

Hobsons Bay City Council Target 2265

A four year emissions reduction plan

Executive Summary

Background

In November 2007, Council committed to reducing greenhouse gas emissions from its own operations to become carbon neutral (zero net emissions) by 2020 to show community leadership. This undertaking was in the knowledge that Hobsons Bay was vulnerable to climate change in particular from sea level rise and the effects of a hotter, drier climate on our vulnerable communities.

As detailed in the Corporate Greenhouse Strategy 2013-20, half of these reductions would be achieved through works or actions relating to council buildings and fleet. The remaining 50 per cent would be achieved by purchasing carbon offsets. Carbon offsets could be purchased at any time. However, there is no necessity to purchase offsets until the target date of 2020.

A total of 4,530 tonnes of greenhouse gas (GHG) emissions were generated by Council in 2013-14. These emissions will be used as a baseline for the purposes of establishing a plan to achieve zero net emissions by 2020.

Therefore, the emissions reduction figure that is required to be achieved by works or actions relating to council buildings and fleet is 2,265 tonnes per year by 2020.

To achieve this reduction, the corporate greenhouse strategy estimated that implementing all actions would cost a total of \$7,213,000 over eight years or \$901,625 annually. The budget allocation for the past three financial years has been approximately \$400,000. It is acknowledged that every effort should be made to leverage these funds with contributions from other sources. However, Victorian and Australian government policy have provided for few if any relevant funding programs. Recent Victorian Government funding announcements such as the New Energy Jobs Fund may provide some future opportunities. Based on the strategy's estimates the reduction target would take 18 years to achieve under current budget allocations.

Current status

Emissions reduction works started in 2013-14 with a focus on Altona Library and, to a much lesser extent, the Civic Centre building.

Works to date have reduced emissions by 7.5 per cent at a total cost of \$1,029m. Whilst these actions have been progressed in part alignment with and have taken advantage of periodic building maintenance and renewal needs, this cost-benefit ratio has prompted a review of the current path Council is taking to reduce its corporate emissions. This document encompasses the outcomes of the review and recommendations.

Recommendations

The review of Council's current and potential emissions reduction works identified four cost-effective priority activities that would result in an estimated emissions reduction of 1,185 tonnes per year. Priority activities include:

- a) installing solar PV on seven Council buildings
- b) completing the Altona Library and undertaking the Civic Centre lighting upgrades
- c) undertaking additional building efficiency measures on Council buildings such as lighting upgrades and installing sensor lighting
- d) continue to improve the fuel efficiency of the council vehicle fleet

The following recommendations are made:

1. Undertake the following six actions relating to council buildings and fleet.

1.	Install solar PV to four major buildings	2016-17
2.	Complete the lighting upgrade to the Altona Library	2016-17
3.	Install solar PV to three major buildings	2017-18
4.	Undertake a lighting upgrade to the Civic Centre	2017-18
5.	Undertake lighting upgrades to seven other major buildings	2018-19
6.	Develop a fleet management policy and implement fleet efficiency actions	2016-17 – 2019-20

2. Add any emissions shortfall amount (estimated at 910 tonnes per year) to the offsets to be generated or purchased in 2020 to address the required 2,265 tonnes of emissions and continue work to reduce buildings and fleet emissions.¹

Financial implications

The total estimated cost for these works is approximately \$1.3 million over four financial years to 2019-20, including new greenhouse actions \$1.3M and fleet operational (\$125K) budget items. Payback on investments is approximately eight years.

Conclusions

These recommendations align with the following Council's Community Health and Wellbeing Plan objectives:

- 2.5 *Reduce the Council's ecological footprint and ensure our community has the capacity to adapt to the effects of climate change*
- 4.1 *Undertake responsible and sustainable decision making and management*

Undertaking these priority works:

- demonstrates community leadership within the context of climate change mitigation and tangible approach to environmental issues
- highlights that Hobsons Bay City Council is an innovative, proactive and leading organisation that undertakes responsible and sustainable decision making and management
- will assist in helping to reduce Council's climate change adaptation risks
- will reduce Council's financial loss through reduced electricity costs, as total annual savings to Council are approximately \$180,000, noting that savings are likely to be higher due to the annual trend of increasing electricity and gas prices

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1. Purpose

This paper:

1. Examines current emissions reduction works and the results to date.
2. Estimates the remaining emissions based on scheduled works.
3. Estimates the potential emissions abatement from fleet abatement actions.
4. Estimates the potential emissions abatement from potential installation of solar panels on seven Council buildings.
5. Provides recommendations on actions to reach the goal of zero net emissions by 2020.

