represents 2 per cent of Council's CO2e emissions; 204 tonnes of CO2e emissions per year. Since the facility's construction the cost and efficiency of solar and lighting technology has improved significantly.

An audit was conducted of the facility in mid-2013, as part of the development of this strategy. The actions in Table 8 were identified as cost-effective upgrade opportunities, given technology improvements since the time of the facility's construction. These actions and their timing are also are listed in Council emissions action plan on page 35.

Table 8. Pakenham Library Hall and U3A upgrade activities

Activity	Cost	Energy savings (kWh pa)	Cost savings (pa)	GHG savings (t/co2e/pa)	Payback period (years)
Lighting upgrade	$13,800	24,838	$6,000	30.3	2.3
Solar power installation	$37,500	19,710	$5,000	24	7.5
Economy cycle on Heating, Ventilation and Cooling system	$28,000	11,858	$3,000	14.5	9.3
Total	**$79,300**	**56,406**	**$14,000**	**68.8**	**5.7**

4.8 Lakeside Park

The fountain that runs in the lake in Lakeside Pakenham provides water quality and aesthetic functions but is a high energy consumer. This fountain operates under a timer and a wind sensor to reduce its operational hours.

The fountain creates 119 tonnes of greenhouse gas emissions per year, representing 1 per cent of Council's emissions. The fountains operation has been reviewed as part of an energy audit. Due to the significant amount of energy the fountain consumes, careful management is anticipated to

reduce the fountain's energy use by more than 50 per cent; saving Council at least 60 tonnes of greenhouse gas emissions per year.

4.9 Koo Wee Rup outdoor pool

Koo Wee Rup outdoor pool facility, including a heated 33-metre pool, program pool, and toddlers' pool, is located on Rossiter Road, Koo Wee Rup. The facility is open during the warmer months when it is most popular with the community. The facility is responsible for 97 tonnes of CO2e emissions per year, and represents 1 per cent of Council's emissions. An energy audit of the facility recommended the actions shown in Table 9.

Table 9. Koo Wee Rup outdoor pool energy efficiency projects

Activity	Cost	Energy savings (pa)	Cost savings (pa)	GHG savings (t/co2e/pa)	Payback period (years)
Lighting upgrades	$2,000	3,053 kWh	$400	2.3	5.2
Installation of VSD units on pool pumps	$7,200	5,443 kWh	$1,200	7.3	6
Boiler upgrade	$5,000	37,162 MJ (LPG)	$1,600	2.4	3.1
Total	**$14,200**	**8,496 kWh (electricity) 37,162 Mj (lpg)**	**$3,200**	**12**	**5.7**

These actions, are listed in the action plan will take place as part of a retrofit program in 2017-18.

4.10 Beaconsfield Community Complex

Beaconsfield Community Complex provides a variety of spaces for community activities, training and events. It also houses the Beaconsfield Kindergarten. Of Council's emissions, the facility represents 1 per cent or 94 tonnes CO2e emissions per year.

An energy audit of the facility recommended a variety of lighting upgrades at the site including the installation of energy efficient LEDs. Table 10 indicates the details of the lighting upgrade project.

Table 10. Beaconsfield Community Complex upgrade projects

Activity	Cost	Energy savings (kWh/pa)	Cost savings (pa)	GHG savings (t/co2e/pa)	Payback period (years)
Lighting upgrades	$30,000	38,008	$7,900	51.4	3.8 years

This action, including its timing, is listed in the action plan.

4.11 New facilities

Council requires that all new facilities are constructed to strict sustainable design guidelines. The majority of energy required for new facilities should be provided via solar electricity systems or other sustainable onsite power generation, where practical and economically viable. The capital funding required for the solar power or other onsite electricity generation will be provided via each facility's construction budget, which is not accounted for in this strategy.

Where economically viable, preference will be to purchase 100 per cent certified green power for any energy required to be purchased for these facilities. This will ensure that Council's emissions do not rise as new facilities are constructed. The anticipated additional cost each year to Council's electricity bill is $2,000.

An example of this strategy in place is the Toomah Community Centre. Toomah is a multi-use community centre that includes consultation rooms, meeting rooms, performance space, a cafe and kitchen. A 30Kw solar system is proposed for the centre, that will provide a significant percentage of its energy requirments. The new Henry Road East children's centre is following a similar model; a 25Kw system has been installed at this centre.

To ensure the cost–benefit of the solar systems, they are being sized for all new facilities to meet the peak energy demand in summer. If solar systems are oversized they are not cost effective due to the poor rates paid for electricity fed into the grid.

4.12 Staff behaviour change programs

Council's internal behaviour change programs and Eco Team will encourage sustainable behaviour among staff. Behaviours such as reducing printing and ensuring computers, lights and other devices are switched off at the end of the day can make a significant impact in terms of reducing energy consumption and greenhouse gas emissions. An analysis based on recent after hours energy audits of Council office space indicates at least 30 tonnes of CO2e emissions can be saved per annum by the promotion and adoption of energy-efficient behaviour by staff.

4.13 Other facilities

While the 10 emission sources described above represent more than 95 per cent of Council's greenhouse gas emissions, the emissions from other facilities are also being investigated. Equipment at the end of its life will be replaced with more efficient models, and lighting or other simple upgrades across all facilities will be considered.

Council will also be exploring purchasing renewable energy for all facilities as described in Section 4.14. Once the detailed initiatives outlined for the 10 main emissions sources are completed, an auditing and retrofit program for smaller Council facilities will be implemented. It is anticipated that this retrofitting program of smaller facilities will cost $100,000 and pay for itself within four years (a saving of $25,000 per year).

4.14 Renewable energy

Council currently purchases more than 6 million kilowatt hours of electricity per annum, and 8 per cent of its electricity is accredited green energy from the electricity retailer.

A more cost-effective way of purchasing renewable energy can be achieved through a power purchasing agreement. A power purchasing agreement is a long-term contract for the purchase of power, often from a renewable energy facility.

A long-term power purchasing agreement will provide a renewable energy company with a guaranteed customer for their power. This will provide them with the financial certainty they need to invest in renewable energy infrastructure.

Council will investigate purchasing all its required electricity from a renewable energy facility via this or other competitive mechanisms. This should allow Council to access power at a reduced

rate, from a renewable source. This will take place following the completion of the identified energy efficient retrofit activities, and other actions to reduce energy consumption.

Council will look at group purchasing and tender options for its renewable energy purchase. The process of sourcing the renewable energy will be timed with Council entering a new contract for its electricity needs, unless the renewable energy component is decoupled from Council's electricity supply. Procurement Australia, that currently runs Council's electricity procurement process, may be part of this action.

Decoupling renewable energy purchasing allows renewable energy credits to be purchased separately from the electricity supply contract and can provide competitive pricing.

This proposed renewable energy purchase will reduce Council's emissions by an additional 4,642 tonnes of CO2e per year (46%) following the efficiency measures described in this strategy.

Council will also continue to install solar energy systems on new and existing facilities where appropriate. Council has set a price cap in relation to the renewable energy purchase, as outlined in table 11. Council will not spend more than this price cap on renewable energy and if purchasing renewable energy is not affordable, offsets will be investigated as an alternative.

4.15 Carbon offsets

Following the sourcing of electricity from a renewable source, all that will be remaining of Council's emissions will be 1,328 tonnes of CO2e from vehicle emissions and gas usage. It is estimated $6,000 per annum will be required to offset these remaining emissions from the year 2023. By 2024, Council aspires to be supplied via renewable electricity, have implemented a variety of energy efficiency messages, and to be certified Carbon Neutral through NCOS or a similar standard.

4.16 Council emissions action plan

Table 11 shows a summary of proposed emission reduction actions over the next 10 years for Council.

