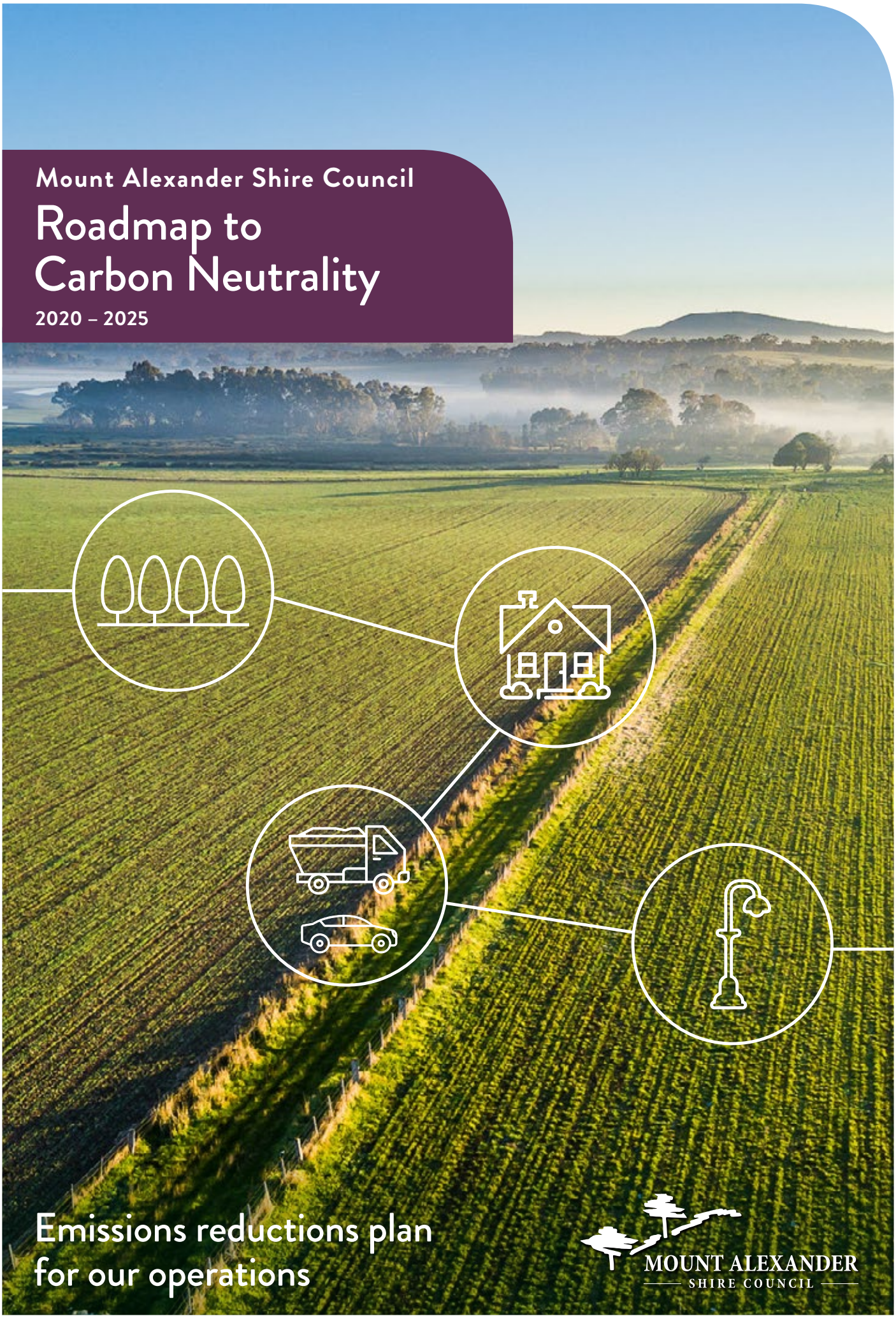
Mount Alexander Shire Council

Roadmap to Carbon Neutrality

2020 – 2025



Emissions reductions plan for our operations

MOUNT ALEXANDER SHIRE COUNCIL

Contents

Acknowledgements

Mount Alexander Shire Council would like to thank Renew Consulting for the assistance they provided in developing this report.

Acknowledgement of country

Mount Alexander Shire Council acknowledges that the traditional custodians of this land, the Dja Dja Wurrung and Taungurung peoples, proudly survive. We acknowledge their continued practise of custom and their close cultural, spiritual, physical, social, historical and economic relationship with the land and waters that make up their country, which includes Mount Alexander Shire.

Council recognises the Victorian Government's Recognition and Settlement with both the Dja Dja Wurrung Clans Aboriginal Corporation and the Taungurung Land and Waters Council.

List of acronyms

GHG: Greenhouse Gas Emissions

LGPPA: Local Government Power Purchase Agreement

tCO2e: tonnes of carbon dioxide equivalent

Mayor's message

Councillor Christine Henderson

I'd like to thank the many people involved in delivering this Roadmap. Our staff have worked hard to develop a detailed plan that will help us meet a key commitment made in our Climate Change Action Plan 2016-2020, namely to be carbon neutral, as an organisation, by 2025.

The ten principles outlined in this document guide our direction and help us prioritise our actions. These begin with leadership. By accepting responsibility for reducing our own greenhouse gas emissions to zero, we demonstrate that we can "walk the talk".

Another principle is collaborating locally. As we implement the Roadmap we will strive to consciously couple our efforts with those of the community. In this way, we will ensure that the benefits of reaching carbon neutrality are shared with those seeking to tread the same path.

The Roadmap guides us to be both fiscally and environmentally responsible. Many of the actions we undertake to 2025 will help us tighten our belts and operate more leanly with lower energy bills and more efficient ways of managing our resources.

One of the exciting initiatives that forms part of this Roadmap is the Local Government Power Purchasing Agreement. Mount Alexander Shire Council is leading the way as one of 48 Victorian councils to form Australia's largest ever buying group to switch to 100% renewable energy.

Implementing this Roadmap will also put us on the front foot with regard to emerging markets and our ability to respond to the growing needs of our community for new services and technologies, such as electric vehicle charging stations and smart road lighting.

Council declared a climate emergency at the start of what was to be the most devastating fire season in Australia's history. We listened to the concerns of the community presented at the the Climate Change in December 2019. Council resolved to act on the urgency of this moment by applying a climate lens to all that we do.

A new climate strategy to be delivered in 2021 will provide the framework for all our action on climate change both within Council operations and in partnership with the community. The Roadmap an important first step towards this broader ambition.

Executive summary

This emissions reduction plan sets out Mount Alexander Shire Council's roadmap to carbon neutrality that will lead to zero net emissions for Council operations by 2025.

Carbon neutrality

Being carbon neutral means that the net greenhouse gas emissions associated with an organisation's or council's activities are equal to zero. The 'net' depicts that emissions are balanced by absorbing an equivalent amount from the atmosphere through other activities. It is achieved through a combination of measuring and reducing greenhouse gas emissions and purchasing of carbon offsets. The terms zero net emissions and carbon neutral can be used interchangeably.

Figure 1 shows the three steps taken each year to claim carbon neutrality: establishing a baseline carbon footprint, reducing emissions where possible and then purchasing offsets.

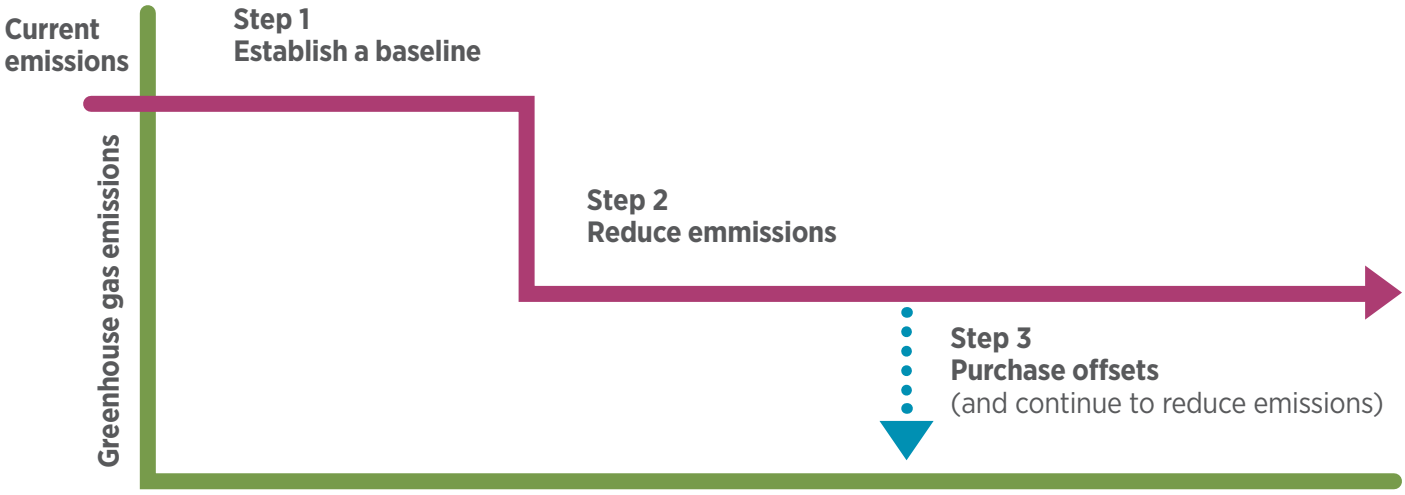


Figure 1: Stepping down the carbon ladder

Ref: *The business guide to the low carbon economy: NSW* (2009), The Climate Group

The Roadmap seeks to ensure that all actions are informed by a set of agreed guiding principles (see Figure 4). Amongst these are the need for cost-effectiveness and the consideration of co-benefits and costs to society and the environment. Together these principles will guide Council to invest in actions with the best returns while maintaining its services and a sustainable long term budget.

Executive summary

Priorities for action

This plan describes actions that we will undertake to reduce our emissions over the five years from 1 July 2020 to 30 June 2025. These come under nine priority areas which have the following goals, as outlined below:

1

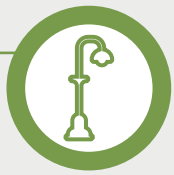
100% renewable electricity supply
by 2022

2

Zero-net emissions buildings
by 2025

3

Zero-net emissions lighting
by 2022



4

Zero-net emissions transport
by 2025

5

Zero-net emissions waste
for Council operations by 2025 and supporting community-wide waste reduction

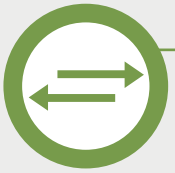
6

Creating a thriving low carbon culture

7

Encourage emissions reductions
across goods, services and works

8



Strategic offsetting
to reach zero-net emissions by 2025

9

Monitor and report
upon our progress from 2021

History and context

There is global scientific consensus that climate change poses significant risks to the environment, countless species, and humans. The global standard for taking action was set via the 2015 Paris Agreement. This established the international consensus on a zero-net emissions target of 2050. In 2018 the Intergovernmental Panel on Climate Change (IPCC) Global Warming of 1.5 °C Report was released and modelled a drop to zero-net emissions within a 12 year period, to remain within 1.5°C. This would significantly lower the impact of climate change and has inspired greater leadership and shorter, more ambitious targets.

The Victorian Government's response to the Paris Agreement has been to align with and adopt the zero-net emissions by 2050 target, which is overseen by the Climate Change Framework, inclusive of the Climate Change Act of 2017. An early requirement was that all water authorities (inclusive of local supplier Coliban Water) must reach zero-net emissions by 2040. A key action of the state government has been to establish a renewable energy target of 50% by 2030 and to establish the Take2 climate change pledge to which Council is a signatory, and which commits us to reducing emissions in order to stay within two degrees of warming. The Victorian Government is also currently determining its interim targets for 2025 and 2030.

Local governments have an important role to play in reducing emissions. A report surveying councils in 2018 found that over 80% of responding local governments across Australia currently have a corporate emissions reduction target[1]. The new Local Government Act 2020 (Vic) considers local government's role in mitigating and planning for climate change risks as an overarching governance principle. Councils can reduce emissions in two ways: directly through their operations and indirectly through their influence on communities. This roadmap is focused on Council's own operations.