2. Our commitment and target

In November 2007, Council committed to reducing greenhouse gas emissions from its own operations to become carbon neutral by 2020 and assisting the local community to do the same by 2030. Council re-committed to these targets in the Climate Change Policy 2013. The Corporate Greenhouse Strategy 2013-20 presented actions that may achieve up to 50 per cent reduction in emissions. Carbon offsets could be purchased to account for the remaining emissions.

As demonstrated in Figure 1, a 50 per cent reduction target equates to a reduction of 2,265 tonnes per year.

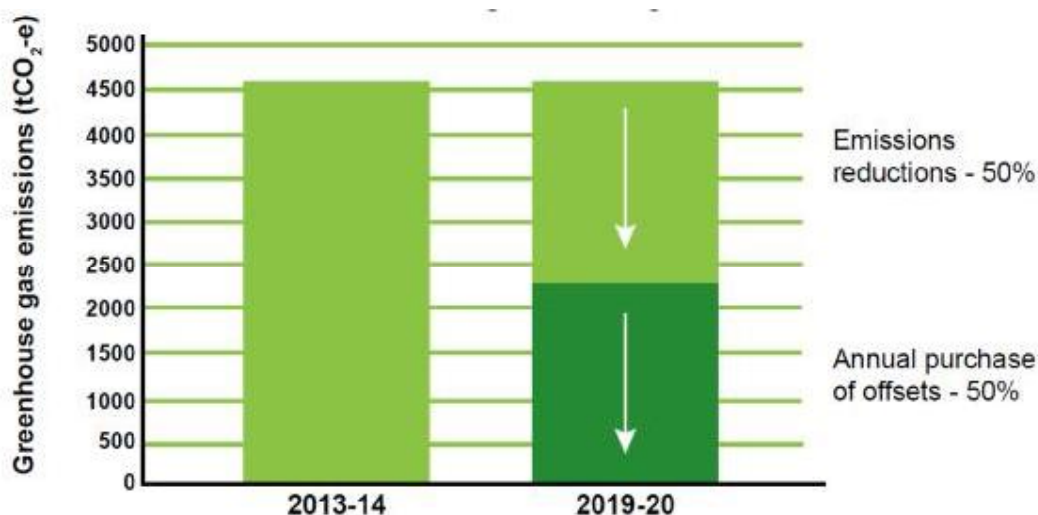


Figure 1 Zero net emissions reduction 2013-14 to 2019-20

It is acknowledged that from time to time, out of necessity, new buildings may be constructed or that extraordinary events may require that additional greenhouse gas emissions must be generated through works or services operations. However, for the

purposes of meeting the objectives of the Corporate Greenhouse Strategy 2013-20 and the Climate Change Policy 2013, emissions reductions will be measured against the 4,530 tonnes emitted in 2013-14. Corporate emissions will continue to be tracked and reported annually through the Environmental Sustainability Report and variations noted and explained where practicable. New buildings will continue to be constructed in accordance with Council's ecologically sustainable design practices and procedures to minimise their greenhouse footprint.

As demonstrated in Figure 2, almost 95 per cent of Council's emissions originate from electricity consumption in buildings and from fuel use in Council fleet vehicles.