Table 11. Council emissions reduction summary

Area	Proposed Action	Cost	GHG saving (tonnes CO2e per annum)	Timeframe	Cost saving per annum	Responsibility
All Council facilities	Promote and reward energy efficient behaviour	$500 pa ($5,000)	30	Ongoing	$2,000	Environment and Engineering
Lakeside lake	Investigate efficient management of the fountain	N/A	60	2014 onwards	$12,300	Operations
Cardinia Life	Environmental upgrade project	$370,000	1224	2013-14 to 2014-15	$111,800	Building and Facilities
Civic centre	New green star centre	N/A for construction up to $2,000 pa from 15/16 for NABERS assessment ($18,000)	138 based on current emissions (563 compared to moving to a standard building)	2013-14	$89,700 compared to moving to a standard building	Building and Facilities
Fleet	Eco-driver training	$24,000	85	2013-14 to 2015-16	$50,000	Operations
Cardinia Cultural Centre	Environmental upgrades	$120,000	230	2014-15	$44,900	Building and Facilities
Beaconsfield Community Complex	Environmental upgrades	$30,000	51	2014-15	$7900	Building and Facilities

Area	Proposed Action	Cost	GHG saving (tonnes CO2e per annum)	Timeframe	Cost saving per annum	Responsibility
New facilities	Incorporate sustainable design, solar PV and purchase green power for energy supply	$56,000 ($2,000 cumulative pa for green power)	1000	2015-16 to 2021-22	N/A	Buildings and Facilities
Heavy fleet	Offset purchase	$3,000 pa ($27,000)	686	From 2015-16	N/A	Environment and Engineering
Street lighting	Decorative lighting upgrade	$400,000	254	2015-16, 2016-17 and 2018-19	$41,700	Environment and Engineering
Pakenham Library, Hall and U3A	Environmental upgrades	$80,000	69	2017-18	$14,000	Building and Facilities
Koo Wee Rup Pool	Environmental upgrades	$14,000	12	2017-18	$3,200	Building and Facilities
Solar power	Roll out photovoltaic solar systems to Council buildings where cost effective	$20,000 pa ($120,000)	125	2018-19 onwards	$30,000	Environment and Engineering
Smaller facilities	Retrofit program	$100,000	130	2018-19 and 2019-20	$25,000	Building and Facilities
Review of plan's targets	Conduct a detailed review of the aspirational carbon neutral target in relation to renewable energy and offset market conditions	N/A	N/A	2021-22	N/A	Environment and Engineering

Area	Proposed Action	Cost	GHG saving (tonnes CO2e per annum)	Timeframe	Cost saving per annum	Responsibility
Energy supply	Purchase 100% renewable electricity through a power purchasing agreement and infrastructure installation, or offset emissions	Up to $50,000 pa ($100,000)	4642	From 2022-23	N/A	Environment and Engineering
Offsetting	Offset the remainder of Councils emissions	$6000 pa ($6,000)	1328	2023-24	N/A	Environment and Engineering
Certification	Carbon neutral	$40,000	N/A	2023-24	N/A	Environment and Engineering
Total		**$1,510,000**	**10,064**		**$432,500 pa** **$3.7m over the strategy ($2.2m net savings)**	

The cost of the carbon offsets and renewable energy can be paid for by the savings achieved from energy efficiency projects. The above table indicates costs to demonstrate return on investment. Some activities have already been paid for at the time of developing this strategy. Table 17 provides a financial summary of new costs to Council for this strategy's implementation.

4.17 Council emission reduction targets

Council will be following a simple process to eliminate emissions. This process can be summarised in three steps:

1. Improve efficiency of Council facilities.

2. Purchase green power.

3. Offset remaining fuel and gas emissions.

Based on the above, aspirational reduction targets for Council's emissions are:

- by 2018, a 33 per cent reduction on emissions (based on the year 2012 levels)
- by 2022, a 85 per cent reduction on emissions (based on the year 2012 levels)
- by 2024, a 100 per cent reduction in emissions and certified carbon neutral status achieved.

By 2024 Council's aspirational target is to be certified carbon neutral under the Australian Government's National Carbon Offset Standard (NCOS) or similar standard. NCOS provides a process for official carbon neutral certification.

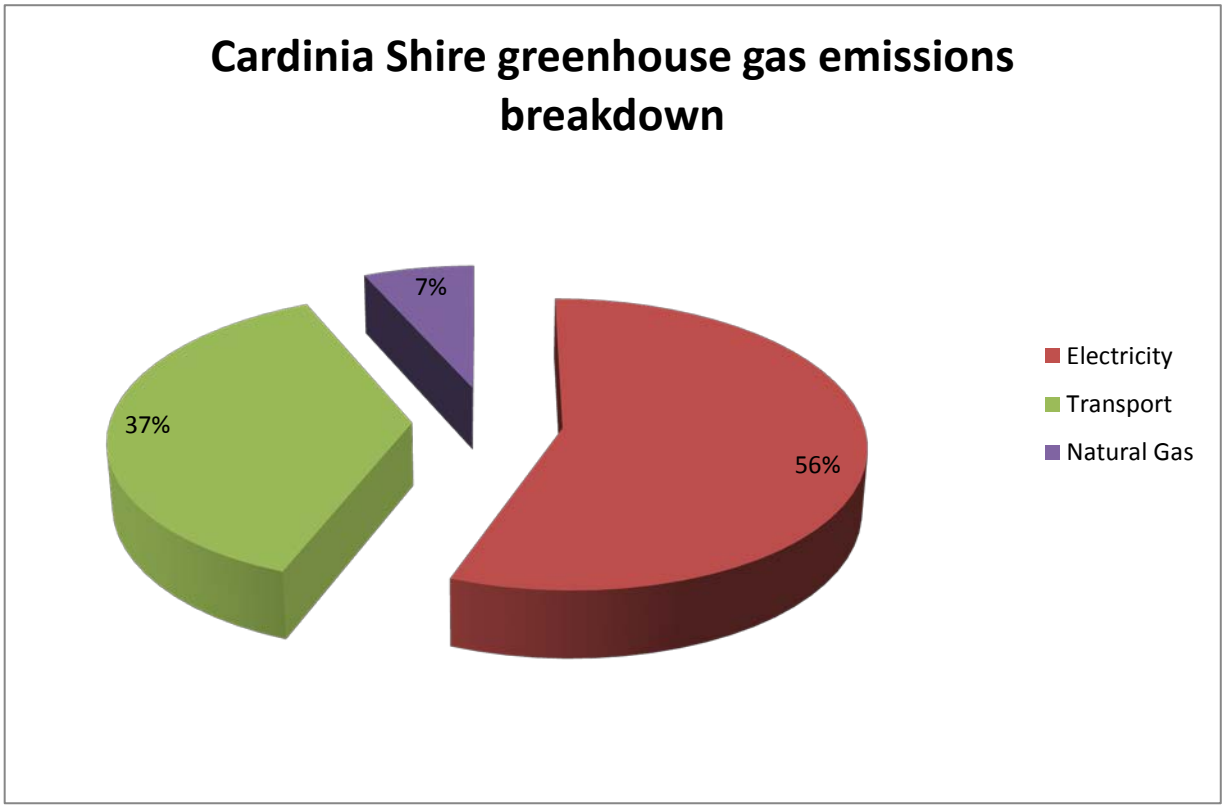
The carbon neutral target in this plan is aspirational due to the extended timeframe for the plan and uncertainty regarding the future renewable energy and carbon offset markets. In 2021, a review of the aspirational target will take place. The review will consider market conditions at that time and their implications in relation to the aspirational target. At the time of the review a decision regarding the continued pursuit of the carbon neutral target will be made.

5 COMMUNITY EMISSIONS

5.1 Emissions summary

Greenhouse gas emissions from the community come from a variety of sources. The majority of community emissions are from electricity use. This is followed by transport and gas usage. Figure 6 provides a breakdown of community greenhouse gas emissions in the Shire (electricity 56%, transport 37% and natural gas 7%).