Council's first greenhouse gas action plan was adopted in 2000 and began a process that has resulted in diverse emissions reduction projects being implemented over the past two decades. In recent years, Council's corporate emissions have been steadily falling, thanks in large part to a significant and ongoing energy efficiency upgrades in buildings, street lighting infrastructure, as well as investment in rooftop solar[2].

Council has an ambitious target of carbon neutrality for Council's operations by 2025, which was first suggested in our Climate Change Action Plan (CCAP) for 2016-2020, as:

> "A long-term goal of 2025-2040: 'Council is carbon neutral and resilient to the impacts of climate change."

But has since been strengthened through Council's motion to declare a climate emergency (2019):

> "Approving and implementing a roadmap that will lead to zero net emissions for Council operations by 2025, ensuring that all actions are informed by cost-benefit analyses to ensure that Council invests in actions with the best returns while maintaining its services and a sustainable long term budget."

[1]www.ironbarksustainability.com.au/fileadmin/public/downloads/IRO_GEN_001_Local_Government_Reivew_Report_FINAL.pdf

[2]Refer to Action on Climate Change for a summary of our climate actions to date, available on our website: www.mountalexander.vic.gov.au/files/Environment/Climate_Change_Forum_Action_On_Climate_Change_Background_Dec_2019.PDF

Scope of the roadmap

The roadmap to carbon neutrality addresses how Council will work to reduce (mitigate) carbon emissions from our own operations. It does not directly address our responsibilities in relation to assisting the community with reducing carbon emissions and adapting to climate change, nor does it address actions we will be taking to adapt to climate change as an organisation, for example by integrating climate risks into our own operations.

Other partnership initiatives underway will fill these gaps, such as the Z-Net Community Transition Planning project, and the state government's ADAPT Loddon Mallee program.

Climate change strategy 2021 – 2030

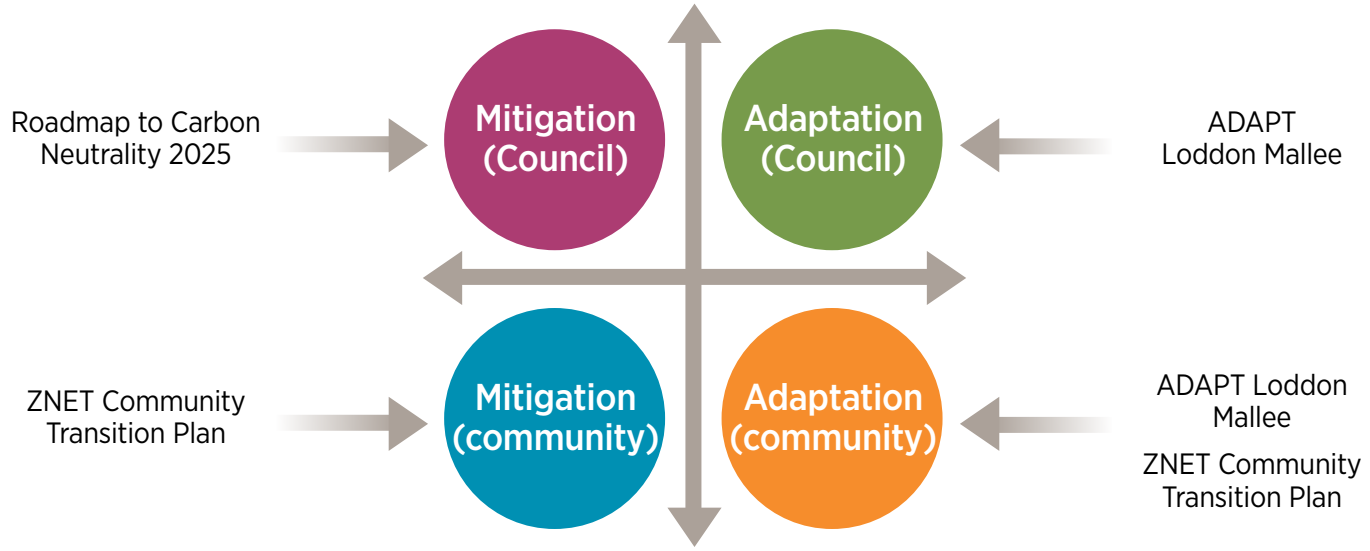


Figure 2: The roadmap in the context of our climate change response

Mount Alexander Climate Emergency Team celebrate Council's declaration of a climate emergency, pictured with Mayor Christine Henderson, Cr Bronwen Machin and Deputy Mayor Max Lesser.

As Figure 2 illustrates, an updated Climate Change Strategy will be the overarching document that will frame our actions in both adaptation and mitigation, across our own operations and in partnership with others.

The commitment to a Climate Change Strategy formed part of Council's 2019 motion to declare a climate emergency and will pick up where the current Climate Change Action Plan (2016-2020) left off. The timeline for these strategies and plans is presented in Figure 3.

In recognition of the connections between the roadmap actions and these emerging strategies and plans, each key priority area in this report identifies further opportunities for partnership and advocacy. By highlighting where emissions reductions efforts in our own operations can be leveraged to benefit community-wide efforts at carbon mitigation, these suggestions will support the agreed principle of leadership, i.e. to exert positive influence in areas where we can't apply direct control (see Guiding Principles).

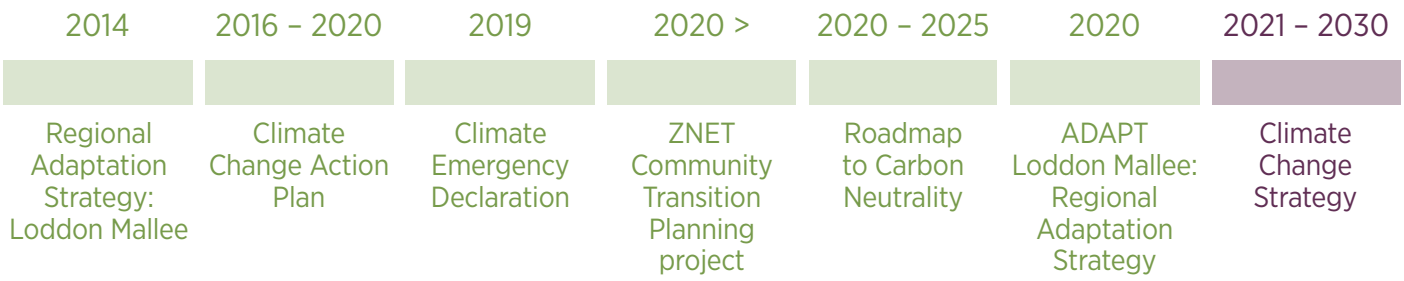


Figure 3: Timeline for climate policy development and collaboration

Box 1: Z-NET Community Transition Planning Project

The term 'Z-NET' refers to an open-source model and pathway for a local community to set targets and achieve zero-net emissions. The Z-NET model was first used in the NSW regional town of Uralla where Z-NET stood for Zero Net Energy Town. In its second iteration in neighbouring Hepburn Shire the model expanded beyond the energy sector to the full emissions spectrum and became Zero-Net Emissions Transition.

Here in Mount Alexander Shire, the Z-NET blueprint will be adapted again to include adaptation to climate change, amongst other innovations. This partnership project is underway in 2020 thanks to seed funding from Sustainability Victoria and Council. Further funding will be sought to support the whole of community approach to co-designing and completing the Z-NET masterplan to fit our shire's unique vision and support the implementation of key projects identified in the process.

Guiding principles

The following principles were agreed by Council in 2019 to guide the development of the roadmap, including its scope and the prioritisation of actions.

1. **Leadership:** seek to deliver an approach to carbon neutrality that demonstrates leadership to the community and accepts responsibility commensurate with level of control and influence. Where Council can exert direct control it should take full responsibility, where it can't it should apply influence.
2. **Transparency:** with regard to our own emissions data and actions.
3. **Greener procurement:** encourage or require suppliers to be transparent about their emissions and use this as a criteria in procurement decisions.
4. **Cost effectiveness:** prioritisation of actions which achieve the greatest emissions reduction from a cost-benefit perspective.
5. **Co-benefits and costs:** for all actions, prioritising those that deliver positive co-benefits, and de-prioritising those that result in social or environmental costs. This includes applying Life Cycle Analysis to any major technology investments (commensurate with scale of investment) to assess the impacts of new technology at a systems or life-cycle level.
6. **Timeliness:** adopt a strategy that delivers early wins, and takes a step-wise approach to tackling the bigger challenges (commensurate with level of control).
7. **Collaborate locally:** where possible seek to work with local partners in service delivery for the benefit of our region.
8. **Prioritise avoidance and reduction measures:** working through a hierarchy where avoidance and minimisation of energy use happens first. This means, for example, that even where the electricity being used is from a 100% renewable source, investment in energy savings is still a priority. Although the level of this investment would need to be guided by a cost-benefit analysis.
9. **Reducing business risk:** such as by reducing exposure to increasing energy costs.
10. **Develop a low carbon culture:** through internal education and engagement of Council staff in reducing emissions.

These principles are illustrated by icons in Figure 4, and are used throughout the report to indicate where they are relevant to individual decisions and actions.

Image: Expedition Pass Reservoir, Golden Point

Figure 4: Principles for guiding the roadmap actions

Emissions and targets

Under the Local Governments for Sustainability International Local Government GHG Emissions Analysis Protocol[3], the two boundaries that are applicable to local government are:

- Organisational Boundary – consisting of functions directly under local government control, consistent with private sector reporting. In cases where certain functions are shared, a proportional share approach may be needed; and
- Geopolitical Boundary – consisting of the physical area or region over which a local government has jurisdictional authority.

A complete local government greenhouse gas emissions inventory should ideally aim to have both, but separately account for the operations of the government and all activities that occur in the broader geopolitical area. It is therefore recommended that a community-wide inventory and masterplan to zero-net emissions for the shire is an activity to co-develop with the community (work on the Z-NET Mount Alexander Shire Community Transition Plan began in 2020, see Box 1).

The graphic in Figure 5 below represents the scope of direct and indirect emissions to be accounted for.

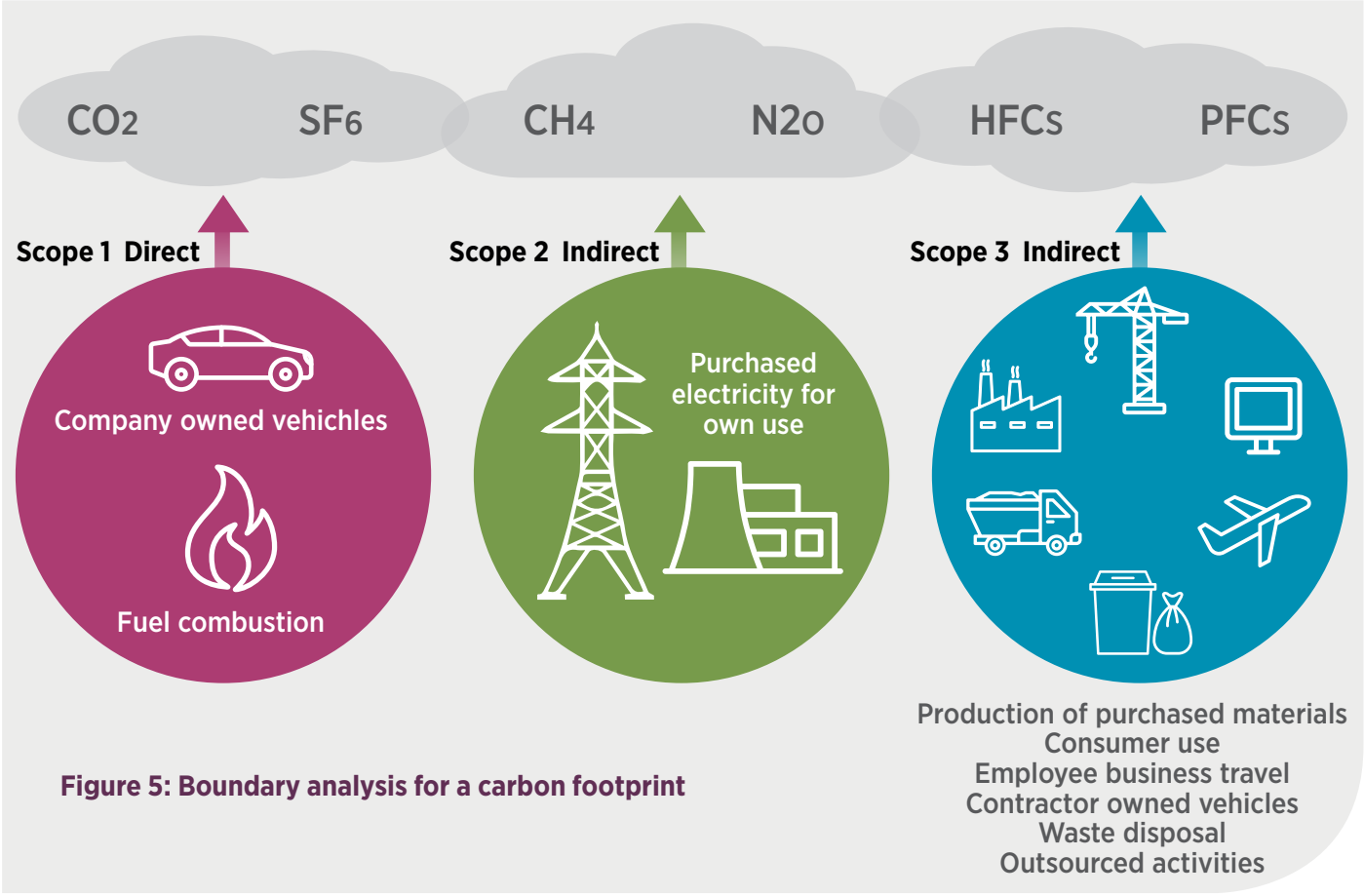


Figure 5: Boundary analysis for a carbon footprint

For Council the following boundary is relevant:

