

4.2 CARBON NEUTRAL AND ZERO EMISSIONS ACTIONS

Responsible Director: Ossie Martinz

EXECUTIVE SUMMARY

PURPOSE

To provide an update and address actions as resolved at the September 2019 – Council meeting (Item 6.3 – Council’s Response to Climate Change)

KEY CONSIDERATIONS/ISSUES

This report addresses the first component of the requested actions at the September 2019 Council meeting regarding Council’s response to Climate Change. GHG emission modelling has been completed for current corporate operations, to determine the status of total GHG emissions generated and what is required for Council to achieve carbon neutrality by 2025, 2030 and 2040, and minimise our impact on the environment (Attachment 1: Trajectory for Carbon Neutrality for Council’s Corporate Emissions). A number of actions are already initiated and others considered following a review of leading councils.

Consideration has also been given to how Council might further reduce our impact on the environment by:

- supporting the community to become more resilient to changes in climate, and
- increasing the use of recycled content materials in our operations.

In addition and complementary to Council’s strategy to address climate change, Council has been approached by Monash University to be an advisory member of Australian Research Corporation (**ARC) Linkage Project for Net Zero Precinct Transitions**. A letter of support is attached.

FINANCIAL IMPLICATIONS

There are no immediate costs implications associated with this update. Once the final strategy to address climate change is approved there will be upfront capital investment decisions required to make the changes but over the long term will result in financial and environmental savings for Council.

CONCLUSION/RECOMMENDATION

That Council notes the Trajectory for Carbon Neutrality for Council’s Corporate Emissions and supports the development of the final strategy to address climate change by September 2020; and to support becoming an advisory member to Australian Research Corporation (**ARC) Linkage Project for Net Zero Precinct Transitions**.

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RECOMMENDATION

That Council:

1. Notes the outcomes of the carbon neutral modelling for Council's corporate emissions and this report.
2. Supports Council joining as an advisory member to the Australian Research Corporation (ARC) Linkage Project for Net Zero Precinct Transitions and delegate authority to the CEO to sign the attached letter and other relevant documents that may be required.
3. Seeks a further report by September 2020 which will form the basis of a strategy to address climate change.
4. Notes that the modelling indicates that 2028 is the optimum time for targeting carbon neutrality. This will require funding for key projects in the next few years including:
 - a. Participating in the Local Government Power Purchase Agreement for up to 100% renewable energy for all electricity use.
 - b. Major Roads Street Lighting Changeover to LED.
 - c. Major Infrastructure Upgrades of high energy usage sites to reduce energy use, including the aquatic centres.
 - d. Investment in solar panel at key sites through the municipality.
 - e. Fleet Optimisation including more use of Electric and Hybrid Vehicles.
 - f. Investment in Carbon Offset sourced from local businesses or alternatives which provide a high social-economic benefit.
 - g. Reducing paper use and use of Carbon Neutral paper.
 - h. Developing specification for recycled content materials which meet local government requirements.
 - i. Facilitate suitable programs and activities which support our community to reduce energy, costs and GHG emissions.

INTRODUCTION

This report provides an update and addresses actions as requested at the September 2019 – Council meeting (Item 6.3 – Council's Response to Climate Change). Since that meeting, work has been undertaken to determine how Council could become carbon neutral and achieve zero net emissions by 2025, 2030 and 2040, noting the financial and environmental benefits.

BACKGROUND

In July 2019, Council agreed to participate in the Local Government Power Purchase Agreement coordinated by the Victorian Greenhouse Alliances on behalf of 48 councils, sourcing 100% renewable energy. Council committed 90-100% of its corporate electricity load to this tender process.