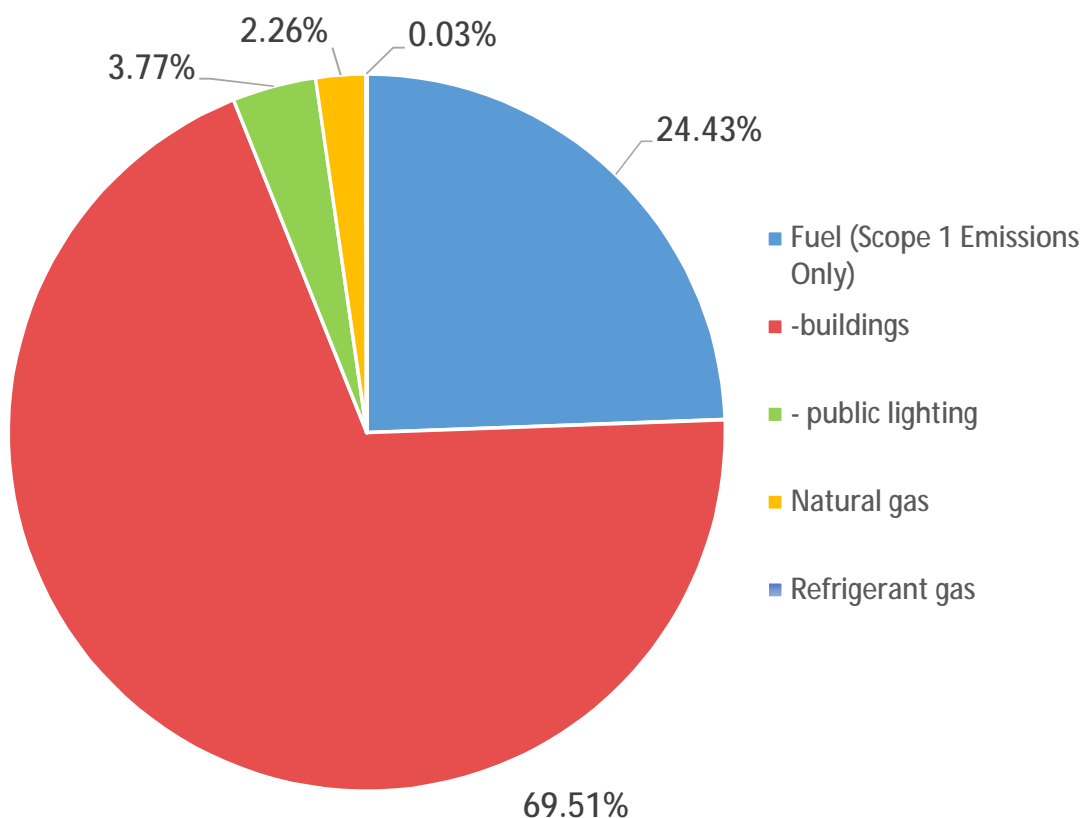


Figure 2 Breakdown of Council's emissions 2013-14

In addition, it should be noted that a small number of larger buildings contribute significantly to our greenhouse gas emissions. Council's top ten emissions producing buildings are illustrated in Figure 3. These buildings represent a total of approximately 53 per cent of Council's 2014-15 emissions. The remaining Council buildings individually contribute less than 1.5 per cent of Council's total emissions. That is, approximately 21 per cent of Council's total emissions. Figure 3 demonstrates that emission reduction works should focus on these top ten buildings, as beyond these, the magnitude of savings is unlikely to warrant the investment. The most significant opportunity for emissions reduction exists within the Altona Civic Centre.

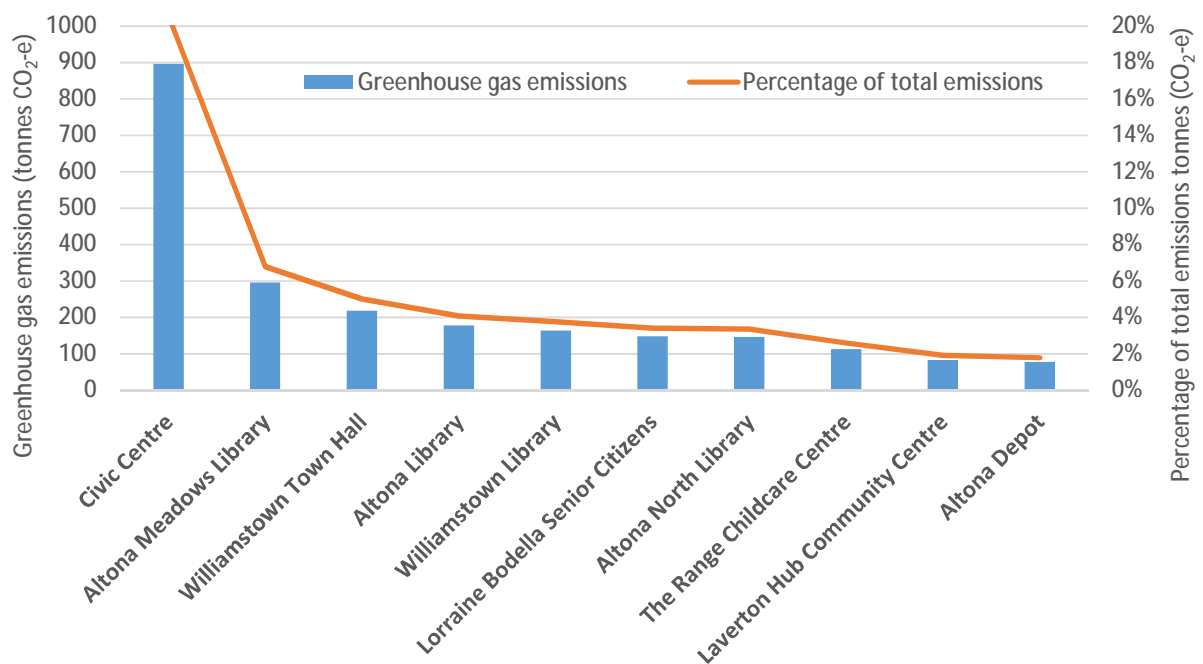


Figure 3 Breakdown of emissions from Council's top 10 buildings 2014-15

3. Emissions reductions to date

3.1 Buildings

Buildings account for 69 per cent of total emissions with the 10 largest energy consuming buildings accounting for around 53 per cent. For this reason, they were the first priority of the Corporate Greenhouse Strategy 2013-20.