Scope 1

- Stationary combustion (e.g. natural gas or diesel)
- Mobile combustion (e.g. petrol from car fleets)
- Fugitive emissions (e.g. methane from landfill)

Scope 2

- Purchase of electricity – buildings; street lighting (does not include Council owned buildings managed by a third party, e.g. kindergartens, stadiums and sporting facilities, with the notable exception of the library complex[4])

[3]carbonn.org/fileadmin/user_upload/carbonn/Standards/IEAP_October2010_color.pdf

[4]The National Carbon Offset Standard for organisations suggests that some Scope 3 emissions may be included in Scope 2 if they are large and the responsible entity has the potential to influence their reduction. This has been taken to apply to the library complex, even though it is managed by a third party.

Although not calculated as part of the boundary analysis, the following Scope 3 activities are addressed in regards to actions to reduce emissions:

- Contractor waste disposal (see Box 2 in regards to the movement of waste from Scope 1 to Scope 3 and Waste section)
- Staff travel to work
- Procurement
- Production of purchased materials.

Throughout this document suggestions are made under the heading 'Opportunities for Partnership and Advocacy' for actions that reach beyond reducing Scope 1 and 2 emissions into other areas of influence and action.

Note: Our carbon footprint data is presented here in the commonly used metric of tCO2e or tonnes of carbon dioxide equivalent, which is a measure that allows you to compare the emissions of other greenhouse gases relative to one unit of CO2. It is calculated by multiplying the greenhouse gas's emissions by its 100-year global warming potential.

Box 2: Community waste - inside or outside the boundary?

Emissions from waste are estimated to be 87% of total emissions in 2018 (See Figure 6). However, from 2020, the community's waste emissions moved from being within the Council boundary (Scope 1) to outside it (Scope 3). The Castlemaine Waste Facility landfill reached capacity in 2020 and the community's waste is now transported to Patho Landfill in the northern part of the state. This places emissions from community waste into Scope 3, in that, the methane emissions from solid waste generated within the community, will then decompose at landfills outside of the community's geopolitical boundary, and will no longer be at a council operated facility.

Based on current data the following trajectory (see Figure 6) is forecast for Council emissions reductions towards the target of zero-net emissions by 2025. Note that this is a conservative estimate and assumes Council only implements its already agreed 100% renewable energy commitment through the Local Government Power Purchase Agreement by 2022 (Key Action 1.1 below). It also reflects the move of community waste management to outside the shire boundary. Much work can be done to further reduce the emissions across all areas including supporting zero-net community waste initiatives. Figures 7 and 8 breakdown the emissions by sector.

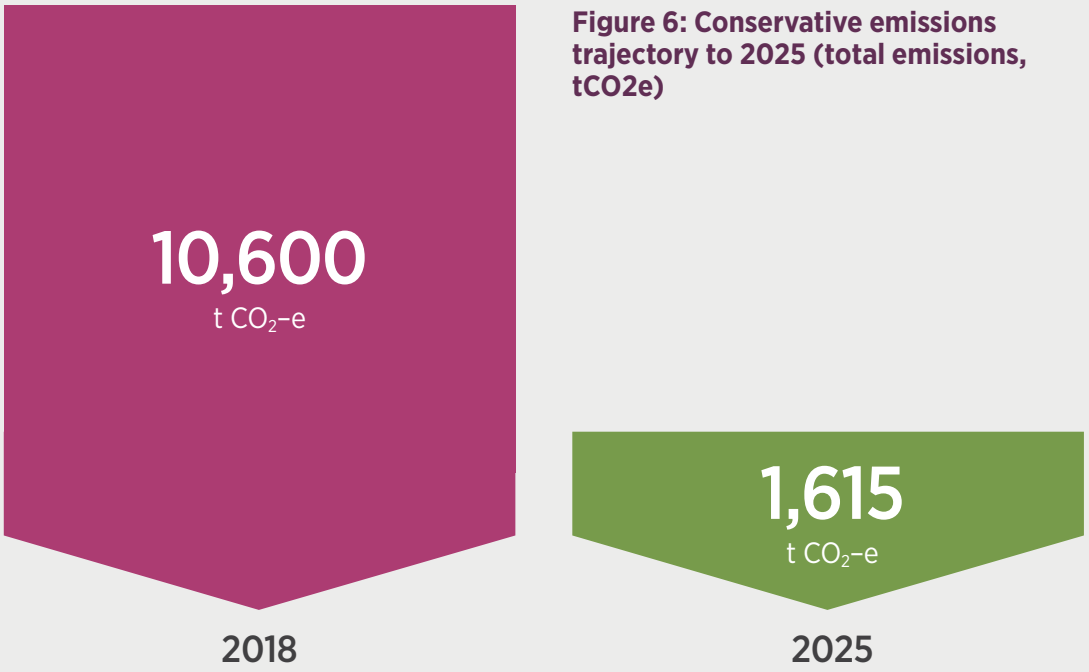


Figure 6: Conservative emissions trajectory to 2025 (total emissions, tCO2e)

Emissions and targets

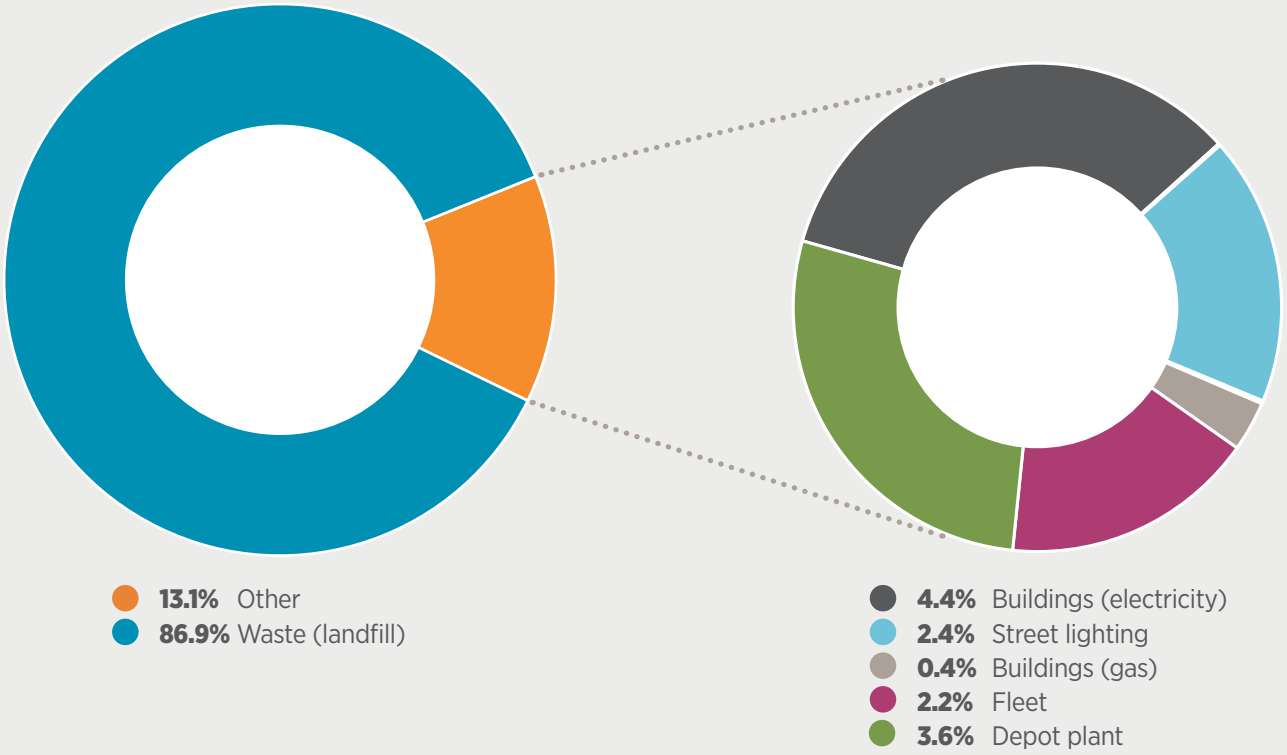


Figure 7: Emissions profile in 2018 (Prior to landfill closure) [tCO2e, %]

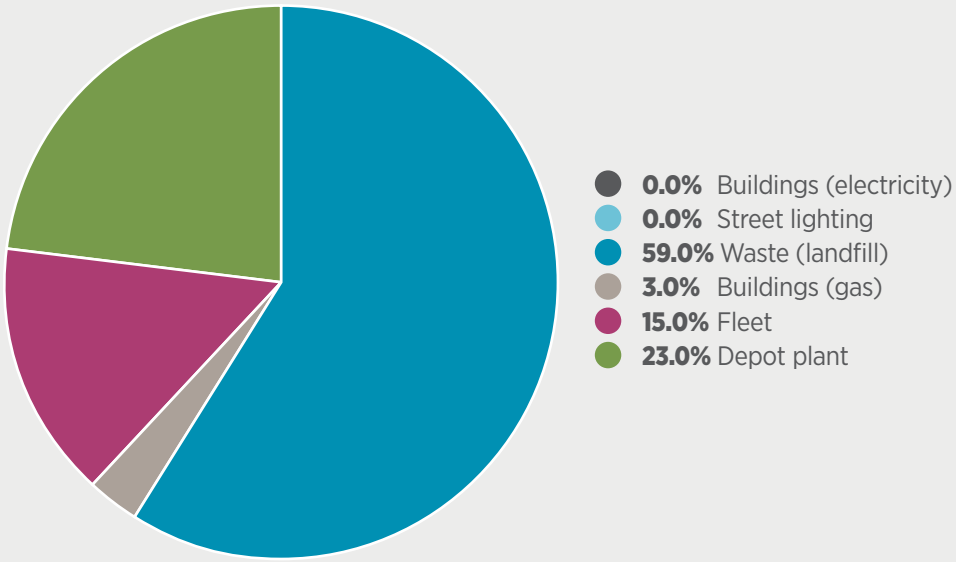


Figure 8: Projected emissions profile in 2025 (Post landfill closure and 100% renewable energy contracting) [tCO2e, %]

1. 100% renewable electricity

Goal: 100% renewable electricity supply by 2022

Key Action

1.1 Local Government Power Purchase Agreement (LGPPA) for 100% renewable electricity supply

Carbon footprint analysis

The electricity emissions for Council buildings is 471 tCO2e and street lighting is 242 tCO2e. Key to delivering on this goal will be the power purchase agreement for renewable electricity to meet the balance of electricity not already supplied by on-site rooftop solar. By participating in the Local Government Power Purchase Agreement (LGPPA) Council will reduce its total annual emissions by 29% in 2022 (see Key Action 1.1. below).