Figure 6. Cardinia Shire community greenhouse gas emissions

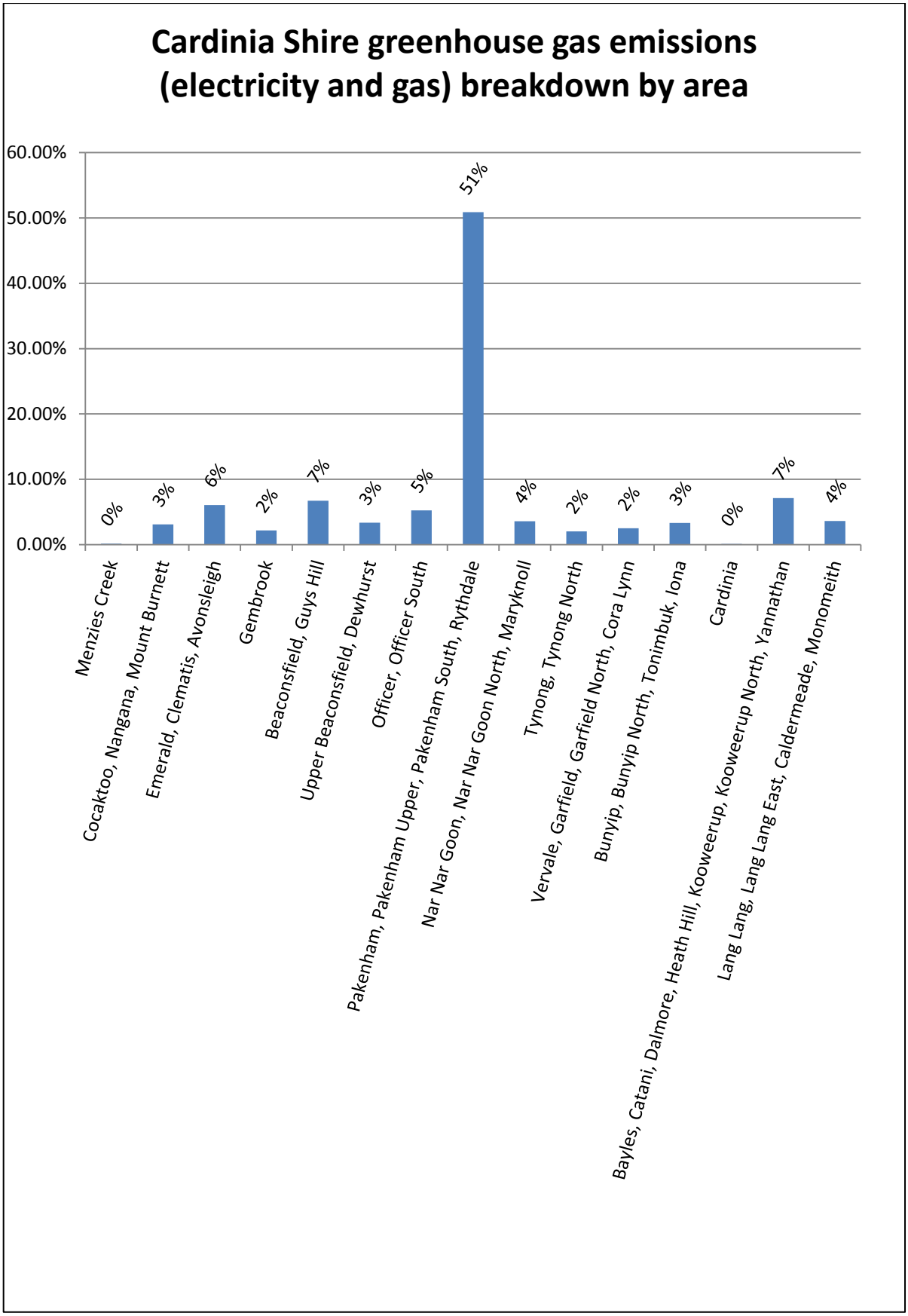


Total annual emissions based on 2012 electricity data, current population data for transport emissions and 2012 natural gas data are 750,785 tonnes of CO2e per annum. Figure 7 shows emissions related to electricity and natural gas consumption per postcode area. More than 50 per cent of emissions take place in Pakenham, with other areas of high emissions including Koo Wee Rup, Beaconsfield and Emerald. Emissions in Officer are growing quickly with this township's development.

Community emissions have shown a trend of increasing in recent years, in line with population increases. Council will attempt to stop this growth in emissions via the actions outlined in this section of the plan.

Community emissions data is based on transport fuel combustion, electricity usage and natural gas usage. Other sources of greenhouse gas emissions, such as methane production from agriculture and waste, are outside of the scope of this energy-focused plan. Council acknowledges these other emissions sources, and supports efforts to reduce them.

Figure 7. Cardinia Shire community greenhouse gas emissions by area



5.2 Electricity

The largest source of greenhouse gas emissions in the Shire comes from the consumption of electricity. Figure 8 shows the 13 per cent increase in emissions that has taken place between 2007 and 2012 (due to population increases). In 2012 (the last available data), emissions from electricity in the Shire were 417,762 tonnes of CO2e per annum.

Figure 8. Greenhouse gas emissions electricity by year

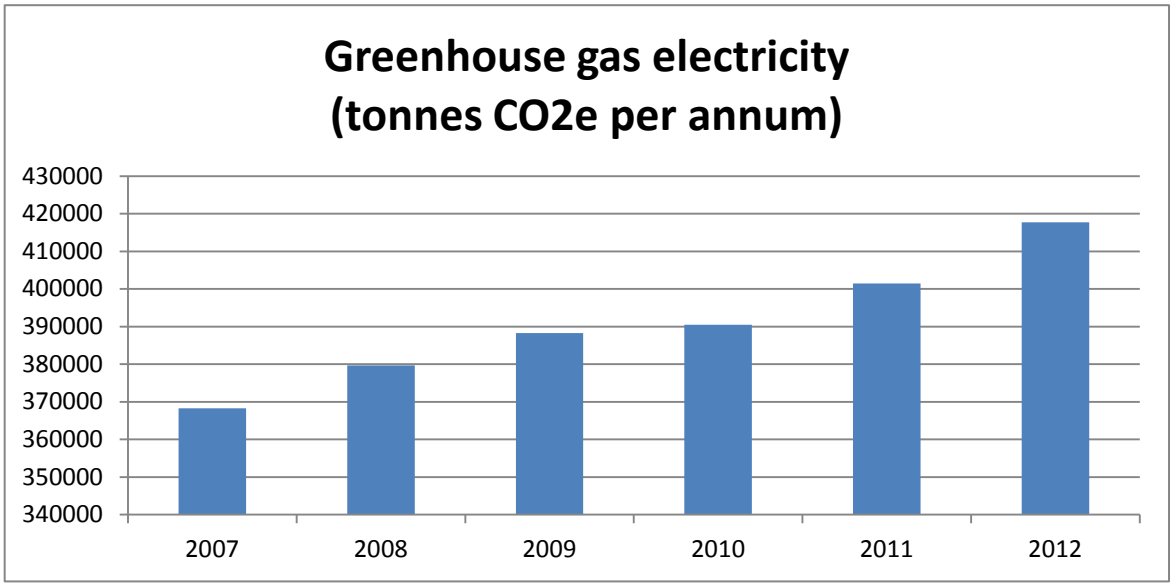
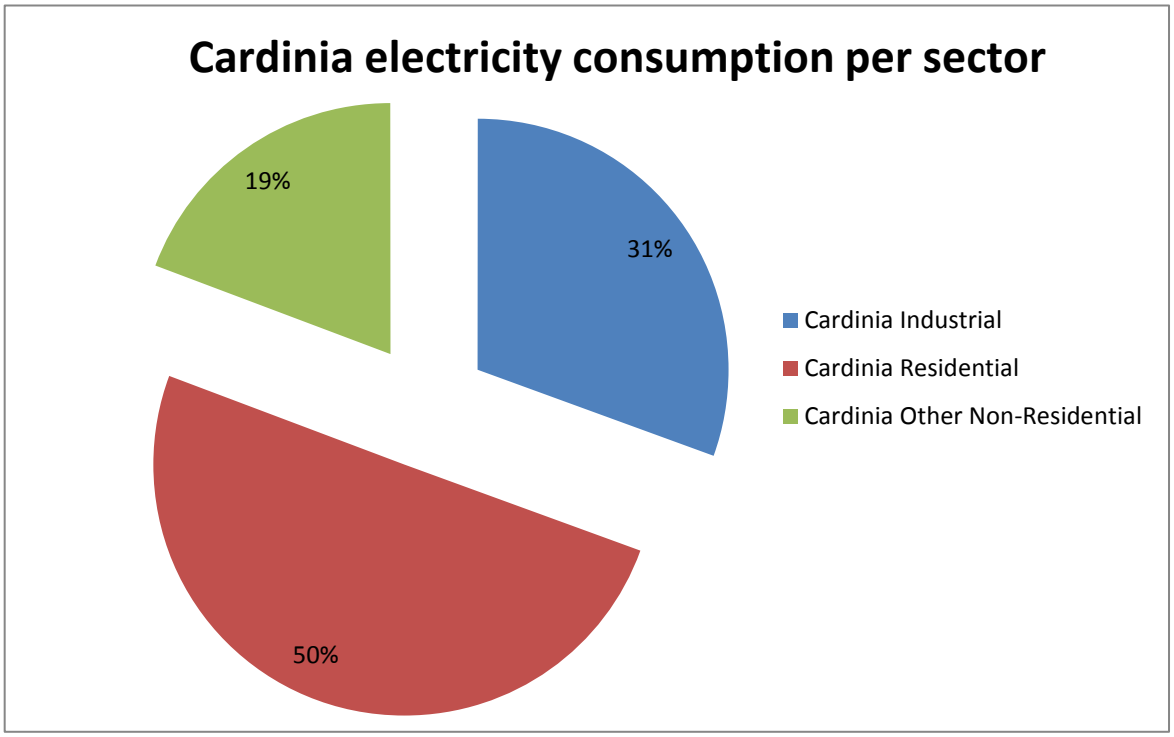


Figure 9 shows electricity consumption in the Shire per sector, clearly indicating that residential consumption is the highest source of electricity consumption at 50 per cent.