Building emissions reduction works have reduced the target by 7.5 per cent at a total cost of \$1.029m, with the majority of works being at the Altona Library which was targeted for works as it incorporates the Hobsons Bay EnviroCentre. It is estimated that the works to the Altona Library will reduce the building's emissions by 95 per cent.

The main issues in progressing works and achieving significant emission reductions from buildings include:

- long planning, design and tendering time frames (up to six months)
- quotations coming in higher than the estimates indicated in the project plans
- hidden costs in relation to complying with legislation in the context of an ageing building stock, some of which is heritage listed e.g. Williamstown Town Hall
- competing departmental priorities (e.g. building renewals budget constraints versus prioritising emissions reductions)

- disruption to daily operations
- substantial and continuous officer time
- small returns for significant investment

3.2 Corporate (pool vehicles) and Heavy Fleet

In 2013-14 fleet vehicles accounted for 24 per cent of total emissions. Reductions in fuel emissions have been limited although, where possible, smaller engine capacity vehicles are chosen to replace larger engine capacity pool (corporate fleet) vehicles. It should be noted that while potential fleet emission reductions were identified in the Corporate Greenhouse Strategy as relatively small (seven per cent), the fleet vehicles have a highly visible profile that help reflect Council's environmental stance.

Barriers to making significant reductions in emissions from fleet include:

- there is no fleet policy to guide the purchase of fuel efficient or alternative technology vehicles
- there is some reluctance to purchase LPG vehicles due to re-fuelling safety concerns
- the technology in hybrid vehicles is unfamiliar to users
- there are operational requirements for heavy fleet which minimises the ability to make fuel efficiency gains in this sector
- long trial/pilots required to trial new technologies e.g. electric vehicles and the cost associated infrastructure such as charge points
- current lease agreements restrict a rapid change-over to a more efficient fleet

4. Future actions

In order to achieve Council's zero net emissions target, four options have been identified and evaluated against the barriers previously outlined in Section 3. The following methods represent the easiest and most effective emissions reduction over the next five years, listed in order of proposed implementation:

1. Installing solar PV on seven Council buildings.
2. Completing the Altona Library and undertaking the Civic Centre lighting upgrades.
3. Undertaking additional building efficiency measures on other large council buildings such as lighting upgrades and installing sensor lighting.
4. Continue to improve the fuel efficiency of the council vehicle fleet through the use of hybrid and fully electric vehicles.

4.1 Priority 1 - Solar PV systems

Emissions reduction project plans for Altona Library and the Civic Centre included recommendations for solar PV feasibility studies. These feasibility studies were completed in July 2015, identifying that solar PV is feasible for both buildings. Altona Library's 63.22kW system was installed and switched on in May 2016. Payback periods for solar PV to both buildings are less than eight years, subject to the surrender (sale) of the Small-scale Technology Certificates (STC). The information in these studies has been used as a reference for desktop analysis of other Council buildings. When comparing the cost per tonne of emissions abatement of completed and proposed works, solar PV is the most practical and economically responsible option of achieving immediate emission reductions at a cost competitive rate. Installation of solar PV systems on Council facilities will:

- be an efficient use of Council resources (in comparison to other emission reduction activities)
- result in minimal disruption (a few hours for one day at most) to daily operations, reducing risks associated with internal building works' impact on staff

Budget: \$644,000 Corporate Greenhouse Strategy Capital Works budget

Best case for solar PV to seven buildings:
644 tonnes emission reductions per annum
28.4 per cent of 2,265 tonnes per year relating to council buildings and fleet
\$90,675 savings from reduced electricity costs per annum

4.2 Priority 2 - Altona Library and Civic Centre lighting upgrades

Building emissions reduction works started in 2013-14 with a focus on Altona Library and, to a much lesser extent, the Civic Centre building.

Works completed up to and including the 2015-16 financial year should reduce the target by 7.5 per cent.

Priority 2 recommended works include the:

- upgrade of the Civic Centre's lighting
- completing the remaining upgrade of the Altona Library's lighting

Budget: \$251,000 Capital Works - Corporate Greenhouse Strategy budget (Civic Centre and Altona Library lighting)

Best case for Civic Centre and Altona Library measures:
80 tonnes emission reductions per annum
3.5 per cent of 2,265 tonnes per year relating to council buildings and fleet
\$11,300 savings from reduced electricity costs per annum

4.3 Priority 3 - Other buildings lighting retrofit works

The Corporate Greenhouse Strategy identifies actions such as lighting upgrades, installation of sensor lighting, installation of wall insulation and gas heating as priorities for Council to reduce emissions. In regards to buildings other than the Civic Centre and Altona Library, recommendations for which are provided previously, lighting works are recommended over other interventions.