Key Action 1.1 Local Government Power Purchase Agreement (LGPPA) for 100% renewable electricity supply

Council is leading the way as one of 48 Victorian councils to form Australia's largest ever buying group to switch to 100% renewable energy. The LGPPA Project is the collective effort of councils, Victorian Greenhouse Alliances and is led by Darebin City Council seeking a new electricity contract for council operations that is sourced from 100% renewable energy sources. The group is pooling 250GWh of electricity. This is the equivalent to powering 47,000 homes with renewable energy or taking 87,000 cars off the road each year.

The key aspects are:

- 100% of the electricity consumption for Council facilities to be supplied
- The contract term is expected to be between 7-10 years in length and begin in December 2021
- The project will support more investment in renewables in Victoria.

The facility(s) will be located within Victoria and be connected to the National Energy Market (NEM) grid and be 100% renewable energy (i.e. solar and/or wind). This important contract will result in Council reaching the zero-net emissions goal for electricity by 2022.

There is a risk that this action will not go ahead if a small market contract is not able to be secured due to the nature of small markets not being as attractive to retailers. The size of the collective load mitigates this risk partially, however, should the LGPPA not go ahead then the contingency would be to maximise onsite solar and purchase Large-scale Generation Certificates (LGCs[5]). Under this scenario, this approach and the cost-benefit analysis would need to be revisited every year.

Principles

Timeliness	Delivers zero-net emissions for electricity by 2022, significantly reducing total emissions by 29%.
Reducing business risk	Price certainty for 7-10 year period.
Cost effectiveness	Price certainty and less procurement / contract administration.
Co-benefits	Brand benefits from aligning with the other member councils, supporting new renewable energy jobs.
Leadership	Being a part of Australia's largest ever buying group to switch to 100% renewable energy.
Greener procurement	Renewable energy procurement.

[5]www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Power-stations/Large-scale-generation-certificates

Opportunities for partnership and advocacy

In order to extend the impact, Council can support community uptake of renewable electricity through programs such as More Australian Solar Homes (MASH) and the Mount Alexander Sustainability Group (MASG)-led biogas, waste to energy project.

> Council has a strong track record of delivering solar PV on the rooftops of its own facilities, with 158kW currently installed.

2. Zero-net emissions buildings

Goal: zero-net emissions buildings by 2025

Key actions

2.1 Deliver and implement a Buildings Emissions Reduction Plan

2.2 Reduce energy consumption to NABERS 5 rating and transition from gas

Carbon footprint analysis

Emissions from Council-managed buildings amounts to 515 tCO2e annually. Council had 10 natural gas accounts and 46 buildings-related electricity accounts in 2018. This includes 471 tCO2e from electricity, and 44 tCO2e from natural gas. Council has a strong track record of delivering solar PV on the rooftops of its own facilities, with 158kW currently installed.

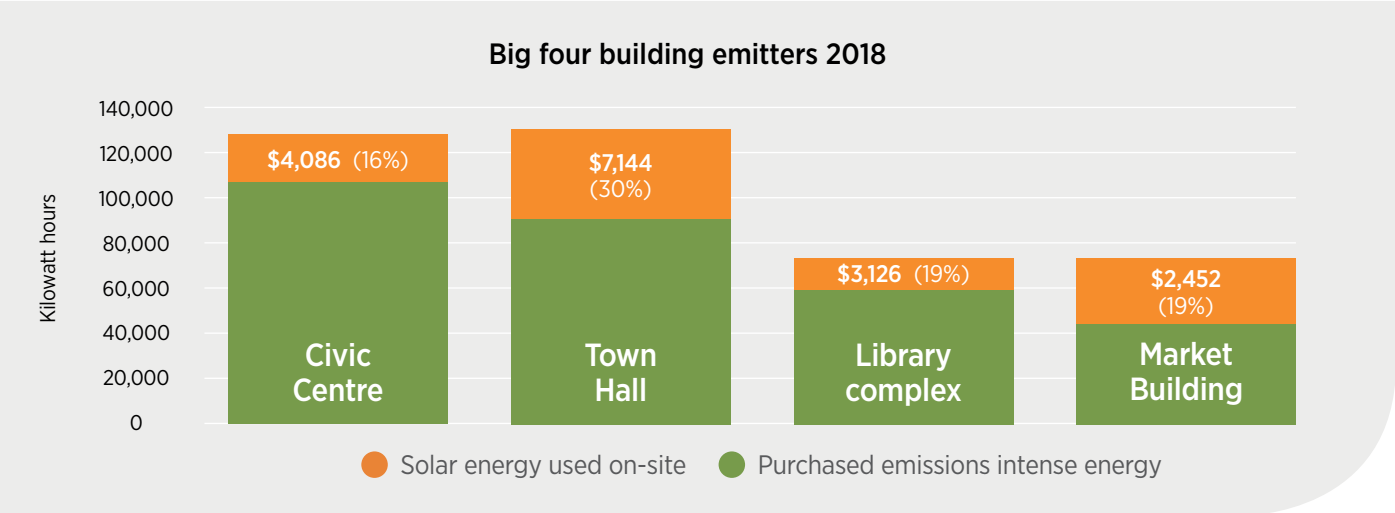


Figure 9: Solar energy's contribution to electricity savings at Council's 4 main energy intensive buildings.

Key Action 2.1 Deliver and implement a Buildings Emissions Reduction Plan

Large efficiencies can be gained through thorough audits, energy efficiency improvements and upgrades. Long term planning also needs to be in place for the gas to electricity transition of these sites by 2025 and an increase in rooftop solar where viable and financially desirable to do so. The four main sites for energy consumption are the Town Hall, Civic Centre, Library Complex and Market buildings.

This study would explore:

- Audit of the four major sites with the goal of energy efficiency in buildings to reach 5 star NABERS rating.
- Switching one or two gas appliances with electric appliances, and retaining an existing mains gas connection or a complete switch from gas to electric appliances, with subsequent disconnection from the mains gas network.
- Opportunities for optimising or enhancing solar PV installations on sites including potential for battery storage and demand response.
- Government policy and incentives, such as VEETs (Victorian Energy Efficiency Target) certificate opportunities.
- Analysis of future projected load for LGPPA.
- Multi-year plan of capital upgrades as an investment strategy guided by electricity savings and benefits to building users.

In addition, a staff workshop will be held to build the capacity and understanding about on-site energy reduction.

Once these four main sites are planned, the same approach can be used across the remaining building stock and the approach can also be shared with community groups for their managed sites. Any newly built Council building stock should target being 6-star NABERS.

Key Action 2.2 – Reduce energy consumption to NABERS 5-star rating and transition from gas

Key to ensuring that Council is maximising the long term benefit of the LGPPA program, is to ensure that Council sites are as efficient as possible with the aim of reducing energy consumption to NABERS 5 rating across the four main sites and transitioning gas based appliances. Further gains can be made through staff behaviour change to reduce usage in buildings as per Key Action 6.1.

Note also: The achievement of zero-net emissions buildings by 2025 is dependent on delivering 100% renewable electricity for Council buildings as per Key Action 1.1, as well as offsetting the remaining emissions from gas use as per Key Action 8.2.

Principles	
Timeliness	Provides a step-by-step approach to ensuring sites are as energy efficient as possible so that the energy load is stable over the period of the LGPPA.
Prioritise avoidance and reduction measures	Apart from the phase out of gas appliances, the works will not reduce net GHG emissions if the LGPPA is in place, but they will meet the principle of prioritising energy use reductions where affordable.
Cost effectiveness	Works on buildings will save money on energy bills.
Co-benefits and costs	Staff will be more comfortable in buildings that are draft-proofed and responding well to automated controls to manage heating and cooling.
Leadership	By applying best practice technology and decision-making to the management of public buildings, Council will be leading the way for the community to follow suit
Transparency	Benefits to be verified and reported to the public.
Develop low carbon culture	Staff behaviour change to reduce energy usage in buildings.
Reducing business risk	Historically site upgrades have not always occurred in a strategic manner and this has resulted in missed opportunities and additional costs, the key actions ensure a holistic approach is delivered across the buildings stock moving forward.

Opportunities for partnership and advocacy

In order to leverage the benefits of work done to improve our own managed buildings, Council will look to develop a Zero-Carbon Community Buildings Policy, for those Council-owned buildings where the community pays the bill, aimed at reducing energy costs for tenants.

The opportunity for partnering with the business sector to finance a range of environmental upgrade investments to buildings is currently available through Council's Environmental Upgrade Finance mechanism. This mechanism provides low cost finance to raise the environmental standard of the shire's commercial building stock. Given recent changes to the Local Government Act 2020 (Vic), Council has the opportunity to expand this offering to households, which could make a significant contribution to emissions reductions and climate resilience in our community.

Finally, Council can advocate for targeted policies in the planning scheme to support a low-carbon built environment for the wider community and advocate to state and federal government for minimum standards, rating tools and incentives to stimulate low-carbon building stock[6].

[6]www.everybuildingcounts.com.au

3. Zero-net emissions lighting

Goal: Zero-net emissions lighting by 2022

Key action

3.1 Transition balance of lighting assets to reduce energy use

Carbon footprint analysis

Emissions from street lighting in the shire amounts to 254 tCO2e annually. In 2015, through the Lighting the Regions project, almost 900 lights were upgraded from the old mercury vapour-style street lighting to 18 Watt LEDs. This significant project resulted in overall street lighting energy usage dropping by 55% and reductions in annual emissions by 308 tCO2e per annum.

Key Action 3.1 Transition balance of lighting assets to reduce energy use

Council will continue to assess and upgrade lighting assets in order to meet future compliance obligations and to reduce energy use. The next phase of upgrading lighting assets will be through the Major Roads. Lighting Upgrade Project. This project is looking to upgrade 342 non-LED lights across the shire by 2022 and is a collaborative program with 18 councils and the Central Victorian Greenhouse Alliance. Where appropriate, for example in the case of cost-shared lighting, the Department of Transport will also be a partner in the program.

While the focus of this next upgrade is on street lighting at key selected intersections and sections of road in order to meet future compliance obligations, it will also have a significant impact on progress towards the goal of zero-net emissions lighting.

Note also: The achievement of zero-net emissions lighting by 2022 is dependent on delivering 100% renewable electricity for Council buildings via the LGPPA as per Key Action 1.1.

Principles	
Timeliness	Provides a step-by-step approach to ensuring lighting efficiency is improved before the LGPPA comes into effect.
Prioritise avoidance and reduction measures	The works will not reduce net GHG emissions if the LGPPA is in place, but they will meet the principle of prioritising energy use reductions where affordable.
Cost effectiveness	Works on lighting will save money on energy bills and costs associated with repair and maintenance.
Cost effectiveness	Modernising assets will ensure price certainty.
Co-benefits and costs	Increased safety and reduced light pollution from more directional lighting and higher compliance.
Leadership	Being a part of collaborations across councils to upgrade lighting and procure 100% renewable energy.

> In 2015, through the Lighting the Regions project, almost 900 lights were upgraded from the old mercury vapour-style street lighting to 18 Watt LEDs. This significant project resulted in overall street lighting energy usage dropping by 55%.

4. Zero-net emissions transport

Goal: zero-net emissions transport by 2025

Key action

4.1 Transition Council fleet to electric vehicles (EVs) and deploy the necessary supporting infrastructure

Carbon footprint analysis

Council's transport emissions from fleet and plant operations amount to 621 tCO2e annually. Council has a fleet of 39 vehicles, plus plant machinery. The fleet is made up of mainly Utes and SUVs, and includes four community buses (14 seat), one hybrid hatchback, sedans and a van. Plant machinery is fueled by bowsers at the Castlemaine and Maldon depots, and includes excavators, mowers, trucks and graders. It is highly likely that only a portion of the existing fleet will be transitioned to electric vehicles or fuel change options by 2025 and that the balance of emissions will be offset.