Figure 9. Cardinia electricity consumption per sector



5.3 Transport

Transport emissions in the Shire have been modelled at 282,500 tonnes of CO2e per year per annum, 3.7 tonnes of CO2e per person, based on the Victorian average.[27] Light vehicles as well as commercial vehicles make up the mix of these emissions. This also takes into consideration the emissions caused by transporting goods to and from the Shire.

5.4 Gas

Greenhouse gas emissions from the consumption of natural gas in the Shire are 50,522 tonnes of CO2e per year. The most common gas usage in the Shire is for heating and cooking. Consumption of bottled gas in the Shire for outdoor heaters and barbeques and for usage in areas where mains gas is not available has been excluded from this analysis due to the unavailability of data. The emissions from LPG consumption are estimated to be small, as in areas where non-mains gas is available, electricity is often used as an alternative.

Figure 10 demonstrates that in Cardinia Shire, 87 per cent of natural gas is used for residential purposes and only 13 per cent for commercial.

Figure 10. Greenhouse gas emissions from natural gas in Cardinia Shire

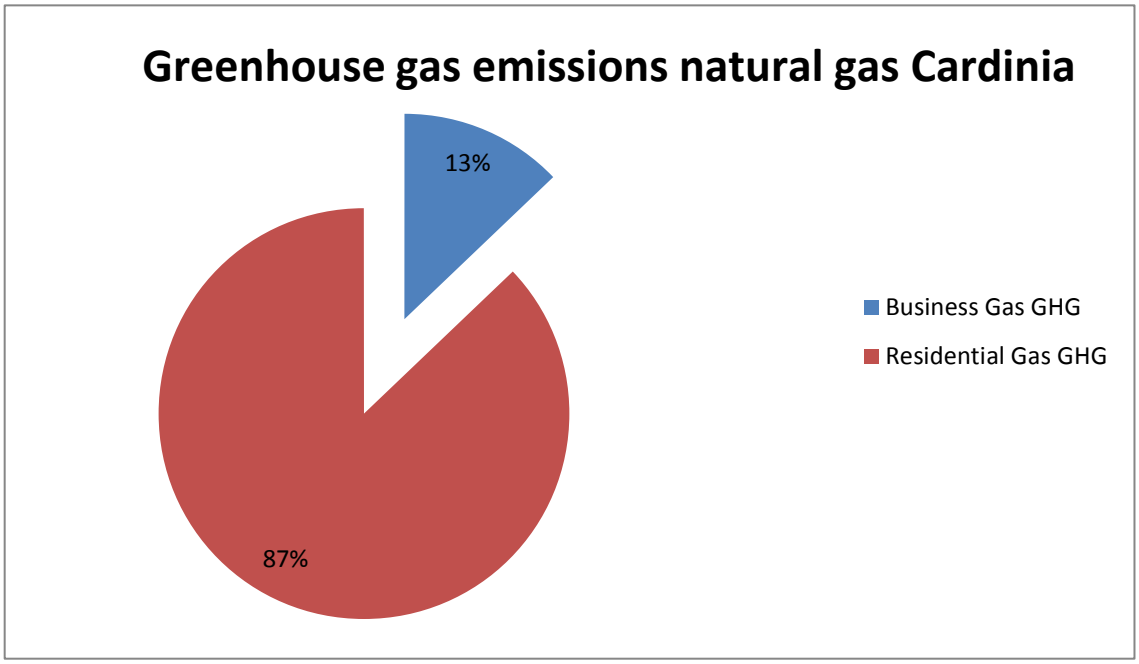
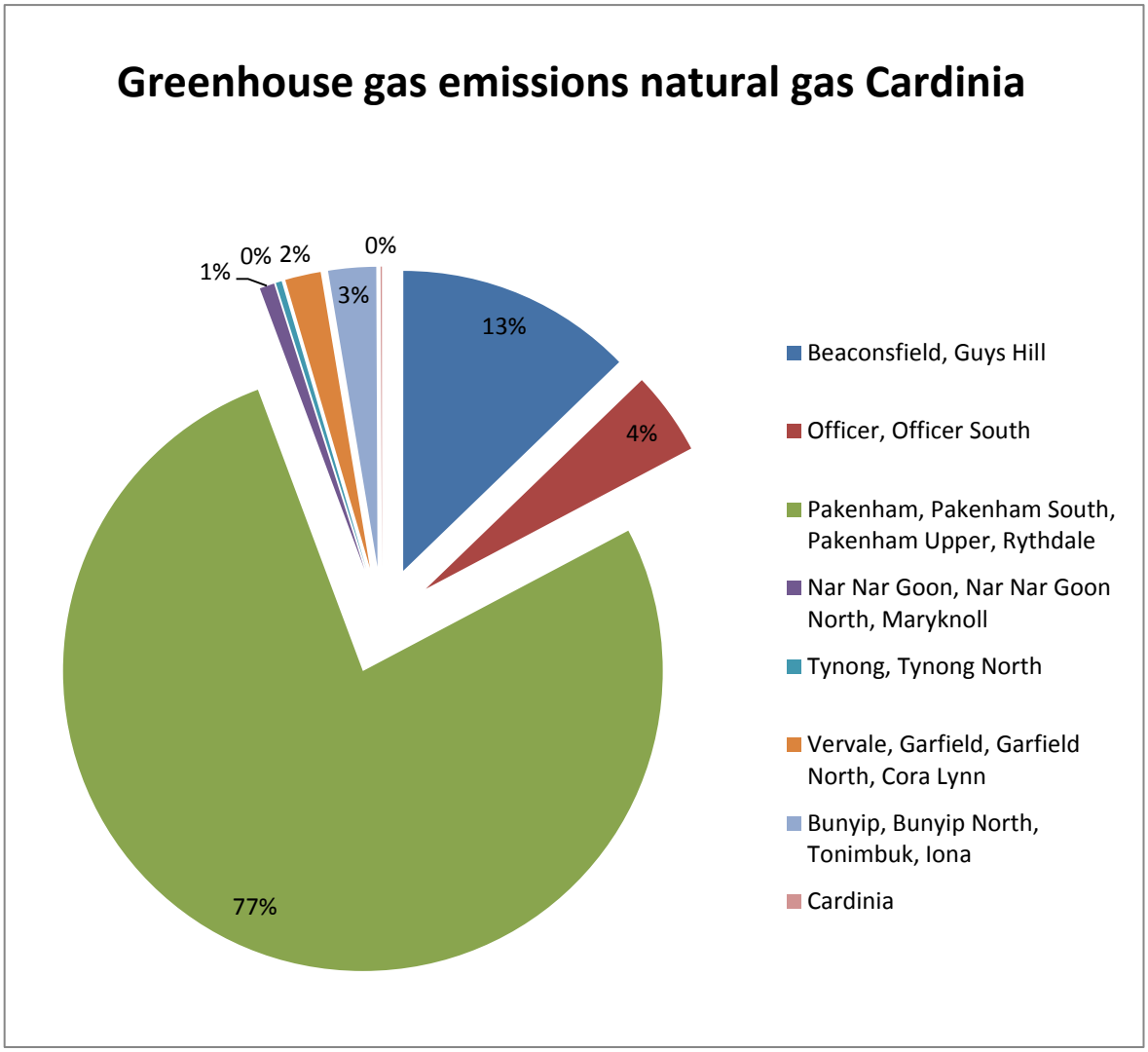


Figure 11 shows natural gas, greenhouse gas emissions by postcode; 77 per cent is produced by Pakenham, Pakenham South, Pakenham Upper and Rythdale (postcode 3810) and the remaining 23 per cent is produced by the rest of the Shire.

[27] For data on Victorian Transport Emissions see: State Government Victoria, Information Sheet Victorian Greenhouse Gas Inventory - 2007, available from: http://www.climatechange.vic.gov.au/__data/assets/pdf_file/0020/74063/VGGI2007.pdf For population data see: Australian Bureau of Statistics 2008, 3235.0 - Population by Age and Sex, Regions of Australia, available from: http://www.abs.gov.au/ausstats/abs@.nsf/Products/3235.0~2007~Main+Features~Victoria?OpenDocument

Figure 11. Greenhouse gas emissions from natural gas in Cardinia Shire – by area



The majority of natural gas related greenhouse gas emissions occur in the population centre of Pakenham, followed by Beaconsfield.[28]

5.5 Residential solar electricity

The production and feeding in of renewable energy from solar panels has increased rapidly over the last four years. Approximately 900 times more energy was being fed into the grid from solar in 2012, compared to 2007. The amount of energy fed into the grid from small scale solar systems in the shire equates to over half a percent of total electricity consumption.