In September 2019 Council resolved the following motion;

That Council:

- 1. Resolves to strengthen and further prioritise its response to dealing with environmental and climate concerns.***
- 2. Directs the Chief Executive Officer (CEO) to provide a report and recommendations to Council by no later than February 2020 outlining how Council can become carbon neutral and achieve zero-net emission by 2025, 2030, 2040 and any other target the CEO wishes to include as an option (the Report). For each target date, the report should make it clear what the environmental benefits will be for adopting that target and the financial costs to Council to reach each target as compared to the status quo.***
- 3. Further, the Report should also provide commentary, advice and recommendations on the following:***
 - What are the examples of leading response to climate change by other local councils and government entities which might be relevant to Monash;***
 - Actions which Council could take to reduce greenhouse gas emissions within Council's operation;***
 - Measures Council can take to enhance local community resilience to the effects and impacts of global warming and to assist the community with their efforts to reduce greenhouse gas emissions***
 - Ways in which Council can prioritise the use of recycled materials in its operations:***
 - Outline a number of budget initiatives to achieve the desired outcomes and refer those to the 2020/2021 Budget, for funding***
 - Outline potential additions to the Council Plan and LTFP to help prioritise and achieve the desired outcomes.***
- 4. Prioritises the delivery of a whole of Council strategy for tackling climate change, as referred to in the Environmental Sustainability Strategy 2016-2026, with an aim to have it presented to Council by September 2020.***
- 5. Directs officers to allocate the required funds from the 2019/2020 budget.***

With a focus on action, and to strengthen and prioritise its response to dealing with environmental and climate concerns, Council asked that carbon neutral modelling be undertaken to determine how Council could become carbon neutral and what would be required to achieve zero-net emissions by 2025, 2030, or 2040, addressing costings and potential social, financial and environmental benefits.

CarbonetiX was appointed to undertake this modelling. The report provides an inventory of GHG emissions currently generated by Council to set a 2018/19 baseline (Attachment 1). To determine what would be required to be carbon neutral by 2025, 2030 and 2040, CarbonetiX evaluated the cost of

key actions to reduce emissions, including those already considered by Council, to determine the net cost to achieve carbon neutrality at the target years. They quantified the net present value, cost per tonne CO₂e reduced and cumulative net cost of the investment in these actions. A number of unquantified actions have also been proposed. The modelling was completed according to the requirements of the Federal Government National Greenhouse and Energy Reporting Act 2007 (NGERS).

Net zero modelling requires that Council account for all greenhouse gas (GHG) it has influence over, including:

- **Scope 1 GHG emissions** are generated as a **direct** result of activities in Council-owned facilities and assets (gas, fuel for fleet and refrigerants)
- **Scope 2 GHG emissions** are **indirect** emissions generated via consumption of **electricity** in Council owned facilities and assets
- **Scope 3 GHG emissions** are **indirect** emissions generated both up and down the **supply chain** of an organisation.

Finally, actions to prioritise the use of recycled materials were investigated as they may also provide a GHG emission reduction benefit. Additional research has also been completed to determine further opportunities to reduce or offset emissions, and support community resilience to a changing climate, taking inspiration from leading councils (Attachment 5).

Prior to this report, an Emission Reduction Study was completed by Iron Bark Sustainability (August 2019, summary provided at Attachment 2), to:

- Quantify GHG emissions generated by Council and provide the 2015-16 baseline for the Environmental Sustainability Strategy.
- Set a science-based target (or carbon budget). Science-based targets consider GHG emissions reduction required to keep global temperature increase below 2°C compared to pre-industrial temperatures – consistent with Intergovernmental Panel on Climate Change, State and National targets. The aim is to reach at least a 30% reduction by 2030.
- IronBark also completed a community emissions profile and carbon budget, to take the lead on addressing municipal GHG emissions and facilitating an approach to support community resilience.

Collectively, both studies resulted in a comprehensive approach to reducing our corporate GHG emissions, reduce our impact on the environment and improving community resilience.

If the Council is satisfied with the outcome and recommendations presented, the priority actions and associated budget requirements will be quantified. This will inform a strategy to deliver a whole of Council approach to reducing our impact on the environment and climate, as referred to in the Environmental Sustainability Strategy 2016-2026.

DISCUSSION**GHG Emission Source**

Carbonetix report quantified that the total GHG emissions generated by Council's corporate operations in 2018-19 was **22,811 tCO₂e**.