Key Action 4.1 Transition Council fleet to electric vehicles (EVs) and deploy necessary supporting infrastructure

It is expected that price parity between EVs and conventional vehicles (based on whole of life cycle costs) could be reached around 2023-2025. In order to ensure that council is investing in the most efficient fleet from a carbon and price perspective, a fleet transition study will be undertaken to guide the strategic goal of zero-net emissions transport and 100% electric fleet within 10 years, if possible.

The terms of reference for this study are recommended to include the following items:

- A review of the current state of play with EV markets, policies and projects.
- Case studies from leading councils to assess best practice.
- Audit of Council's current fleet characteristics and procurement policy guidelines.
- A prioritised schedule of actions that optimise fleet size, efficiency and overall life-cycle cost.
- A timetable for transition within a decade, if possible, complete with interim targets.
- A new Green Vehicle Procurement Policy that includes a fleet renewal tool to be embedded into the process of decision-making.
- A strategy for investment in charging infrastructure and associated capital works, aligning both Council and community needs.
- Consideration of 1) bulk buy opportunities, 2) alignment with broader precinct, regional and national strategies, and 3) staff incentives for vehicle ownership.
- Consideration of e-bikes and bicycles as part of the fleet transition study.
- Capacity building of Council staff across climate change and procurement.

Note also: The achievement of zero-net emissions from transport by 2025 is dependent upon offsetting the remaining emissions from fuel use as per Key Action 8.2.

Principles	
Timeliness	As the EV transition is just beginning in the Australian market, although a portion of the fleet will have transitioned, it is likely the balance of fleet will need to be offset in 2025, so it is timely to be planning now and setting a target.
Prioritise avoidance and reduction measures	The study will help identify and prioritise reduction measures, ensuring there is not an ongoing reliance on offset measures.
Cost effectiveness	The fleet will be transitioned in alignment with actions that have the best long term value for money taking into consideration the cost of offsetting and whole of life cycle costs.
Co-benefits and costs	Significant co-benefits to the community could be derived through regional collaboration and consideration as to how best to deploy charging infrastructure for both internal council and community use.
Leadership	By staging the fleet's transition and considering charging infrastructure, Council will be leading the way for the community to follow suit.
Greener procurement	A focus on procuring low-emissions vehicles, and working with other local governments to increase EV uptake, aligns with greener procurement goals.
Reduce business risk	If the fleet isn't transitioned there is the risk of Council hosting an outdated and more expensive fleet.

Opportunities for partnership and advocacy

The key opportunities for increasing Council's impact is to:

- align with regional plans to ensure sufficient public charging infrastructure is deployed
- support the community to reduce emissions through walking, cycling and public transport
- promote the Healthy Heart Victoria program's work on sustainable transport options
- support staff to reduce travel emissions.

In 2019 and 2020 the *Charging the Regions - Local Government EV Charging Network Study* investigated the opportunities for a joint investment program that could see a dense and coordinated network of EV charging across the state. Work is under way to consider next steps, including advocating to the state and federal governments for at least one fast charger in every rural and regional shire. Council will continue to work with the Central Victorian Greenhouse Alliance to pursue and promote best practice emissions reductions in council transport such as electric waste trucks. The Victorian Government is also set to release its Zero Emission Vehicle roadmap in 2020 which is likely to have further opportunities for collaboration with local governments.

> "By staging the fleet's transition and considering charging infrastructure, Council will be leading the way for the community to follow suit."

5. Zero-net emissions waste

Goal: zero-net emissions waste for Council operations by 2025 and supporting community-wide waste reduction

Key action

5.1 Reduce landfill emissions through gas capture, monitor emissions and future proof new infrastructure

5.2 Waste Strategy to drive future waste reduction activities

Carbon footprint analysis

According to the 2019 Blue Environment Report, Castlemaine landfill is a significant source of emissions, with estimates of around 7,000 – 8,000 tCO2e emitted annually over the past decade.

As described in Box 2 in the Emissions and Targets section, in 2020 the waste emissions associated with the community have moved from being within the boundary of council operations (Scope 1) as at 2019, to being outside the boundary in 2020. This is due to the Castlemaine Waste Facility landfill being full in 2020 and the waste instead transported to Patho Landfill in the northern part of the state. This places community waste into Scope 3, meaning that the methane emissions from solid waste generated within the community will then decompose at landfills outside of the community's geopolitical boundary and will no longer be at a council operated facility[6].

Therefore the carbon footprint for the timeline of the plan for waste is made up of:

- Legacy emissions from the closed Council-operated landfill
- Waste from Council owned and operated buildings
- Transportation of community and Council waste by contractor to offsite landfill.

[7]Also in Scope 3 is the emissions from residential waste collection (transportation), which accrue to the contractor, currently estimated at 30 tCO2 per month and 360 tCO2 per year.

Legacy emissions from landfill were modelled by Blue Environment and are presented in Figure 10. If the landfill receives no new waste after 2020, existing organics material will still continue to decompose and emit emissions, however these will decline each year. How much they decline depends if gas is captured and flared on site. By 2025, the emissions are predicted to be over 4,900 tCO2e per annum if no gas is captured. If 60% of the gas at the landfill is captured, emissions at 2025 drop to approximately 1,900 tCO2e. At 80% gas capture, emissions drop further to 950 tCO2e. Works planned on the landfill in 2022/23 will achieve at least the equivalent of the 80% flaring option shown in the graph.

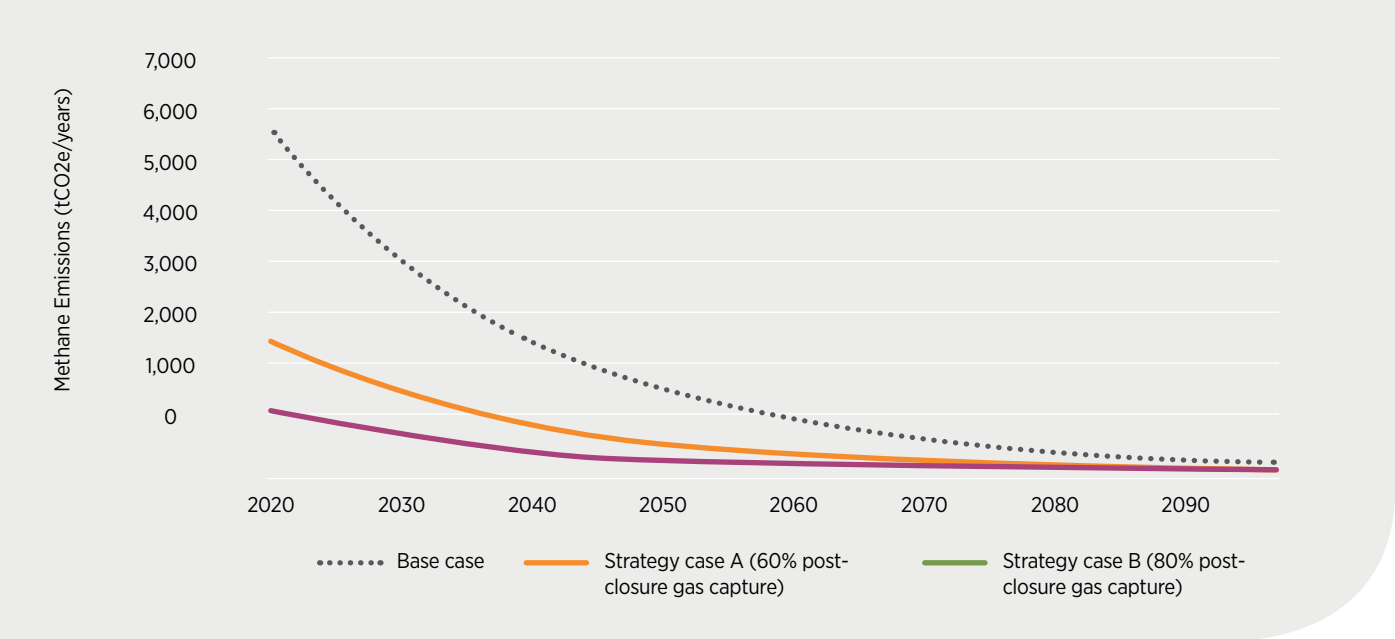


Figure 10: Post-closure landfill gas estimations (assuming oxidisation of 10% of fugitive emissions through the landfill cap)

For the waste that Council employees generate whilst at work there is a waste management system that is designed to separate food waste, commingled recycling and cardboard. Food waste from the Civic Centre and Town Hall is collected and placed in a commercial size worm farm located in the community garden and there are bins for people to place commingled recyclables. There is also a dedicated skip bin for cardboard recycling. The Castlemaine Visitor Information Centre and the Works Depot also have bins to separate commingled recyclables from general waste to landfill. More recently, staff have informally introduced a soft plastics recycling bin in the Civic Centre where staff members are encouraged to drop off soft plastics before they are taken to a Coles or Woolworths store which is participating in the RedCycle soft plastics recycling program.

Council's own waste has been estimated at 10 tonnes per year, which is equivalent to 14 tCO2e[8]. Efforts to measure any reduction in this waste would not be justified due to the high cost relative to benefit, particularly given that significant waste recycling and diversion practices are already in place.

Key Action 5.1 Reduce landfill emissions through gas capture, monitor emissions and future proof new infrastructure

The works expected to be completed in 2022/23 will include gas capture and flaring as well as monitoring of the conversion of methane to CO2 from flaring (which will provide a more accurate estimate for annual emissions). These works must be undertaken as part of Council's ongoing obligation for after care management of the landfill rehabilitation, therefore they do not constitute an additional cost.

[8]This is based on an assumption of 1.4tCO2e per tonne of waste which is a conservative estimate.

[9]Recycling Victoria: A New Economy, DELWP, February 2020

Key Action 5.2 Waste Strategy to drive future waste reduction activities

Emissions from the community's waste represents a significant proportion of the overall carbon footprint of Mount Alexander Shire with over 9,200tCO2e produced in 2018. Whilst this is outside the scope of the Roadmap, Council is committed to actively supporting the community to reduce its emissions from waste as part of the delivery of this essential service. To this end, Council will deliver a Waste Strategy that will set out our actions in relation to improving waste management in the shire in order to contribute to a shire-wide goal of zero-net emissions.

The overarching context for the Waste Strategy will be the new state and federal level mandates around Victoria's transition to a circular economy (see Box 3). The 2020 Victorian Government Recycling Victoria strategy[9], sets the following targets of relevance to councils:

1. Divert 80 per cent of waste from landfill by 2030, and an interim target of 72 per cent by 2025.
2. Cut total waste generation by 15 per cent per capita by 2030.
3. Halve the volume of organic material going to landfill between 2020 and 2030, with an interim target of 20 per cent reduction by 2025.
4. Ensure every Victorian household has access to food and garden organic waste recycling services or local composting by 2030.

The Waste Strategy will be developed in 2021/22. In the meantime, Council will continue to:

- Plan upgrades and investment in the Castlemaine Resource Recovery Centre to accommodate the potential future collection of Food Organics, Garden Organics (FOGO) by 2026/7.
- Deliver education to the community focusing on waste avoidance campaigns, organic diversion campaigns and recycling programs.
- Roll out its recently released Wastewise event policy and Event Toolkit, which aim to reduce the impact of events run in the Shire on climate change through waste minimisation.
- Work with contractors to capture data on emissions from waste streams produced within the Shire, which can inform progress in this area.

The Waste Strategy will encompass:

- Cost benefit analysis of community programs, incentives and subsidies that can be leveraged.
- Council sites waste reduction opportunities.
- Opportunities for circular economy, systems improvement, community education and waste management targets.
- An action plan and timeline that encompasses the period 2021 – 2025.

Note also: The achievement of zero-net emissions waste by 2025 is dependent upon offsetting the remaining emissions from landfill as per Key Action 8.2.