Figure 12 shows the amount of solar that fed into the grid by postcode area in 2012. This production has been proportionately higher in the regions of Upper Beaconsfield, Guys Hill, Nar Nar Goon, Nar Nar Goon North and Maryknoll, considering the population of these areas.

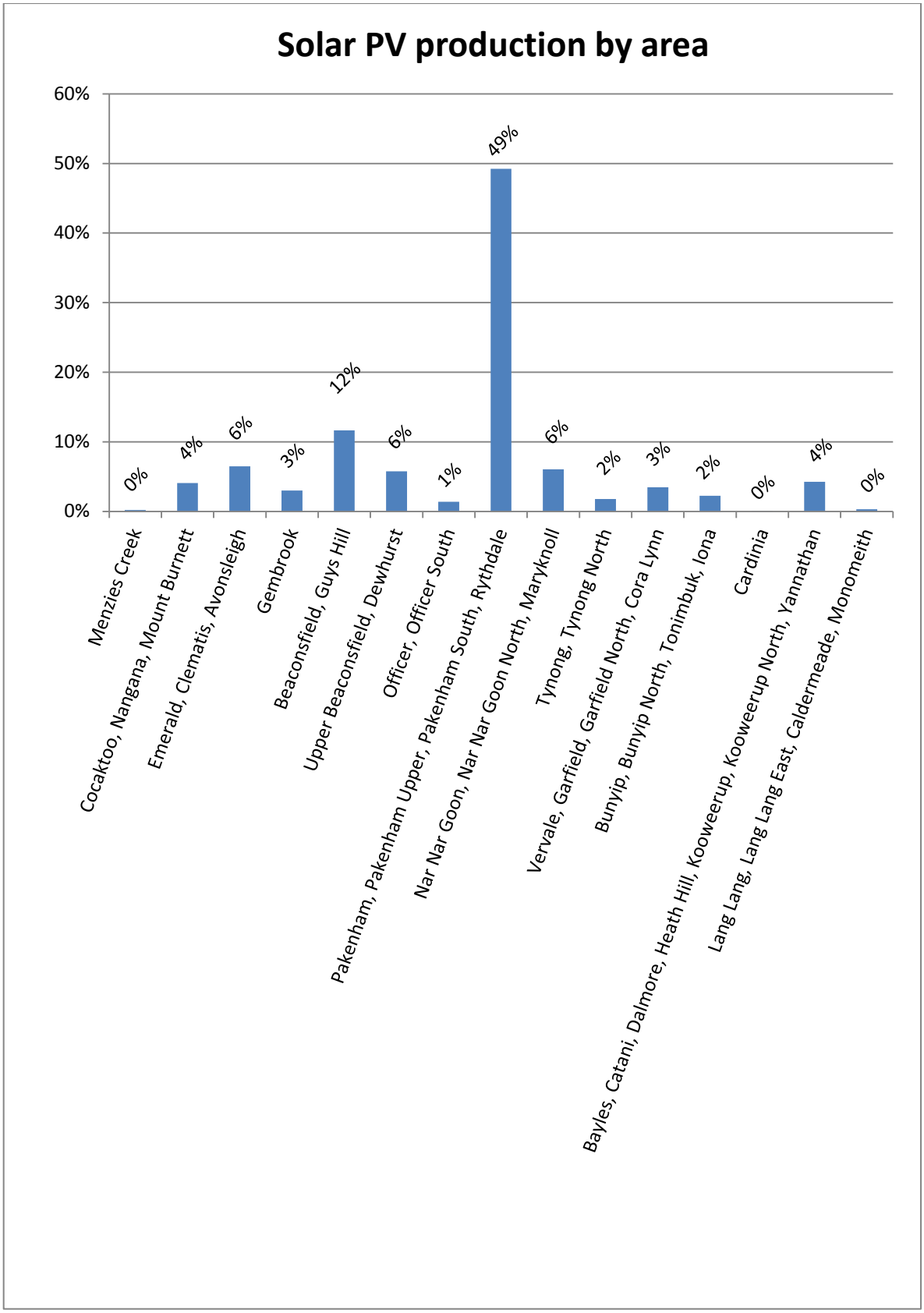
If solar installations continue at the current rate, the community will have enough solar power to provide its electricity needs in the near future. The outlook for the solar trend to continue is

[28] Mains gas consumption data provided by the APA group

positive, as the price of residential solar continues to drop. Solar is being installed on both new and existing houses.

Population and housing numbers are set to continue to rise in the Shire. Figures 13 and 14 show how the environmental impact from energy use (electricity and gas) in new housing in the Shire can be reduced by more than 50 per cent from the inclusion of Solar PV. The scenario presented in Figure 14 is possible given the reducing cost of solar PV. The modelling has taken place for houses built to 6-star and above standards (6-star is the minimum permitted thermal performance rating for new houses in Victoria). Figure 13 also demonstrates the challenge in managing emissions in a Shire with a rapidly growing population.

Figure 12. Solar PV by area[29]



[29] SP Ausnet Electricity data, provided by the Northern Alliance for Greenhouse Action

Figure 13. Greenhouse impact of new house in the Shire business as usual model

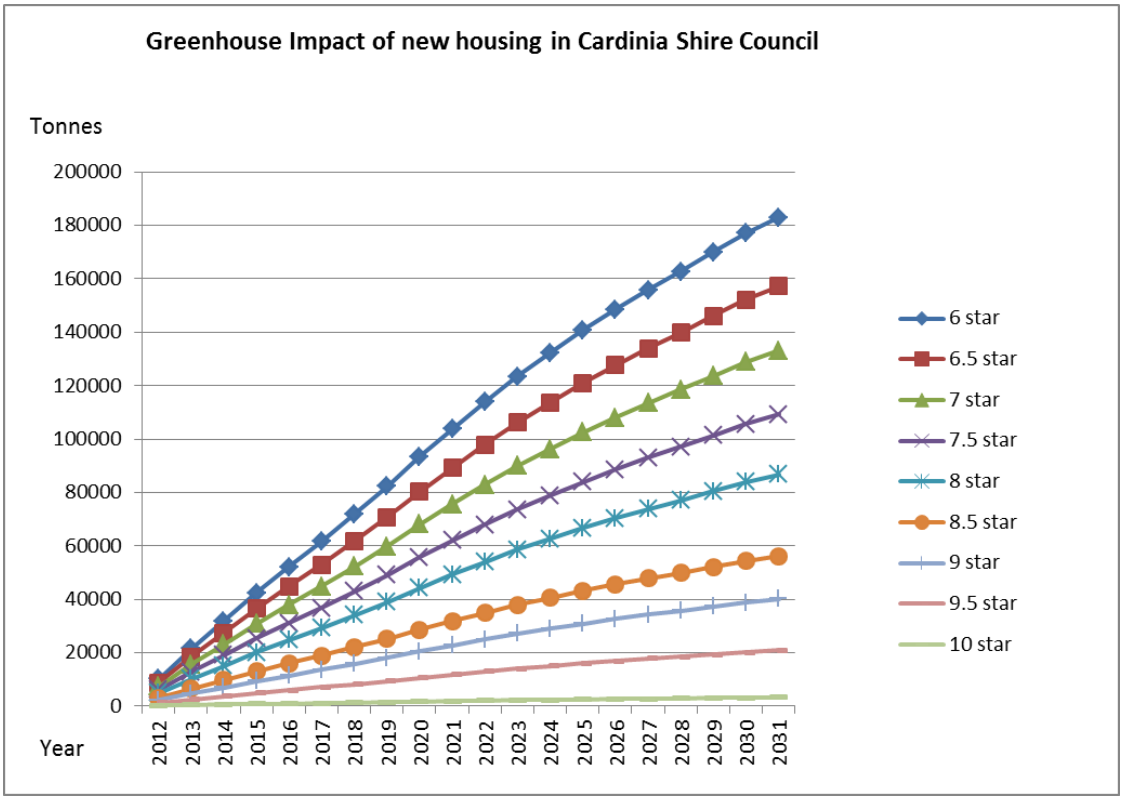
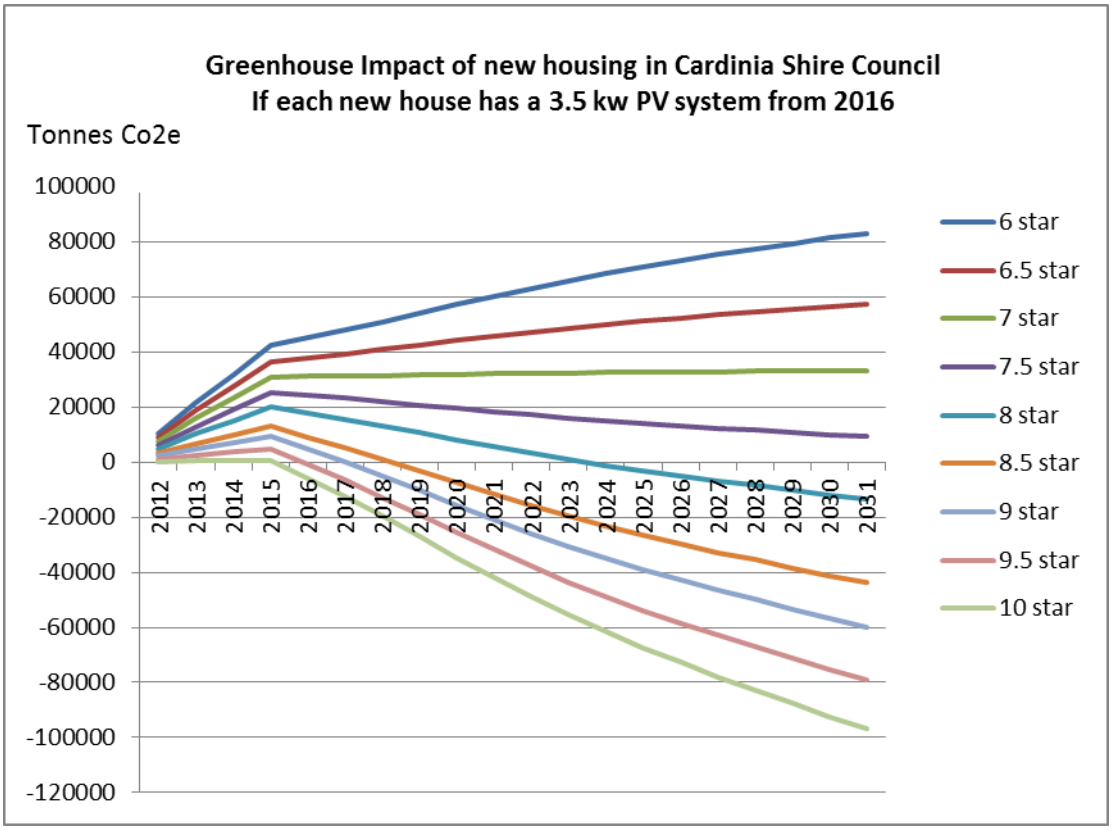