Source of GHG emissions include:

- Scope 1 (gas, fleet, refrigerant) 4427 tCO₂e (19.4%)
- Scope 2 (electricity) 9168 tCO₂e (40.2%)
- Scope 3 (lighting, travel, waste, etc.) 9,215 tCO₂e (40.4%)

Our **top five sources** of GHG emissions (tCO₂e) are:

1. Electricity 14,507 tCO₂e (63%)
2. Natural Gas 3,059 tCO₂e (13.4%)
3. Asphalt and Concrete use 1,675 tCO₂e (7.3%)
4. Fleet Vehicles 1,476 tCO₂e (6.5%)
5. Employee commute 1,392 tCO₂e (6.1%)

Table 1 shows the overall breakdown of GHG emissions sources

Table 1: Summary of 2018/19 GHG emission inventory (from Attachment 1)

Scope	Category	Source	GHG Emissions (tCO ₂ e)	Percentage of Scope
Scope 1	Transport Fuel Combustion	Fleet vehicles	1404	32%
	Stationary Fuel Combustion	Natural Gas	2844	64%
	Fugitive Emissions	Refrigerants	179	4%
Scope 1 Total			4427	
Scope 2	Grid Sourced Electricity	Electricity	9168	100%
	Scope 1 Total			9168
Scope 3	Grid Sourced Electricity	Public lighting	4515	49%
	Grid Sourced Electricity	Leased Assets	148	2%
	Grid Sourced Electricity	Transmission Losses	676	7%
	Natural Gas	Transmission Losses	215	2%
	Fugitive Emissions	Waste	422	5%
	Materials	Asphalt and Concrete	1675	18%
	Materials	Paper	87	1%
	Transport Fuel Consumption	Employee Commute	1392	15%
	Fleet vehicles	Transmission Losses	72	1%
	Transport Fuel Combustion	Business Travel	14	0.10%
Scope 3 Total			9216	
Total			22811	

According to the National Greenhouse and Energy Reporting Act 2007 (NGERS), to be Carbon Neutral, Council needs to account for all GHG Scope 1, 2 and 3 emissions, including emissions that Council generates directly, indirectly and up and down our supply chain as part of our operation control. Operational control is defined as any property or asset where Council has the authority to develop operating, environmental, or health and safety policies. This is why employee commute emissions are included.

A source of emissions is material (needs to be included) if it accounts for over 1% of the total organisational emissions. Any sources under 1% are able to be excluded, but the combination of excluded emissions cannot exceed 5%. All emissions within the measurement boundary have been included assuming the emissions are material.

Key Actions Identified to reduce GHG Emissions

CarbonetiX identified and quantified a number of actions to reduce corporate GHG Emissions. These include:

1. Sourcing 100% renewable electricity
2. Energy monitoring technology
3. Reducing energy and water requirements in our largest buildings such (aquatic and civic centres) through Energy Performance Contract (EPC).
4. Purchasing 100% recycled and carbon neutral paper – office and publications
5. Replacing major road lighting with LEDs
6. Small scale solar for Council community facilities (to reduce costs for community tenants, and Council GHG emissions)
7. Energy efficiency initiatives in our other buildings
8. Optimising and electrifying our fleet

Current Actions

Council's participation in the Local Government Power Purchase Agreement (LGPPA) to purchase 90-100% of our electricity usage from 100% renewable sources, will effectively reduce corporate **GHG emissions by over 60% from 2021**, providing a quick win with minimal cost differential to current services.

A number of the above suggested actions to reduce emissions have also already been initiated or planned by Council this financial year (2019-20) including:

- Sourcing 100% recycled content/carbon neutral office paper and on demand printing
- Ongoing refrigerant change over and HVAC upgrades
- Procurement Policy up date to strengthen sustainable procurement
- Fleet optimisation and Net Zero by 2035 (internal goal) currently have a two electric and a number of Hybrid vehicles in the fleet.

Approach to a Zero Emissions Fleet

An extended roll out is preferred for Electric vehicles for a few key reasons:

- prices will continue to drop and will be comparable to standard vehicles
- diesel is still currently the most efficient option for our heavy duty fleet
- technology and engine capacity is evolving, so Council wants to ride the wave of these changes
- while generating lower GHG emissions than petrol or diesel vehicles, charging electric vehicles can use significant electricity. Some of our sites are energy constrained, so charging capacity is limited.
- Until 2021, Council only has 20% green power, so most of the electricity is source from black coal.