Lighting accounts for approximately 20 per cent of a typical building's electricity. Other benefits are that the energy savings are easily calculated and the interference with the building fabric is less compared to the other interventions. This, coupled with an integrated approach to utilising daylight and sensor controls may result in further reductions than estimated.

Budget: \$300,000 Corporate Greenhouse Strategy Capital Works budget

Best case for other buildings lighting retrofit works:
362 tonnes emission reductions per annum
16 per cent of 2,265 tonnes per year relating to council buildings and fleet
\$51,000 savings from reduced electricity costs per annum

4.4 Priority 4 – Fleet management

The Corporate Greenhouse Strategy identifies two Corporate (car pool) Fleet actions in relation to fuel efficient and hybrid vehicles. Alongside with these, Council should liaise with other councils (City of Melbourne, City of Moreland) that have fully electric vehicles in their fleet to ascertain challenges and opportunities prior to replacing vehicles with fully electric vehicles.

The two most likely actions to progress are:

Purchase fuel efficient vehicles – Council should be encouraged to continue the current practices of replacing existing vehicles with more fuel efficient vehicles. The Corporate Greenhouse Strategy 2013-20 indicated that greenhouse emissions could be reduced by approximately 60 tonnes per year by 2020 through this method alone.

Purchase hybrid vehicles – Whilst there are some user concerns regarding petrol/electric hybrid vehicles (e.g. starting procedures), hybrid vehicles are more fuel efficient than standard petrol/diesel engines. Council's pool vehicles currently include four hybrid vehicles out of 27 departmental pool vehicles. The Corporate Greenhouse Strategy indicated that greenhouse emissions could be reduced by approximately 39 tonnes per year by 2020 by purchasing a greater proportion of hybrid vehicles.

Budget: \$125,000 Fleet management budget

Best case for fleet actions:
99 tonnes emission reductions per annum
4.4 per cent of 2,265 tonnes per year relating to council buildings and fleet

4.5 Investigations

Whilst priority actions are progressed, investigations should proceed to ensure that the most cost effective implementation is undertaken to meet the emission reductions for buildings and fleet and commence consideration for the generation or purchase of carbon emission offsets.

Energy Performance Contracts

Energy Performance Contracts are a process where a contractor is engaged to design, implement, verify and guarantee the savings from an energy efficiency project. This method of delivering energy efficiency upgrades to buildings is considered low risk and is widely accepted around the world. Energy Performance Contracts aim to achieve a low payback period for all projects, i.e. projects must pay for themselves with the savings achieved over a set time frame. However, Energy Performance Contracts are not suitable for all facilities and are typically only used for large buildings.

Solar PV feasibility studies

Solar PV feasibility studies have already been undertaken for the Altona library and Civic Centre. Feasibility studies will also need to be undertaken for other major buildings to ensure that solar PV can be established on those rooftops.

Renewable energy Power Purchasing Agreements

Renewable energy Power Purchasing Agreements are a financial arrangement in which a third-party solar services provider owns, operates, and maintains a renewable energy system (e.g. a solar PV system), and a host customer (e.g. Council) agrees to purchase the system's electric output from the solar services provider for a predetermined period. This financial arrangement allows the host customer to receive stable, and sometimes lower cost electricity, while the solar services provider or another party acquires income generated from the sale of electricity to the host customer. The first step will be to go to tender to the market to understand actual costs and conditions of current Power Purchasing Agreements. If found feasible, such an agreement may reduce the need for Council to install solar panels on all major buildings. Alternatively, the solar services provider would install the solar PV at no cost and then sell the renewable energy back to Council.

Carbon Offsets

Carbon Offsets are projects that indirectly compensate for emissions by investing in emissions avoidance or reductions elsewhere or removing carbon from the atmosphere, usually by storing in trees or soils. Carbon offsets are not considered equal, with some offset products considered superior to other products. It is envisaged that in 2018-19, Council will commence investigations into the opportunity for generation and/or purchasing of carbon offsets taking into consideration Australian Government policies and a range of parameters. Generating or purchasing some level of offsets in 2020 will be necessary to meet Council's zero net by 2020 corporate emissions target.

5. Conclusions and proposed implementation schedule

5.1 Conclusions

As demonstrated in Table 1, the above four priority actions would result in emissions reductions of 1,355 tonnes. That is, including completed works, 59 (59.8) per cent of the 2,265 tonnes per annum relating to council buildings and fleet that is required to be reduced.