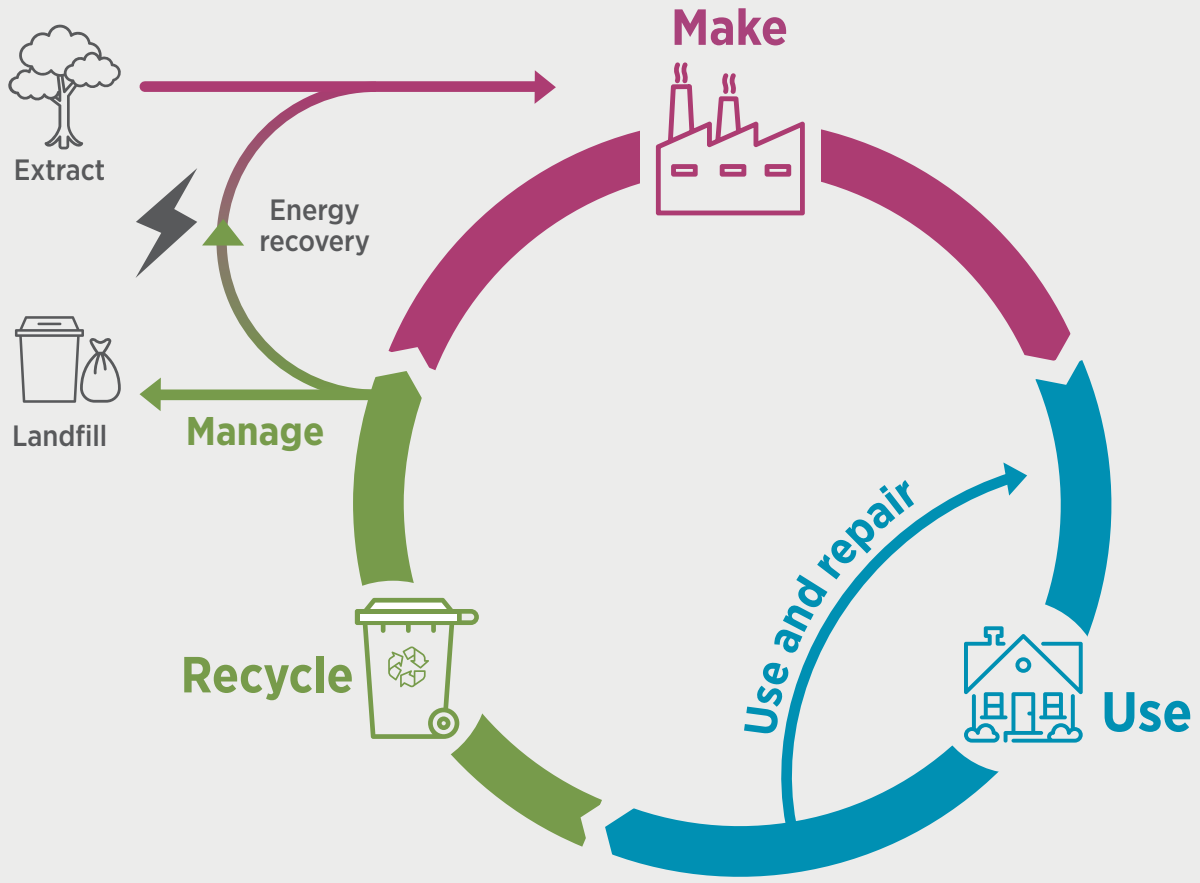
Box 3: What is the circular economy?

The circular economy transforms our linear economy mindset—take, use and throw away—and fosters innovation and productivity by treating waste as a resource.

In a circular economy resource use is minimised, and waste and pollution are avoided with good design and efficient practices:

- Products are designed so that they are durable and can be readily repaired, reused and recycled at the end of their lives.
- Business models encourage intense and efficient product use, like sharing products between multiple users, or supplying a product as a service that includes maintenance, repair and disposal.

This reduces environmental impacts while maintaining or increasing the value people obtain from goods and services; ultimately bringing jobs and growth to local and regional economies.



Source: Recycling Victoria: A new economy, The State of Victoria Department of Environment, Land, Water and Planning, 2020.

Principles	
Timeliness	Council is supporting the community to reduce their waste and waste emissions even though it is out of scope in 2020.
Prioritise avoidance and reduction measures	Key actions prioritise reduction of emissions on site and reduction of waste across Council and community.
Co-benefits and costs	Significant co-benefits to the community could be derived through support programs such as re-use campaigns, education, compost and worm bin subsidies.
Collaborate locally	Opportunities for circular economy based initiatives to support local enterprises.
Leadership	Council will be leading the way for the community to follow suit through Council operations reductions and community support programs.
Reducing business risk	Council can continue to reduce costs and potential social license risk in the community by continuing to support the community's transition to zero waste, although it is now processed offsite, this is further reinforced by requirements from the new state government legislation.

Opportunities for partnership and advocacy

As both state and Council waste and circular economy strategies develop, we will continue to work closely together to unlock vital funding and support to assist local organisations to identify and implement innovative waste reduction and recycling initiatives. The Z-NET Community Transition Plan which is addressing community-wide waste reduction opportunities using a circular economy lens will help us work together to achieve a shared net-zero emissions goal.

Council will also continue to support the waste-to-energy biodigester plant proposed to be located in Castlemaine, as well as advocate to other levels of government for incentives and support to avoid waste, reduce waste to landfill and increase recycling.

6. Low Carbon Culture

Goal: Creating a thriving climate change aware culture across the organisation

Key action

6.1 Integration of climate change action implementation and sustainability across Council

Carbon footprint analysis

Instilling a low-carbon culture in Council's 220 employees is integral to the success of this roadmap's implementation. The responsiblity for goals and priority actions outlined in this document are shared across a number of parts of the organisation. There are also actions that all members of staff can take that will reduce emissions. In terms of Scope 1 and 2 emissions, a good example is the way that staff interact with the heating and cooling in our buildings to reduce energy wastage and fine-tune performance of building management systems. In terms of Scope 3 emissions, the way that staff choose to travel to work could be surveyed and impacts assessed over time.

Key Action 6.1 Integration of climate change action implementation and sustainability across Council

Traditionally, an internal volunteer Green Team has had responsibility for affecting positive change on the organisation's environmental performance. The need to improve the organisation's focus on climate change measures has been elevated by the Council's motion to declare a climate emergency. In that motion, Council committed the organisation to: "Integrating a climate change lens into council's design and construction of infrastructure, the planning and implementation of services and the development of policies and strategies."

A climate change lens requires examining both the mitigation and adaptation impacts and opportunities across all of Council's activities. This is no longer the remit of the Green Team or a single Climate Change Coordinator, but an organisation-wide responsibility that needs to be led from the top. Council's track record with implementation of climate change commitments through its Climate Change Action Plan 2016-2020, from which about 30% of actions still require work, point to the need for greater leadership and support.

Council will set up a governance model for implementation of this and future climate change strategies such that the responsibility is shared and leadership is provided from the highest levels across the organisation. The key way to enact this is to:

- Create responsibility at the leadership group level for climate change action implementation (including and beyond the implementation of this roadmap).
- Undertake a program of education, events and training aimed at raising awareness of the roadmap and facilitating more climate-aware choices by staff to encourage climate innovation, both in the personal and professional sphere. This could start with a launch event for the roadmap.
- Report progress in implementing the roadmap to the public and to Council annually.
- Make progress visible via Council's actions as demonstrations by regular public project reporting and snapshots on social media, print media etc.
- Consider adopting key emissions reduction performance indicators across the Executive Management Team.

As further outlined in Key Action 9.2, our ability to assign responsibility, track progress with implementation of key priorities, and measure and report on the impact of our efforts will be greatly enhanced with the introduction of a greenhouse gas emissions reporting system and interface.

> "Council will set up a governance model for implementation of this and future climate change strategies such that the responsibility is shared and leadership is provided from the highest levels across the organisation."

Principles	
Prioritise avoidance and reduction measures	Staff buy-in is required as critical to success of the roadmap as a whole and will drive emissions reductions.
Cost effectiveness	Likely bill and emissions savings can be achieved from building staff capacity and awareness to reduce energy, waste and fuel use.
Co-benefits and costs	Co-benefits could be derived across multiple strategies such as buildings, waste and transport, resulting in increased staff comfort, pride and innovation.
Leadership	Council will be leading the way for the community to follow suit through staff actions and achievements.
Develop low carbon culture	Actions here are critical to developing a low carbon culture.
Reducing business risk	Reduces the risk of not acting in accordance to the plan and ensures implementation responsibility is delegated across the organisation and must be reported on.

Opportunities for partnership and advocacy

Each council service area has a role and influence on reducing corporate and community emissions. For example, a number of trials are underway in relation to low emissions concrete in footpath construction. Council should continue to identify opportunities for capacity building for staff including by working with the Central Victorian Greenhouse Alliance, Sustainability Victoria and other partners to deliver tailor made webinars/forums and programs.

In terms of addressing Scope 3 emissions, the way that staff choose to travel to work can be incentivised through provision of cycling infrastructure and incentives for greener forms of transport to be used. There is a natural overlap with the Council's Walking and Cycling Strategy which could incorporate a Council staff component, for example surveying staff to understand the opportunities to encourage uptake of active transport. These actions can also be shared with other businesses in the community as suggestions.

In regards to supporting the development, and increasing the impact, of a low carbon culture in the community, Council could seek to expand the reach of community education, for example through its program of sustainable living workshops.

Member of Council's Parks and Gardens Team.

7. Goods and services

Goal: Encourage emissions reductions across goods, services and works

Key action

7.1 Align procurement and contractor service providers with Council's ambition for zero-net emissions

Carbon footprint analysis

Whilst not included within the direct emissions boundary, Council has the ability to extend its sphere of influence in relation to the acquisition of goods, services and works, by having procurement policies and contractor requirements that seek to align service providers with the Council ambition for zero-net emissions.

Council assets like bridges, roads and footpaths are out of scope but it is important to consider that they can be a significant source of emissions and measures to drive greener procurement are vital to drive these emissions down.

Council's updated Procurement Policy 2020 provides a framework to guide the efficient, effective, socially and ecologically responsible procurement of goods, services and works. The Policy directs Council to give preference to suppliers who have set similar goals, with a minimum 5% weighting applied to quotations and tender submissions that deliver environmentally preferable outcomes alongside 'Value for Money'.

Further, the policy identifies the following procurement priorities in order to reduce Council's impact on the natural environment:

- Reducing greenhouse gas emissions
- Reducing waste to landfill and increasing the amount of waste recycled
- Reducing water consumption and improving water management
- Encouraging improved environmental management in Council's supply chain
- Selecting products/services that have minimal effect on the depletion of natural resources and biodiversity
- Improving our ability to adapt to climate change

Sustainable Procurement schedules are currently required for all quotations and public tenders above $60,000.

Key Action 7.1 Align procurement and contractor service providers with Council's ambition for zero-net emissions

In order to encourage suppliers to reduce emissions across these areas and to promote innovation, Council will deliver staff and supplier education through provision of tailored guidance and sectoral workshops. Tailored guidelines and workshops will be focused on areas such as:

- Procurement of roadworks and other infrastructure (specify recycled materials, low carbon concrete etc)
- Waste management contracting
- Recreational and building infrastructure (e.g. to have a compulsory Environmental Sustainable Design component).

The inclusion of a reporting requirement on contractors will be essential to ensure that sustainable procurement outcomes are actually delivered.

> "Council's updated Procurement Policy 2020 provides a framework to guide the efficient, effective, socially and ecologically responsible procurement of goods, services and works."

Principles	
Leadership	Council will be raising the bar for contractors and service providers to also consider their emissions.
Greener procurement	By working together with service providers to encourage supply chain innovation, Council will be expanding opportunities for greener procurement.
Transparency	Efforts to integrate sustainability in procurement should improve Council's transparency in how greener procurement is prioritised.
Reducing business risk	There is a great opportunity for more low carbon materials to be deployed in roadworks and footpaths, particularly in larger developments and projects.

Dog Rocks.

8. Offsetting, insetting and sequestration

Goal: Strategic offsetting to reach zero-net emissions from 2025

Key action

8.1 Develop a working group and an Offset/Inset Sequestering Carbon Strategy

8.2 Offset annually from 2025, the emissions that are remaining

Carbon footprint analysis

Figure 6 in the Emissions and Targets section shows that up to 1,615 tCO2e could need to be offset in 2025 in order for Council to meet its commitment to zero net emissions. Emissions are forecast to decline in future years, partly due to the aging landfill and partly due to actions undertaken to transition the fleet to EVs. However, offsetting will be needed in the future.