Other activities underway include:

- A **detailed facility study** has been completed for eight of our highest energy-using buildings including aquatic centres, and major civic buildings. This study identified a range of projects which can be delivered through an **Energy Performance Contract (EPC)**. **An EPC is an approach which guarantees GHG emission reduction, cost and energy savings**, and can include improved **energy efficiency** by upgrading aging facilities, installation of **solar panels**, **reduce gas** usage and **improve amenity** for our community. Some work may be able to be completed under our facility renewal process and is a low risk approach for Council.
- ***Environmental Sustainable Design Policy for Buildings and Infrastructure*** for Council buildings is being developed to support project design, in partnership with the Eastern Alliance for Greenhouse Action (EAGA)
- Sustainability team working closely with Strategy Planning and Horticulture teams to increase our tree canopy in Monash.
- Review of internal **project development** and **procurement** stages to increase the opportunity to use recycled and sustainable materials.
- Results of a recent **staff travel survey** showed that there is strong interest in more sustainable travel options such as flexible working, MYKI club, e-bikes, end of trip facilities, and carpooling opportunities.
- Use of recycled asphalt for car parks has been trialled.

It is still good business sense to implement energy efficiency and LED installations, even when sourcing 100% renewable electricity, as this reduces our GHG emissions locally and reduces overall costs. There may also be the opportunity to invite our tenants to join us in the LGPPA to share benefit and bring them along on our carbon neutral journey.

Since the changeover of residential street lights to T5 energy efficient lighting in 2014-15, they have now effectively paid for themselves, in energy savings (18% savings). Note that LEDs were not suitable at the time of installation, but should be considered in the end of life of current lighting.

Getting to Carbon Neutral

Based on the quantified actions, CarbonetiX modelled the capital costs of implementing the key initiatives above and the resulting savings (from Attachment 1). The initiatives modelled for each target year are the same but the timing of roll out varies for each target year, and identified capital costs were planned to be aligned with the current Council renewal program.

Modelling showed that:

- **To be Carbon Neutral at 2040**, Council would need to **spend \$15.3million** over the next fifteen years (<\$1.02million per year) and \$87,300 in offsets. This would result in a **cost saving of \$32.1 million** during this time. The net saving for Council would be **\$16.7million**.
- **To be Carbon Neutral at 2030**, Council would need to **spend \$13.5million** over the next ten years (<\$1.35million per year) and \$96,600 in offsets. This would result in a **cost saving of \$13.7 million** during this time. The net saving for Council would be **\$138,000** at 2030, and a net saving of **\$17.3million** at 2040.
- **To be Carbon Neutral at 2025**, Council would need to **spend \$9.7million** over the next five years (<\$2million per year) and \$103,000 in offsets. This would result in a **cost saving of \$6.5 million** during this time. The net cost Council would be **\$3.3million** at 2025 and **net saving of \$16.5million** at 2040.
- The modelling showed that delivery of the initiatives under the **2025** scenario, would be **cost neutral by 2028**, in that cost savings would match capital investment (which would be **\$1.2 million per year** if extended over 8 years).

Based on the modelling, **2028** appears to be the most attractive target date as it provides a Cost and Carbon neutral result and return a positive net financial return from this date. The \$300,000 in offsets required to meet the 2025 target, could be invested in further solar and energy efficiency initiatives for Council or community. Suggested breakdown of investment in key initiatives for 2028 can be found in Table 2.

Table 2: Indicative breakdown of 2028 investment and return on initiatives

Key GHG reduction initiatives	Cost	Avoided GHG emissions tCO2e	Annual Cost savings once installed	Payback
LGPPA	no additional costs	14359	-	0
Energy monitoring	\$100,000	190	\$86,000	1.4
Capital works improvements at largest facilities including HVAC and Central plant - avoiding 18789 GJ Natural gas per annum.	\$3,320,000	1102	\$397,000	8.4
Investment in 1000kW solar installation for our major buildings	\$1,400,000	320	\$182,000	7.7
LED major roads streetlights	\$2,200,000	1100	\$300,000	7
Paperless office and Carbon Neutral Paper	\$160,000	39	\$40,000	4
Small scale solar for community facilities	\$520,000	600	\$87,000	6
Energy efficiency initiatives	\$400,000		\$80,000	5
Fleet optimisation and EV	\$1,500,000	308	\$150,000	10
Total	\$9,600,000			