Discounting completed works from these estimates results in the further reductions being accomplished for approximately \$1.3M. This figure includes new greenhouse emissions reductions works (\$1.195M) and operational (\$125K) budget items.

Works	Abatement (tCO ₂ -e)	Percentage of 2020 target (Target = 2,265 tCO ₂ -e)	Cost ('000)	
			Corporate Greenhouse Strategy budget	Other Budget
Completed works*	170	7.5	1,029	
Solar PV on four buildings	294 ¹	12.9	294	
Altona Library lighting upgrade	10	0.4	100	
2016-17 Total	304	13.3	394	
Solar PV on three buildings	350 ¹	15.5	350	
2017-18 Total	350	15.5	350	
Civic Centre lighting upgrade	70	3.1	151	
Other council buildings lighting upgrade works	362	16	300	
2018-19 Total	432	19.1	451	
Fleet management – to 2020	99	4.4	-	125 ²
Total less completed*	1,185	52.3	1,195	125
Total cost (Target 2,265)			1,320	

Table 1 Total for works undertaken, scheduled and uncommitted

1. Refer to Table 10 in Appendix 2 for detail on proposed buildings and associated abatement. In 16/17 it is proposed to put solar PV on four buildings with a combined roof space of 1242m² and 17/18 it is proposed to put solar PV on three buildings with a combined roof space of 1636m² which is the key difference in savings.
2. Fleet management budget (estimated)

Figure 4 aligns with Table 1 and demonstrates the predicted annual emissions reductions with associated indicative costs from 2015-16 to 2019-20. The shortfall of approximately 910 tonnes per year from 2018-19 to achieving the 2020 emissions reductions can be noted in the last bar of the graph.