In order to reach zero net emissions by 2025 Council's unavoidable emissions, for example from landfill and vehicle emissions, will need to be "netted out" through offsetting. Offsets are generated in the marketplace through the provision of additional renewable energy (which reduces emissions by avoiding fossil fuel powered energy sources) or through carbon sequestration activities (which removes carbon directly from the atmosphere and stores it in soil, plant and water "sinks"). Both types of offset action reduce the concentration of greenhouse gases in the atmosphere.

Key Action 8.1 Develop a working group and an Offset/Inset Sequestering Carbon Strategy

The opportunity for purchasing local offsets should be explored through a conversation with key stakeholders as a dedicated initiative. Offsetting locally is called "in-setting"[10]. In simple terms, in-setting can be anything from procuring local existing offset opportunities, through to co-designing and implementing a product in the local community that has circular economy outcomes, or value chain impacts related to the area Council is offsetting. In this way it can directly connect and strengthen the relationship between Council and the community.

In-setting in the context of Mount Alexander Shire could encompass:

- Working with local regenerative farmers on soil sequestration credits, and/or
- Working with local revegetation groups on tree planting credits.

Understanding the value of such offset approaches and assessing their merits against other actions that Council could undertake, can provide an important marker for budgetary planning. In an existing example from the Bass Coast Shire, in-setting has been achieved through self-certification of a soil sequestration project at Bimbadeen Farm, with an average trading price of $33 per tonne of carbon.

[10]www.theguardian.com/sustainable-business/2015/jan/09/carbon-offsetting-insetting-supply-chain

A dedicated study will be co-developed with a local working group including interested stakeholders from regenerative farming and Land care. The scope of this study could encompass:

- Determining the local opportunities for carbon sequestration
- How to ensure integrity, additionality and equity
- Understanding the barriers to participation in a local insetting program, such as how to streamline accounting, reporting and auditing
- Determining the preferred certification process (self-certification that delivers payment per year of trade and is compliant with the Emissions Reduction Fund (ERF) methodology[11] or ERF certification with no financial payment to participant for 10 years.)
- Developing pathways to participation such as considering incentives for farm participation and any additional support mechanisms available
- Scoping opportunities for other partners and businesses in the shire to participate in expanding the program through agreeing to also purchase offsets generated locally (to increase viability of the program as well as cost-effectiveness)
- Determining the timeline, costs benefit analysis to support insetting within the shire by 2025 to meet Council's demand and considering the broader community demand

Key Action 8.2 Offset annually from 2025, the emissions that are remaining

In order to reach carbon neutral status in 2025, offsets will need to be purchased equal to the balance of emissions remaining after all efforts at reduction in previous years are made. Offsets purchased each year may be different, as they are based on the annual monitoring and accounting of emissions across all of Council's operations. Ongoing efforts to reduce the amount of offsets required should be prioritised.

Principles	
Leadership	Strategic development of partnerships to deliver local offsets is itself a demonstration of innovation and leadership.
Collaborate locally	Money spent on offsetting stays in the Shire and the investment benefits local farmers and entrepreneurs.
Transparency	Local offset projects are visible to the public and can be visited and verified easily.
Co-benefits and costs	Increased biodiversity, water retention and productivity in soils, landscape amenity, increases resilience and adaptation to the impacts of climate change.
Reduce business risk	Market volatility exposure is reduced.

Opportunities for partnership and advocacy

Beyond offsetting Scope 1 and 2 emissions, there is more that the Council could be doing to encourage investment in drawdown and sequestration in the shire. The MAS Z-NET Community Transition Planning project has already identified a key priority for this community to become a regional 'drawdown hub'. Council's efforts in supporting local offsetting through farming and land care could become one of the key actions Council takes forward to contribute to the community's Z-NET goals. In addition, there is a market of local government buyers of offsets who are looking to buy them locally. In-setting efforts could contribute to a broader vision to build this local industry in order to attract this income stream.

[11]www.cleanenergyregulator.gov.au/ERF/Forms-and-resources/methods

9. Tracking progress and reporting on results

Goal: Monitor and report upon our progress from 2021

Key action

9.1 Annual tracking of progress and reporting on results

9.2 Establish data collation for efficient internal monitoring and reporting

Key Action 9.1 Annual tracking of progress and reporting on results

This roadmap sets out opportunities and actions that provide clear direction for future funding and initiatives. To ensure the actions of this roadmap are being met and reported on transparently both to Council and the community, the following reporting methods will be pursued:

- Annual monitoring and reporting on progress of the Implementation Plan prior to budget cycles to inform budget bids for future works
- Improve staff engagement and delegation to support the roadmap's deployment
- Every year undertake a short update of the key elements of this report, particularly the financial analysis.

The intent is that this report is a living document and is the responsibility of Council to evaluate and track progress and transparently report on progress.

Key Action 9.2 Establish data collation for efficient internal monitoring and reporting

Our ability to assign responsibility, track progress of emissions reductions against the implementation of key priorities, and measure and report on the impact of our efforts will be greatly enhanced with the introduction of a greenhouse gas reporting system and interface. It is our intention that Council subscribe to one of the commercially available platforms employed by councils around Australia order to provide a transparent and accessible platform for staff to access historical and future data and track progress.

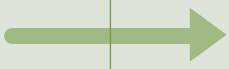
Principles

Prioritise avoidance and reduction measures	Tracking reporting emissions will support lower usage.
Transparency	These methods will enable yearly transparent reporting to Council and community to ensure the goal of zero-net emissions by 2025 is on track.
Develop low carbon culture	Platforms and evaluations can enable staff engagement and behaviour change.
Cost-effectiveness	Monitoring will enable bill reduction and more efficient processes.
Reduce business risk	Council will be reducing uncertainty around emissions and the impact of actions.

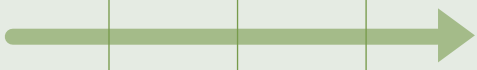
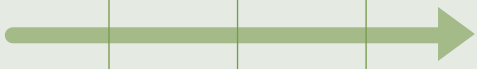
> "The intent is that this report is a living document and is the responsibility of Council to evaluate and track progress and transparently report on progress."

Implementation plan

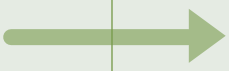
1 100% Renewable electricity

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
1.1	Local Government Power Purchase Agreement (LGPPA) for 100% renewable electricity supply (underway)	Procurement, Climate Change					

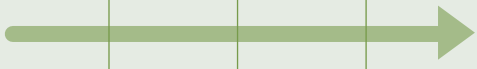
2 Zero-net emissions buildings

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
2.1	Deliver and implement a Buildings Emissions Reduction Plan	Buildings, Climate Change					
2.2	Reduce energy consumption to NABERS 5 rating	Buildings, Climate Change					

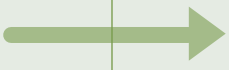
3 Zero-net emissions lighting

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
3.1	Transition balance of lighting assets to reduce energy use	Infrastructure, Climate Change					

4 Zero-net emissions transport

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
4.1	Deliver a fleet transition study to transition Council fleet to electric vehicles and deploy the necessary supporting infrastructure (then roll this out)	Procurement, Climate Change					

5 Zero-net emissions waste

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
5.1	Reduce landfill emissions through gas capture, monitor emissions and future proof new infrastructure	Infrastructure, Climate Change					
5.2	Waste Strategy to deliver future waste reduction activities	Infrastructure, Climate Change					

6 Low carbon culture

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
6.1	Integration of climate change action implementation and sustainability across Council	CEO, Climate Change, Leadership Team	→	→			

7 Goods and services

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
7.1	Align procurement and contractor service providers with Council ambition	Procurement, Climate Change	→	→			

8 Offsetting, sequestration and green infrastructure

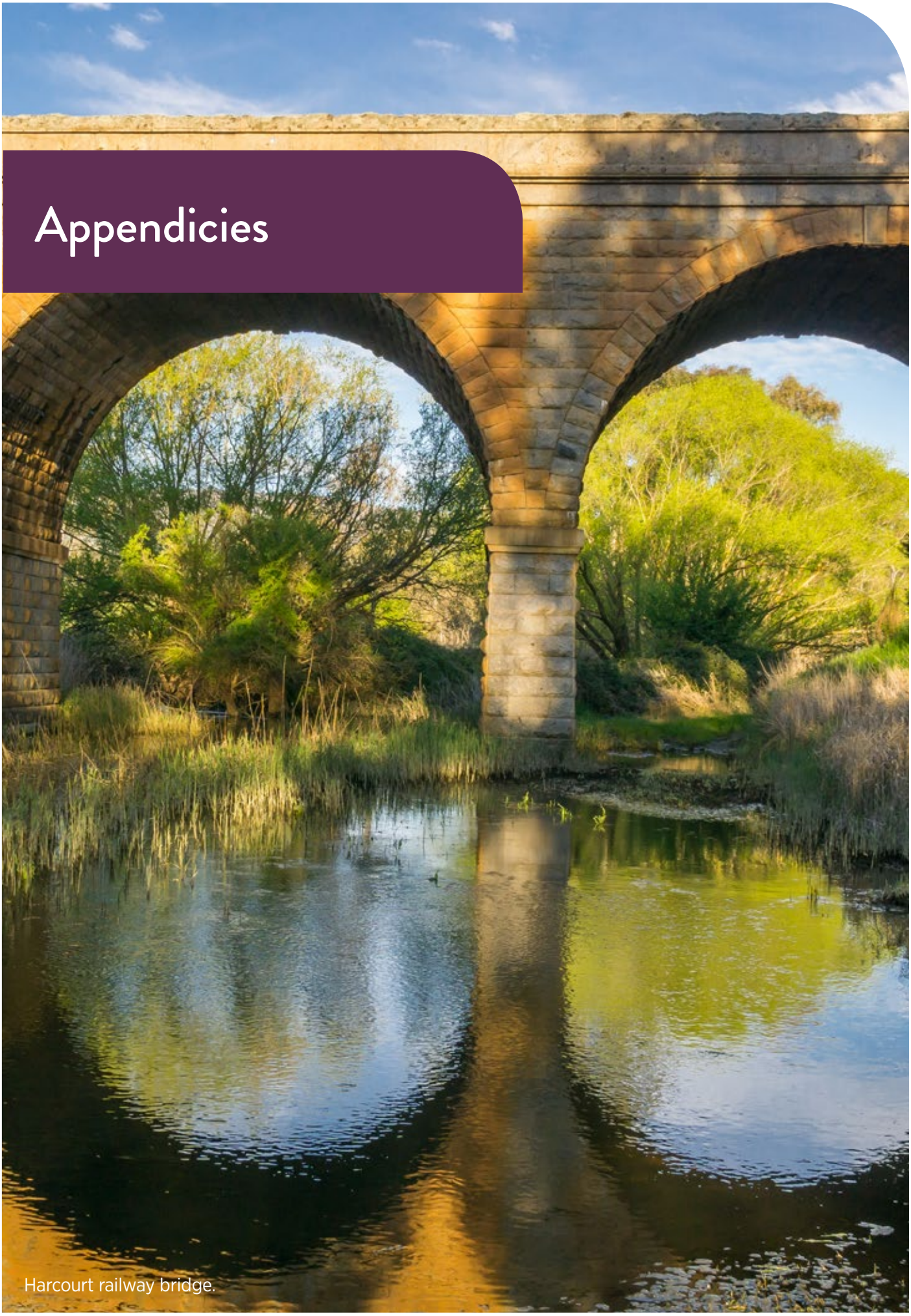
Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
8.1	Develop a working group and an offset/inset strategy	Climate Change, Environment		→	→		
8.2	Offset annually from 2025, the emissions that are remaining	Climate Change					→

9 Tracking progress and reporting on results

Action		Work area	2020–21	2021–22	2022–23	2023–24	2024–25
9.1	Annual tracking of progress and reporting on results	Climate Change		→	→		
9.2	Establish data collation for efficient internal monitoring and reporting	Climate Change					→

Mountain biking at La Larr Ba Gauwa in Harcourt.

Appendicies



Harcourt railway bridge.

Financial analysis for roadmap

This appendix to the roadmap provides the financial analysis to support budgeting decisions, and will be updated annually as new information arises.