GHG emission reduction opportunities used by other councils

As of May 2019, up to 39 Victorian councils have a carbon neutral target in place, and 60 out of 79 have an emission reduction target. On reviewing actions from nine leading councils and Monash University, we have identified **six additional** actions which could enhance Monash's response to reducing corporate and community GHG emissions:

- Electrification of gas equipment
- Increased use of recycled material in Council operations
- Solar farms on decommissioned landfills or industrial roof space
- Community energy foundation to allow access to solar for community.
- Green travel options for employees
- Create more carbon offsets through provision of trees and plants to residents and increase planting on Council land and retaining trees where possible.

Reducing offsets

In this current model, offsets are required to be purchased from a financial provider are estimated at \$87,300-103,500 per annum (an average of cost \$14 per tCO_{2e}). Cost of carbon offsets are highest in the target year and gradually decrease as more efficiencies realised. This is most inexpensive way to become carbon neutral but may the only solution.

The offsets are required to meet carbon neutrality because some of the GHG emission sources are not able to be fully avoided and more work needs to be done to move away from using natural gas, which is our second highest source of GHG emissions (13.4%) after electricity.

Natural gas was, until very recently, an inexpensive and efficient source of energy, with lower GHG emissions than electricity sourced from black coal. Now the costs have risen, and Council has an opportunity to source 100% renewable electricity, consideration should be given to moving away from gas. This is an emerging approach by many councils.

It is recommended that Council invests in further energy efficiency over offsets where possible but net costs of doing this will need to be considered to optimise the costs of reaching carbon neutrality.

Where Council is unable to avoid the need to purchase offsets, priority should be given to:

- sourcing offsets locally from Monash businesses and possibly through maximising solar on Council and community buildings purchasing offsets from these sources may also support our local community resilience and social procurement policy directives
- consider partnering with building owners to utilise roof space for solar and share costs, utility savings and carbon credits, which increases our capacity for solar power, and
- increasing tree canopy in Monash. It is more difficult to quantify the offsets from tree planting, it is not impossible with assistance of a third party to verify offsets. Trees also cool our buildings, provide habitat for wildlife and store carbon locally, so they are definitely considered in the Carbon Neutral approach.

Procurement and Use of Recycled Materials

Council has been tracking its environmental spend for more than 10 years and is currently spending about 4-7% on sustainable products.

In the past, recycling collection services have relied heavily on overseas markets in the past, and since the recycling crisis there is more pressure from state and federal governments to recycle collected materials in Australia for reuse. This pressure will increase when bans to landfill are implemented over the next few years. Consequently, there is a growing expectation for

local government to purchase more recycled content products, and this will increase when the State Government's Circular Economy policy is in place.

As mentioned previously, there have been trials using recycled content asphalt in Monash. The challenge is that products can perform differently, and often outperform, compared to virgin source products. However current specification for roads, are designed for virgin material and it is difficult to meet the requirements for recycled content products.

One consideration is to develop robust specifications for recycled content materials which meet local government requirements. Recycled content products generally have a lower GHG emissions over virgin materials, but choice of product will determine the level of reduction. Where a suitable recycled content product is not available, preference should be given to certified Carbon Neutral products.

Community emissions

In 2018/19, the community GHG emissions generated in Monash were determined to be 2,903,000 tCO₂-e by Iron Bark Sustainability. (See Attachment 2 - Summary report). Monash community emissions include those generated by businesses and residents. The sources of Community GHG emissions were:

- electricity used by buildings and facilities (65%)
- road transport (21%)
- energy from gas (12%)
- solid waste (2%)
- wastewater (1%)

Monash is ranked sixth highest in Greater Melbourne for community GHG Emissions, due to being the being the highest employer outside of the CBD, and significant industry. Council corporate emissions contribute less than 1% of the total.

Council has the opportunity to reduce community GHG emissions through delivery of our services and program (from Attachment 2 and 3).