Figure 14. Greenhouse impact of new housing in the Shire with solar PV installation



One of the key up-front barriers to the installation of solar PV is the initial cost. While it is understood that solar panels will reduce electricity bills, many in the community are not able to access the required capital to have panels installed.

Financing mechanisms for solar PV, where the savings achieved through the installation of panels are used to pay off finance that was accessed for their purchase, are increasing in popularity. On-bill financing is also being introduced by electricity retailers. This allows customers to pay a similar amount for their regular electricity bill, as the savings achieved from the solar panel installation can match the loan repayment amounts. This method allows solar to be installed with no upfront cost.

On-bill financing is currently being aimed towards commercial customers, but will hopefully extend to residential customers in the future.

5.6 Renewable energy and energy efficiency financing

Council will explore how it can support financing renewable energy and energy efficiency for the community. One model being envisioned allows commercial property owners to access a loan from a financial institution for energy efficiency works or solar panels and repay the loan from the achieved energy savings through an environmental upgrade charge attached to their property.

The above model makes finance easier to access due to the guarantee of the funds being recovered through the environmental upgrade charge (repayable via the rates mechanism). It also means that the repayments on the improvements to a commercial building are attached to the property, so if the property is sold the new owners, who reap the benefits of the upgrade, will also pay for them through the savings they are achieving. It also allows the cost of the upgrade to be split in commercial buildings among building owners and tenants, as the benefits of an upgrade are received by both parties.

This model will require, and will only be possible via, a change in Victorian Government legislation. A similar change has occurred for commercial properties in New South Wales and in Victoria (for the City of Melbourne), for which Council will advocate. If the model is implemented, it would be likely to occur on a regional scale with an independent organisation responsible for its management. The organisation administering the program would be self-funded through administration fees charged to finance applicants.

Another option is for Council to charge a special rate to residents and business who choose to opt in and purchase their power from a renewable energy facility (possibly as part of a power purchasing agreement with Council).

The funds recovered through such a rate could purchase renewable energy and offset emissions for the community. Council has already assisted in promoting a bulk buy opportunity for solar panels through the energy innovation cooperative. The above options represent the next steps to encourage this technology.

Table 12 indicates the greenhouse gas emissions that can be saved through solar energy, or by energy consumers choosing green power.

Table 12. Renewable energy opportunities

Area	Saving (t-CO2e per annum)	Comments
Existing residential development	114,020	An aim that two in five existing houses install a 3.5Kw solar system or purchase green energy.
New residential development	109,182	An aim that three quarters of new houses have an average 3.5Kw solar system installed or purchase green energy.
Business	50,895	An aim that 25% of business emissions in the shire are offset with green energy

The above figures are in addition to the 47,207 tonne reduction in the Shire that will be achieved by 2020, by the Australian Government's renewable energy target (RET). The 2020 target is for 20 per cent of Australia's energy to be provided from renewable sources (10% above today's levels). This mandated renewable energy target is part of a national push to clean up our energy systems and increase renewable energy supply. This will increase the amount of renewable energy being used in the Shire and will lead to the 47,207 tonne CO2e reduction in emissions.

5.7 Sustainable Design Assessment in the Planning Process (SDAPP)

The City of Port Phillip is one of 11 Victorian councils that has a process of Sustainable Design Assessment in the Planning Process (SDAPP). According to Port Phillip:

> "The SDAPP framework refers to the consistent inclusion of key environmental performance considerations into the planning permit approvals process in order to achieve more sustainable outcomes for the long-term benefit of the wider community. The SDAPP framework:
>
> - recognises the role of local governments as a statutory authority for planning matters
> - provides a framework for consideration of sustainable design elements of planning applications; and,
> - offers a consistent method for identifying opportunities for improved environmental building performance.
>
> An integrated design response considers sustainability as a core design driver (in collaboration with other design aspects) and will assist in meeting higher sustainable design standards at lower cost". [30]

As rapid growth is being experienced in Cardinia Shire, a huge opportunity exists to improve the design of new buildings, where a planning permit is required. SDAPP requires Council employing a sustainable design officer to assess planning permit applications against sustainability criteria. Simple, low-cost changes to building design (such as orientating buildings to face north) and subdivision layout can have significant impacts on thermal comfort and energy consumption over the building's life.

[30] City of Port Phillip, Sustainable Design Assessment in the Planning Process, available from: http://www.portphillip.vic.gov.au/sdapp.htm.

While the Victorian Government and building code of Australia require certain levels of sustainable design, a much greater level than what is mandated by these authorities can be achieved at the local level through SDAPP. The Victorian Civil and Administrative Tribunal (VCAT) has ruled in favour of local government requirements for improved sustainable design in some cases.

The Victorian planning scheme requires that local governments consider the impact any development has on the environment when reviewing a planning permit application.[31] Developers always have the right to appeal a local decision to VCAT, if it is seen as 'unreasonable', so Council must consider this. Cardinia's planning scheme has the objective of "encourage(ing) land use and development that is consistent with the efficient use of energy and the minimisation of greenhouse gas emissions" which is consistent with SDAPP. [32]

Significant improvements in building design have been achieved where SDAPP is in place. The Victorian Government is currently reviewing local planning policy amendments on this issue for six Victorian municipalities. The policy amendments may be approved to formalise SDAPP in these areas, or a state policy for all municipalities maybe established. Cardinia will follow this process closely and either apply for a local planning policy amendment to formalise SDAPP in the Shire, or follow a revised state planning framework that allows for it.

Once a policy framework is established to support SDAPP, Council will employ a Sustainable Design Officer and commence the SDAPP process. This is anticipated to occur in 2015−16. The policy cannot commence without the employment of an appropriately trained and skilled officer to deliver it. Council will set an appropriate trigger for sustainable design assessment requirements that are within its capacity. A trigger that has been used in other areas requires all commercial developments of more than 300m2 and all residential developments of 10 or more dwellings where a planning permit is required to follow the process.