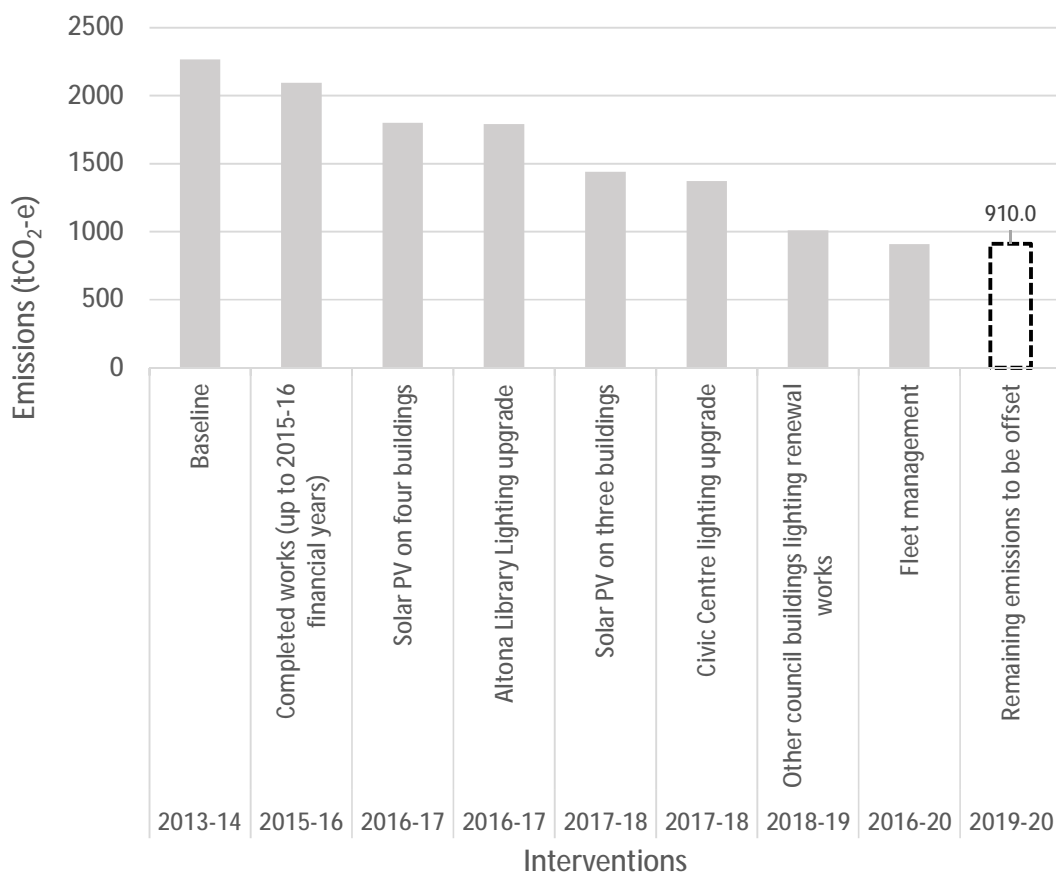


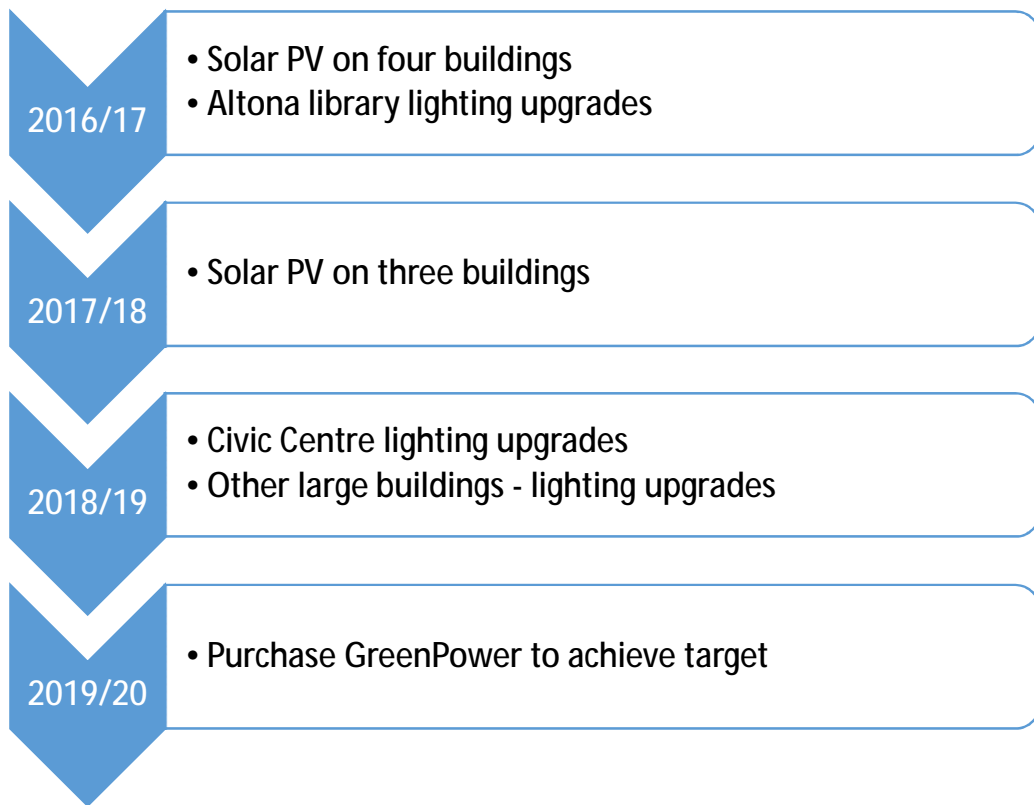
Figure 4 Emission reductions and associated costs to 2020

Based on experience to date, it is recommended that Council should undertake a series of works and a series of relevant investigations activities to meet its target of zero net emissions.

5.2 Implementation schedule - Greenhouse retrofit works

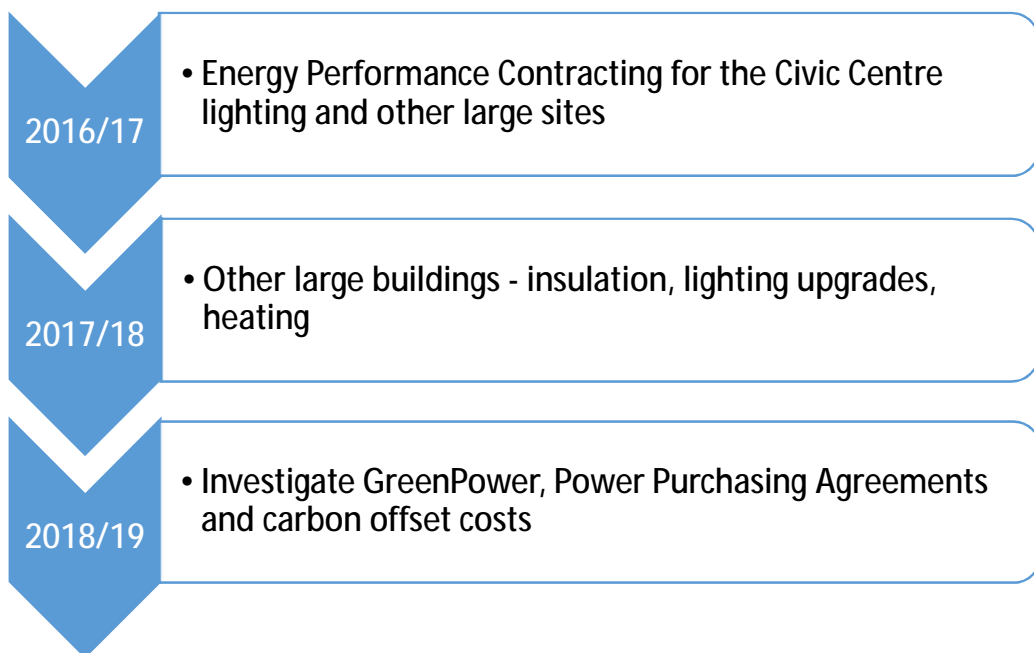
The focus on buildings should continue but change from retrofitting work to using roof space to install solar PV, this provides immediate reductions along with visible actions to the community.