Some **current** activities include:

1. Food Organics in the Green Bin services starts in July 2020, resulting in an up to 50% reduction in waste GHG emissions for the community by diverting food waste from landfill.
2. Environmental Upgrade Agreements to help businesses and building owners to reduce their utility costs and GHG emissions, and share the cost savings with their tenants. To date there are four EUAs in Monash investing \$1.6million in energy efficiency and solar.
3. Solar Savers – helping residents, especially low income households, with online and phone support, a preapproved supplier, access to a low interest loan, and support to access the state government rebates to install solar and save costs.
4. ESD policy for development with 3 or more units has been part of the planning scheme since 2016.

5. Sustainability Hub and workshops to educate and empower the community to take their own Climate change actions
6. Improving vegetation overlays to minimise tree loss and reduce urban heat island effect.
7. Integrating divestment in fossil fuels into Council's investment policy, sending a message to financial institutions to seek alternative investments and maintain credit rating.
8. Participating in the Greenhouse Alliances 'How well are we adapting' project to track our ability to adapt in a changing climate.
9. Partnering with Monash University on Zero Net emission and Zero Net Precincts ARC Linkage project to collaborate on GHG emission reduction across the municipality (Attachment 4).
10. Delivery of the actions under our key strategies such as the Monash Integrated Transport Strategy 2017 and the which includes the delivery of more bicycle and rail infrastructure, green travel and flexible working; and the Health and Resilient Monash (Integrated Plan 2017-2021), to help our community adapt to and be resilient in a changing climate.

Expanding on these program and learning from other leading councils will help us to partner with our community and business to reduce GHG emissions for Monash.

POLICY IMPLICATIONS

This paper supports Priority 3: Climate Change of the Environmental Sustainability Strategy, in particular the following action: -

3.1.1 To develop and implement a Climate Change Action Plan which recognises a whole of Council approach to mitigation, adaptation, risk management, innovation and alternative energy sources.

Retaining trees and increased tree planting can also support the vision of our Urban Biodiversity, Vegetation Canopy and Open Space Strategies, and is complementary to Council's partnership in the Living Melbourne Framework (the Resilient Melbourne Urban Forest Strategy).

Health and Resilient Monash (Integrated Plan 2017-2021) requires Council to help our community adapt to the changing climate in line with the State Government Climate Change Act.

There are also a number of actions set out in the *Monash Integrated Transport Strategy 2017* which may help to reduce community GHG emissions by providing more sustainable options to travel in and around Monash. Once the final actions are determined, they will need to be embedded across all key Council documents – including strategies, plans, policies and contract specifications.

SOCIAL IMPLICATIONS

Through the development of these studies discussed, opportunities have been identified which will provide cost savings and other benefits to community and business, and reduce GHG emissions in the municipality.

This includes focussing on investment in Carbon Offset sourced from local businesses or alternatives which provide a high social-economic benefit.

A clear response to climate change, and a defined way forward, will position Monash as a leader in this space and allow us to be a strong advocate to other levels of government for the benefit of our community.

CONSULTATION

This draft report has been presented to the Environmental Advisory Committee to provide feedback and support. The Environmental Advisory Committee is interested in working with Council to develop the final strategy and actions, to support reduction of corporate emissions and support community resilience. EAGA will also be consulted to help finalise the strategy, which is planned to be completed by September 2020.

FINANCIAL IMPLICATIONS

There are no immediate costs implications associated with this update. Once the final strategy to address climate change is approved there will be significant upfront capital investment decisions required to make the changes but over the long term will result in financial and environmental savings for Council.

CONCLUSION

That Council notes the Trajectory to Carbon Neutrality for Council's Corporate Emissions; provides support for the suggested actions proposed, which will inform the final strategy to address climate change by September 2020; and to endorse Council to be an advisory member to the Australian Research Corporation (**ARC**) **Linkage Project for Net Zero Precinct Transitions**, in partnership with Monash University.

Attachment 1: Trajectory to Carbon Neutrality for Council's Corporate Emissions

Attachment 2: Towards Zero Carbon - Summary

Attachment 3: Further Emission Reduction Strategies for Monash

Attachment 4: Letter of Support ARC Linkage Project for Net Zero Precinct Transitions