By 2024, emissions in the Shire are set to grow by 426,817 tonnes of CO2e per annum under a business as usual scenario due to population growth. It is anticipated that SDAPP is capable of reducing this increase by at least 22,000 tonnes of CO2e per annum. This process will improve community comfort and save the community millions of dollars per year in energy costs.

5.8 Growth areas

A number of new growth areas exist in Cardinia Shire and more are planned. In developing these growth areas, Council uses its influence to achieve the best environmental outcomes. Growth areas represent a significant opportunity to shape and influence sustainable development.

Key methods to influence growth areas are through:

- facilitating distributed energy systems
- building facilities that incorporate a high level of sustainable design as examples
- requiring high level sustainable design for large residential and commercial buildings in a growth area precinct.

[31] Rebecca Leshinsky, The Law Handbook – Planning and Environment, available from: http://www.lawhandbook.org.au/handbook/ch11s01s02.php.
[32] Cardinia Planning Scheme Clause 15, available from: http://planningschemes.dpcd.vic.gov.au/schemes/vpps/15_SPPF.pdf,.

Council's new 'green star' civic centre will be located in the heart of the Officer town centre, demonstrating best practice in terms of sustainable design.

Council is looking at continuing to influence new growth areas in the most positive way possible in terms of sustainable design. Annual emissions in the Shire are set to grow by 426,817 tonnes of CO2e under a business as usual scenario due to population growth over the next 10 years. Sustainability initiatives in growth areas are capable of reducing this increase by at least 55,000 tonnes per annum.

5.9 South Eastern Councils Climate Change Alliance membership

The South East Councils Climate Change Alliance (SECCCA) is a collaboration of eight councils in Victoria's south-east making a regional response to climate change. SECCCA carries out projects in greenhouse gas abatement, in sequestration and in adaption on behalf of member councils.

SECCCA works through partnerships involving councils, community, industry and state and federal governments. The work of SECCCA staff is directed by council members through their representatives on the management committee. SECCCA often applies for and accesses grants on behalf of their member councils.

Cardinia Shire Council will continue its involvement in SECCCA given the valuable support it provides in relation to climate change. Annual membership fees have been and will continue to be funded from the Environment and Engineering Unit's operational budget.

5.10 Sustainable homes program and energy efficiency advocacy

Council currently supports the Sustainable Homes program that is run through SECCCA. A local facilitator runs sessions covering water and energy efficiency, waste reduction and sustainable gardening. These workshops provide valuable information to the community to assist with sustainable living. Council will continue to support these and other sustainability workshops to catalyse sustainable living across the Shire.

Council will also work on other projects and advocacy to promote energy efficiency and sustainable living to the community. Behaviour change alone has been shown to achieve a 10 per cent reduction in energy use and greenhouse gas emissions and Council will try to use its influence to achieve this. Emerging technologies will help to improve efficiency across the Shire and Council will encourage their uptake.

5.11 Business efficiency program

Non-residential premises account for 50 per cent of electricity consumption in the Shire and 13 per cent of natural gas consumption. This is significant and Council will continue to advocate for sustainable business operations in the Shire. Council will explore a variety of options in terms of business efficiency programs to reduce emissions in this sector. Council envisions some key partnerships could easily lead to reductions of more than 3,000 tonnes of CO2e emissions per annum.

5.12 Sustainability Expo

Cardinia Shire Council will continue to provide an annual Sustainability Expo for the community. Expo's have taken place in 2010, 2011 and 2013. The expo aims to promote sustainable living to the community; introducing a variety of groups and initiatives community members can engage with to reduce their environmental impacts. While the impact of the expos cannot be quantified, they will continue to be part of Council's broader campaign to promote sustainable living to the community.

5.13 Low Income Energy Efficiency Program

SECCCA applied for funding from the Australian Government through the Low Income Energy Efficiency Program (LIEEP). The application was to work with 240 low income households from across south eastern Melbourne to provide assistance and guidance to increase comfort and reduce energy consumption. The project involves a variety of retrofit measures, and the promotion of energy efficient behaviour. Eligible households are those receiving support from Health and Community Care (HACC) programs.

While the impact of the program cannot be quantified, it is expected to trial a range of technologies and approaches to improve the comfort and decrease the cost of living for participants.

5.14 Energy Efficiency Information Grants program – sporting facilities

Sporting facilities use significant amounts of energy for lighting, heating, cooling and refrigeration.

This project is coordinated by SECCCA and funded by the Australian Government through the Energy Efficiency Information Grants (EEIG) Program. It is developing a framework and providing support to effectively collaborate with facility owners, clubs and players to deliver a behaviour change program and actions through information provision and engagement to improve energy efficiency. A range of innovative marketing initiatives support the program tailored to the interests and approaches typically effective within the sporting community.

Various participation and information points are being developed to cater for the various interest levels and learning pathways of facility users. Over the course of the program six facilities in Cardinia Shire will undergo audits to identify the opportunities to improve energy efficiency and participate in behaviour change programs and actions. The project includes the development of a training and professional development program and ongoing evaluation for continuous improvement to increase the program's effectiveness and scalability to other facilities and clubs.

5.15 Community indigenous plant giveaway

Planting indigenous plants has four key benefits:

- improving biodiversity for local fauna
- improving amenity
- capturing carbon emissions
- improve river heath and reduce erosion.

This initiative involves providing indigenous plants to residents. The first few years of the initiative may involve providing vouchers to enable residents to claim a small number of plants from local indigenous nurseries.

Following the employment of an environmental education officer, the program will be expanded to include the provision of large number of plants to large landholders.

Carbon emissions savings calculations will be based on the number of large trees provided to rural residents. The loss of plants due to poor care or weather conditions will also be factored into the calculations and trees planting in suburban areas will not be counted as they often have a shorter life span. While a carbon offset can be calculated from this activity, it will not be an accredited offset.

The first stage of the program will commence in 2015–16 and it will be expanded in 2016–17. It is anticipated the program will save an average of 2,000 tonnes per annum of CO2e emissions and also work towards achieving Council's biodiversity goals.

5.16 Community emissions reductions – action plan

Table 13. Action plan

Proposed Action	GHG saving (t-CO2e pa)	Cost	Timeframe	Responsibility
Solar electricity / renewable energy uptake	274,097	Officer time	Ongoing	Environment and Engineering
Business efficiency program	3,000	$40,000	2016-17 to 2017-18	Economic Development
Sustainability workshops/ energy efficiency / advocacy	23,513	$2,000 pa (workshops) ($18,000)	From 2015-16	Environment and Engineering
Continue to provide sustainability expo for community	Not quantified	$20,000 pa ($200,000)	Ongoing	Environment and Engineering
Sustainable Design Assessment in the Planning Process	22,000	N/A	From 2015-16	Statutory Planning
Growth areas advocacy	55,000	Officer time	Ongoing	Strategic Planning
Renewable energy target	47,207	N/A	Ongoing	N/A
Continue the sporting facilities energy efficiency program	Not quantified	Officer time and grant funding	2013-14 to 2014-15	Sustainable Communities
Continue the low income energy efficiency program (LIEEP)	Not quantified	Officer time and grant funding	N/A	Environment and Engineering
Community indigenous plant giveaway	2000	$10,000 pa first year, $15,000 pa following years ($130,000)	2015-16 onwards	Environment and Engineering
Increased (pa) emissions due to population growth (2024)	– 426,817	N/A	N/A	N/A
Total	**0**	**$388,000**		

To undertake all actions included in this plan, extra resources (i.e. employment of two additional Council officers) will be required. Business cases will be developed prior to Council considering these positions. The positions currently being considered are an environmental education officer and a sustainable design officer.

The environmental education officer will work on key projects related to this strategy as well as actions related to the Integrated Water Management Plan. The sustainable design officer's work will support actions in this strategy, the housing strategy and the Integrated Water Management Plan.

Table 14. Key resource requirements – community emissions

Proposed Action	Cost per annum	Timeframe	Responsibility (lead unit)
Conduct a detailed analysis into the benefits of employing an sustainable design officer ($92,000pa 2015−16) and develop a business case	N/A	2014-15	Statutory Planning
Conduct a detailed analysis into the benefits of employing an environmental education officer ($92,000pa 2016−17) and develop a business case	N/A	2015-16	Environment and Engineering

5.17 Community emissions reduction targets

Council aims to influence a reduction in community emissions of at least 36 per cent per resident by 2024 and advocate for strategies at a state and federal level to see an additional reduction in emissions, as shown in Table 15. Council aims to reduce its emission levels per resident from 8.8 tonnes to 5.6 tonnes. Advocacy to the federal and state governments will focus on additional measures to reduce emissions associated with the electrical supply from the national electricity network.