It should be noted that a major benefit of solar PV systems are that they are de-mountable, removable, and re-usable. Should any major works to a building that has a solar PV system installed be necessary, they can either be stored for later use or re-used on another Council building to retain their greenhouse reduction benefits.



5.3 Implementation - Investigation works

The following relevant investigations are recommended to be undertaken concurrently with retrofit works to further inform actions and consist of the following:



6. Options to manage the shortfall of emissions reductions from council buildings and fleet

Table 2 provides details about the works or actions relating to council buildings and fleet that have been completed, are scheduled or are uncommitted that have been discussed in this paper.

Table 2 reflects table 1 however also details annual electricity savings expected following implementation and a simple payback period.

Works	Cost (\$ '000)	Abatement (tCO ₂ -e)	Percentage of 2020 target (Target = 2,265 tCO ₂ -e)	Annual electricity savings (\$)	Cost per tCO ₂ -e (\$)	Payback (years)
Completed or scheduled works	1,029	170	7.5	29,000	5,913	35
Solar PV on seven council buildings	644	644	28.4	90,675	1,000	7.1
Lighting upgrades to Civic Centre and Altona Library	251	80	3.5 (3.1 + 0.4)	11,300	3,100	22
Lighting upgrade works for other buildings ¹	300	362	16	51,100	828	6
Fleet management ²	125	99	4.4	Unquantified fuel savings	454	Unquantified
Total	2,349	1,355	59.8	182,075		

Table 2 Total for works undertaken, scheduled and uncommitted

1. Cost based on Corporate Greenhouse Strategy, annual savings and thus payback is based on savings from lighting upgrade works to the Civic Centre and Altona Library.
2. Based on Corporate Greenhouse Strategy 2013–20 estimates for the cost associated with purchasing fuel efficient vehicle replacements of \$9,000 per year combined with hybrid vehicle replacements of \$16,000 per year.

Completing the above actions will:

- reduce emissions by an estimated 1,355 tonnes
- reduce target emissions by 59.8 per cent
- have a total cost of an estimated \$1,733 per tonne of emissions
- have a payback period of 17.5 years
- leave an emissions shortfall of approximately 910 tonnes per year (approximately 40 per cent) from council buildings and fleet

The options for addressing the remaining 910 tonnes of emissions are to:

- a) Investigate and develop a range of cost effective works to buildings (e.g. installing wall insulation to large sites, installing solar PV to small sites) and progress these in the medium term to longer term. This may extend the building works to say 2021-22.

OR

- b) Progress works as part of the annual building renewal and maintenance program ensuring that energy efficient upgrades are undertaken as part of business-as-usual and in compliance with the Sustainable Design Policy.

OR

- c) Add this shortfall amount to the offsets to be generated or purchased (in 2020) to address the required 2,265 tonnes of emissions.

OR

- d) Add this shortfall amount to the offsets to be generated or purchased (in 2020) to address the required 2,265 tonnes of emissions and continue work to reduce buildings and fleet emissions. The offsets generated or purchased would be reduced as the emissions reductions increased until the requisite emissions reductions are reached.

Option d) is the recommended option. Elements of options a) and b) can also be incorporated to continue to reduce emissions wherever possible between now and 2020.

7. Recommendations

The following recommendations are made:

- 1. Undertake the following six actions relating to council buildings and fleet.

1.	Install solar PV to four major buildings	2016-17
2.	Complete the lighting upgrade to the Altona Library	2016-17
3.	Install solar PV to three major buildings	2017-18
4.	Undertake a lighting upgrade to the Civic Centre	2017-18
5.	Undertake lighting upgrades to seven other major buildings	2018-19
6.	Develop a fleet management policy and implement fleet efficiency actions	2016-17 – 2019-20

- 2. Add any emissions shortfall amount to the offsets to be generated or purchased in 2020 to address the required 2,265 tonnes of emissions and continue work to reduce buildings and fleet emissions.