Table 15. Aspirational community emissions reduction targets

Year	Emissions (t-CO2e pa)	Population	Emissions (t-CO2e) per person
2012	750,785	84,947	8.8
2024	750,785	133,449	5.6

Due to population growth, a 36 per cent reduction in emissions per resident equates to no growth or a decrease in overall emissions, as shown in Table 13.

Based on the above, Council's community emissions reduction target is:

- to stabilise emissions by 2024, at 2012 emission levels (750,785t-CO2e pa).

Council recognises the contribution that community groups in the Shire that focus on sustainability are making towards emissions reductions. Council will continue to support and work with these groups to achieve the targets set in this plan.

5.18 Peak oil actions

As discussed in Section 1, oil is set to become more expensive and harder to access in the future. This will cause significant issues in the Shire, due to the geographic spread of the population. Key actions to address these concerns (many have already commenced) are outlined in Table 16.

Table 16. Peak oil actions

Proposed Action	Timeframe	Responsibility
Continue to encourage community waste reduction through composting and worm farms, reducing rubbish collection requirements.	Ongoing	Environment and Engineering
Encourage local food production through community education and establishing and supporting community gardens.	Ongoing	Health Promotion
Encouraging increased service provision and employment locally, to reduce transport requirements and oil dependency.	Ongoing	Economic Development
Locating high density housing and local food retailers close to rail stations through the planning process.	Ongoing	Strategic Planning
Explore the opportunity of supporting a waste digestion facility regionally to produce energy from municipal waste.	Ongoing	Environment and Engineering
Continue to build a strong sense of community. Provide information on, and connect community members to, initiatives and programs to assist with the challenges faced from both climate change mitigation and peak oil. Build community resilience and connectivity to work through the challenges.	Ongoing	Community Strengthening
Supporting local suppliers to provide economically accessible locally produced food.	Ongoing	Economic Development
Supporting local agriculture to provide food for the Shire and region. The Bunyip food belt project, which aims to increase the intensity of farming in the Bunyip, Koo Wee Rup and Lang Lang region, is a key part of this initiative.	Ongoing	Strategic Planning
Establish a local food security coalition of food producers, distributors and consumers to strengthen food security.	From 2014–15	Health Promotion
Providing and advocating for increased cycling and walking infrastructure, and promoting cycling and walking as healthy and sustainable methods of transportation to the community.	Ongoing	Health Promotion

6 ACTION PLAN AND FINANCIAL SUMMARY

The implementation of this strategy will lead to a significant net cost saving to Council. An impressive $3.7 million of savings will be achieved over the life of the strategy. The strategy requires some investment, as outlined in Table 17. The table also provides a summary of proposed actions and responsibilities.

Only actions that will be paid for by Council, from 2014–15 onwards are shown. Actions where funding has already been expended are not shown.

Table 17. Action plan and financial summary

Proposed Initiative	Council or community	Cost	Timing	Responsibility
Promote and reward energy efficient behaviour	Council	$500 pa ($5,000)	Ongoing	Environment and Engineering
Investigate efficient management of the lakeside fountain	Council	No additional cost to Council	Ongoing	Operations
Waste reduction	Community	No additional cost to Council	Ongoing	Environment and Engineering
Encourage local food production	Community	No additional cost to Council	Ongoing	Health Promotion
Encourage local service provision and job creation	Economic Development	No additional cost to Council	Ongoing	Economic Development
Locate high density housing and food retailers close to rail stations	Community	No additional cost to Council	Ongoing	Strategic Planning
Explore the opportunity of supporting a regional waste digestion facility	Community	No additional cost to Council	Ongoing	Environment and Engineering
Continue to build a strong sense of community, connect community members to climate change mitigation and peak oil initiatives and programs.	Community	No additional cost to Council	Ongoing	Community Strengthening
Support local food distribution	Community	No additional cost to Council	Ongoing	Economic Development

Proposed Initiative	Council or community	Cost	Timing	Responsibility
Support the protection and enhancement of local agriculture	Community	No additional cost to Council	Ongoing	Strategic Planning
Support renewable energy	Community	No additional cost to Council	Ongoing	Environment and Engineering
Support cycling and walking via advocacy and infrastructure	Community	No additional cost to Council	Ongoing	Environment and Engineering
Growth areas sustainability advocacy	Community	No additional cost to Council	Ongoing	Strategic Planning
Sustainability workshops and energy efficiency advocacy	Community	$2,000 pa for Sustainable Homes Workshops ($18,000)	2015-16	Environment and Engineering
Sustainability expo	Community	$20,000 pa ($200,000)	2014-15	Environment and Engineering
Cardinia Life environmental upgrade project	Council	No additional cost to Council	2012-13 to 2014-15	Buildings and Facilities
Move to new civic centre	Council	$2,000 pa from 15/16 for NABERS rating ($18,000)	2013-14	Buildings and Facilities
Low Income Energy Efficiency Program	Community	No additional cost to Council	2013-14 and 2014-15	Environment and Engineering
Sporting facilities energy efficiency	Community	No additional cost to Council	2013-14 and 2014-15	Sustainable Communities
Eco-driver training for Council staff	Council	No additional cost to Council	2013-14 to 2015-16	Operations
Establish food security coalition	Community	No additional cost to Council	2014-15	Health Promotion
Beaconsfield Community Complex environmental upgrade	Council	$30,000	2014-15	Buildings and Facilities
Cardinia Cultural Centre environmental upgrade and solar power	Council	$120,000	2014-15	Building and Facilities

Proposed Initiative	Council or community	Cost	Timing	Responsibility
Prepare local planning policy amendment on Sustainable Design Assessment in the Planning Process (if required)	Council	N/A	2014-15	Planning Policy and Projects
Community indigenous plant giveaway	Community	$10,000 pa first year $15,000 pa following ($130,000)	2015-16 onwards	Environment and Engineering
Incorporate sustainable design, solar PV and purchase green power for new facilities	Council	$56,000 ($2,000 cumulative pa for green power)	2015-16 to 2021-22	Buildings and Facilities
Develop business case for Sustainable Design Assessment in the Planning Process including employment of an officer and budget for administration	Community	N/A	2015-16	Statutory Planning
Offset purchase for heavy fleet	Council	$3000 pa ($27,000)	From 2015-16	Environment and Engineering
Decorative street lighting upgrade	Council	$400,000	2015-16, 2016-17 and 2018-19	Environment and Engineering
Business efficiency program	Council	$40,000	2016-17 and 2017-18	Environment and Engineering
Develop business case for employment of an environmental education officer to assist with the delivery of actions in this plan.	Community	N/A	2015-16	Environment and Engineering
Pakenham library, hall and U3A environmental upgrade and solar	Council	$80,000	2017-18	Buildings and Facilities

Proposed Initiative	Council or community	Cost	Timing	Responsibility
Koo Wee Rup pool environmental upgrades	Council	$14,000	2017-18	Buildings and Facilities
Solar power for Council facilities	Council	$20,000 pa ($120,000)	From 2018-19	Environment and Engineering
Retrofit program for smaller Council facilities	Council	$100,000	2019-20	Buildings and Facilities
Conduct a detailed review into the aspirational carbon neutral target	Council	N/A	2021-22	Environment and Engineering
Purchase renewable energy or carbon offsets for Council's electricity consumption	Council	$50,000 pa ($100,000)	From 2022-23	Buildings and Facilities
Offset the remainder of Councils emissions	Council	$6,000 pa	2023-24	Environment and Engineering
Carbon neutral certification	Council	$40,000	2023-24	Environment and Engineering

7 MONITORING AND REPORTING

An internal review of this strategy and its actions will take place every two years. Progress towards meeting greenhouse gas reduction targets will be reviewed formally on an annual basis. A more thorough review with the consideration of new actions or modifications will take place in 2019, at the mid-way point of the strategy period. A detailed review will take place in 2024-25 following the conclusion of the strategies implementation period.

8 CONCLUSION

Cardinia Shire Council is committed to the Aspirational Energy Transition Plan. This plan outlines the role Council intends to take, to ensure the transition continues to take place for Cardinia Shire.

Cardinia Shire Council will be leading the way in terms of the energy transition, as this plan clearly shows. Council is committed to working with the community to ensure a sustainable future for the Shire and the broader community.

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