Key budgetary items for informing priorities

The costs of the following studies, capital works and offsetting liabilities have been estimated at the time of writing and are for indicative budgeting purposes only. The information in this table will change as studies provide further information. Detailed competitive quotations will need to be sourced for all works.

Action	Cost	Year of implementation	Emissions reduction	Principles
1 100% Renewable electricity supply				
1.1 LGPPA	Electricity costs +/- $4,400 from BAU per annum	2021	888 tCO2-e (per annum)	Timeliness, reducing business risk, cost effectiveness, co-benefits, leadership, greener procurement

Action	Cost	Year of implementation	Emissions reduction	Principles
2 Zero-net emissions buildings				
2.1 The Buildings Emission Reduction Plan (2021-2025)	$11,500	2020/2021	No net emissions reduction for electricity if LGPPA entered into. Max emissions reduction = 44tCO2e for gas	Timeliness, prioritise reduction, cost effectiveness, co-benefit, leadership, transparency, develop low carbon culture, reduce business risk

Action	Cost	Year of implementation	Emissions reduction	Principles
3 Zero-net emissions lighting				
3.1 Major Road Lighting Upgrade Project	$80,000-360,000	Prior to 2023	No net emissions reduction if LGPPA entered into	Timeliness, prioritise avoidance, cost effectiveness, reduce business risk, leadership, co-benefits, leadership

Action	Cost	Year of implementation	Emissions reduction	Principles
4 Zero-net emissions transport				
4.1 Fleet Transition Study	$15,000	2020/2021	TBD	Timeliness, prioritise avoidance, cost effectiveness, co-benefits, leadership, greener procurement, reduce business risk

Action	Cost	Year of implementation	Emissions reduction	Principles
5 Zero-net emissions waste				
5.1 Capping, flaring and monitoring emissions from closed landfill	No additional cost, as factored within existing design of landfill works	2021/2022	3,950 tCOe (in 2025)	Timeliness, prioritise avoidance, co-benefits, collaborate locally, leadership, reducing business risk
5.2 Waste Strategy	$20,000	2021/2022	Outside of boundary in 2020	

Action	Cost	Year of implementation	Emissions reduction	Principles
8 Strategic offsetting				
8.1 Strategy development (including local in-setting options)	$15,000	2021/2022	TBD	Leadership, collaborate locally, transparency, co-benefits, reduce business risk
8.2 Strategic offsetting to reach zero-net emissions from 2025	$4,850 - $53,300 annually (range depends on offset choice)	From 2025	1,615 tCO2e in 2025	

Action	Cost	Year of implementation	Emissions reduction	Principles
9 Tracking progress and reporting on results				
9.1 Data Management Platform	$9,900 per annum	From 2020	Not relevant	Prioritise avoidance, transparency, low carbon culture, reduce business risk, cost effectiveness

100% renewable electricity

Goal: 100% renewable electricity supply by 2022

1.1 Local Government Power Purchase Agreement (LGPPA) for 100% renewable electricity supply.

Financial analysis

This project is seeking to source electricity at the same price or better than current rates, reducing operational costs that influence Council rates. The buyers group will tender for a suitable retailer to provide renewable energy. The tender will cost $4,000 to participate. It is estimated that the electricity costs may vary +/- $4,400 from BAU per annum[12].

Zero-net emissions buildings

Goal: reduce building emissions and zero-net emissions electricity by 2022

2.1 Deliver and implement a Buildings Emissions Reduction Plan.

2.2 Reduce energy consumption to NABERS 5 rating.

Financial analysis

The first piece of work will involve the Buildings Emissions Reduction Plan for an initial four sites at the cost of about $11,500. This plan will determine the strategic upgrades to Council buildings for energy efficiency and energy generation based on estimated energy cost savings over the payback period of 10 years. Works onsite will be funded in part from and will further support the Energy and Water Saving Reserve (the Reserve) which is the revolving fund to finance sustainability upgrades to built assets.

Zero-net emissions lighting

Goal: Zero-net emissions lighting by 2022

3.1 Transition balance of lighting assets to reduce energy use.

Financial analysis

Street lighting upgrades have been a consistent priority for Council as it has a clear business case and pay back period on investment. Estimates in the planning documentation show that (for implementation of Key Action 3.1) costs are estimated between $80,000-360,000 dependent on smart features and co-funding. Project design scenarios show that the net savings over 20 years to be between $210,000-$590,000 with a payback period of approximately 6 years.

Zero-net emissions transport

Goal: Zero-net emissions transport by 2025

4.1 Transition Council fleet to electric vehicles and deploy the necessary supporting infrastructure.

Financial analysis

The first piece of work will be the fleet transition study for the cost of $15,000. This plan will determine the strategic upgrades to Council fleet and the associated timeline, this will then form the basis for future budget bids from 2022.

Zero-net emissions waste

Goal: Zero-net emissions waste for Council operations by 2025 and supporting community-wide waste reduction

5.1 Reduce landfill emissions through gas capture, monitor emissions and future proof new infrastructure.

5.2 Waste Strategy to drive future waste reduction activities.

Financial analysis

Key to prioritising actions for reducing waste emissions is accounting for the cost of offsets required to make waste carbon neutral. The financial liability of the waste will consider both Council's responsibility with the landfill site, with council also committed to working with the community to reduce community waste that is transported offsite. Both will inform future budget submissions. Notably, in 2020, with emissions reducing from 8,000 to 4,900 tCO2e, on current offset pricing, this would cost $14,700 - $161,700 in 2020, depending on the type of offset procured[13]. Gas capture onsite will reduce this financial liability. The scenarios outlined in Table A1 show the range of costs depending on the year and offset choice.

[12]Energetics (2019) Group level business case report: Financial assessment of renewable electricity procurement options for Victorian Local Governments (Darebin Group).

[13]Blue Environment Report

Table A1: Cost of offsetting fugitive emissions from landfill in different years and scenarios

Scenario	Emissions (tCO2e)	Low offset cost ($3/tCO2e)	Medium offset cost ($15.90/ tCO2e)	High offset cost ($33/ tCO2e)
In 2020 (before capping and flaring)	4,900	$14,700	$77,910	$161,700
In 2025 (post-capping and flaring)*	950	$2,850	$15,105	$31,350
Forecast (2025-2030)*	5,100	$15,300	$81,090	$168,300

Note: See Table A2 for references to offset choices and associated prices
*assumes 80% flaring efficiency

The Waste Strategy is estimated to cost $20,000 and is a key first step in ensuring that Council does not forgo all responsibility for community waste due to it being landfilled/processed outside of the shire. It will also ensure that Council considers the cost and emissions savings in regards to developing programs to support the broader community in reducing waste generated.

Low carbon culture

Goal: Creating a thriving climate change aware culture across the organisation

6.1 Integration of climate change action implementation and sustainability across Council.

Financial analysis

Resourcing will encompass a commitment to staff education and the launch of the roadmap, however, no budget allocation is recommended as these costs are relatively minor and considered part of core business.

Good and services

Goal: Encourage emissions reductions across goods, services and works

7.1 Align procurement and contractor service providers with Council ambition for zero-net emissions.

Financial analysis

Resourcing will be required to undertake staff and supplier education, however, no budget allocation is recommended as these costs are relatively minor and considered part of core business.

Offsetting, sequestration and green infrastructure

Goal: Strategic offsetting to reach zero-net emissions from 2025

8.1 Develop a working group and an Offset/Inset Sequestering Carbon Strategy.

8.2 Offset annually from 2025, the emissions that are remaining.

Financial analysis

Because the impact of climate change is global, removing or avoiding greenhouse gas emissions locally or overseas has the same offsetting effect. Therefore, it is possible to purchase offsets overseas in order to reach zero net emissions or carbon neutrality, and it is usually cheaper to do so. However, this forgoes the potential local benefits of local offsetting, through the creation of jobs and potential economic and environmental co-benefits of improving the productivity of agricultural soils (in the case of soil carbon sequestration). Cheaper international programs can be difficult to assess and validate in regards to quality and permanence and may pose a reputational risk.

Standard and readily available offsets within the regional area would be:

- Renewable energy certificates (averaging $30-35 per tonne of C02)
- Native forest revegetation biodiversity offsets (average $12-$16 per tonne of CO2).

Table A2 shows the estimated GHG emissions that will need to be offset in 2025 alongside the expected cost of offsetting them according to three indicative scenarios: low offset cost, medium offset costs and high offset costs. Note prices are based on the 2020 financial market and are subject to change, and assumes no reductions are made in Scope 1 emissions outside of the LGPPA.

Table A2: Comparison of offset strategy costs

Scenario	Total emissions to offset annually (2025)*	Price of offsets	Total cost in 2025 (based on market price 5/2020)
1 - Low cost (offsets generated offshore)[14]	1,615	$3.00/tCO2e	$4,845
2 - Medium cost (existing vegetation Australian offsets)[15]	1,615	$15.90/tCO2e	$25,678
3 - High cost (in-setting or renewable energy certificates)[16]	1,615	$33/tCO2e	$53,295

Tracking progress and reporting on Results

Goal: Monitor and report upon our progress from 2021

9.1 Annual tracking of progress and reporting on results.

9.2 Establish data collation for efficient internal monitoring and reporting.

Financial analysis

The Azility platform will cost $9,900 per annum and is recommended to be deployed from 2020. Further cost savings and efficiencies will be able to be verified at the end of year one with the intent to subscribe to this platform through to 2025.

Yapeen homestead

[14]www.content.ces.ncsu.edu/an-introduction-to-forest-carbon-offset-markets
[15]www.www.accus.com.au/
[16]www.lgc.mercari.com.au/

Table A3: Prioritisation of Key Actions

		2020–21	2021–22	2022–23	2023–24	2024–25	"do nothing" offset budget[1] (per year)	"do nothing" offset budget[1] (10 years)	Other budget benchmark[2] (estimated savings or earnings)
	1 Actions that are required to meet the target of zero net emissions:								
Monitoring and reporting on our carbon footprint and progress	Subscription to data management platform	$9,900	$9,900	$9,900	$9,900	$9,900	N/A	N/A	$20,000 pa savings in staff time
Vehicles (fleet and depot)	Fleet transition study reducing emissions and offsetting	$15,000	$(TBD)_2$	(TBD)	(TBD)		$9,870	$98,700	Anticipated whole of life cost savings from EVs ($TBD)
Waste (landfill legacy emissions)	Capture gas, flare, monitor and offset emissions from landfill	Costs will be subsumed within the landfill rehabilitation programme of works					$15,100	$151,000	
In-setting (which means offsetting within the shire)	Strategic offsetting/ insetting study to enhance co-benefits and reduce costs of offsetting		$15,000						
	2 Actions that are prioritised because they are sound financial investments								
Buildings (note 44tCO2e from gas remaining after LGPPA)	Commissioning the Buildings Emission Reduction Plan (2021-2025), reduction of energy use and offsetting of emissions from gas	$11,500	(TBD)	(TBD)	(TBD)		$700	$7,000	Bill savings potential = $66,000 and $332,000
Lighting	Major Road Lighting Upgrade Project to reduce energy use	$80,000-360,0003 (capex)					N/A	N/A	Return of $250,000 within 10 years (for $80k investment)
	3 Actions that seek to demonstrate leadership and harness our influence								
Waste (Scope 3)	Waste Strategy		$20,000	(TBD)	(TBD)	(TBD)			
	Total (Capex)	**$80,000-360,000**	**TBD**	**TBD**	**TBD**	**TBD**			**Cost-neutral or cost-positive**
	Total (Opex)	**$36,400**	**$44,900**	**TBD**	**TBD**				**Cost-neutral or cost-positive**

Notes to Table A3:

Note 1

The “do nothing” offset budget applies to buildings gas and our fleet and plant emissions and refers to the cost of offsetting in the absence of any efforts to reduce emissions. However, in the context of waste emissions, the scenario costed assumes action is taken to capture, flare and monitor emissions from the landfill, at least once a year.

The range of costs for offsetting is $3/tCO2 - $33/tCO2 (from 2020 market data). The midrange cost is $15.90 (for Australian revegetation offsets), which has been applied in the table for guidance. The expectation is that the offsetting/insetting strategy will seek to procure offsets close to this price with greater reliability of cost combined with social desirability of local procurement.

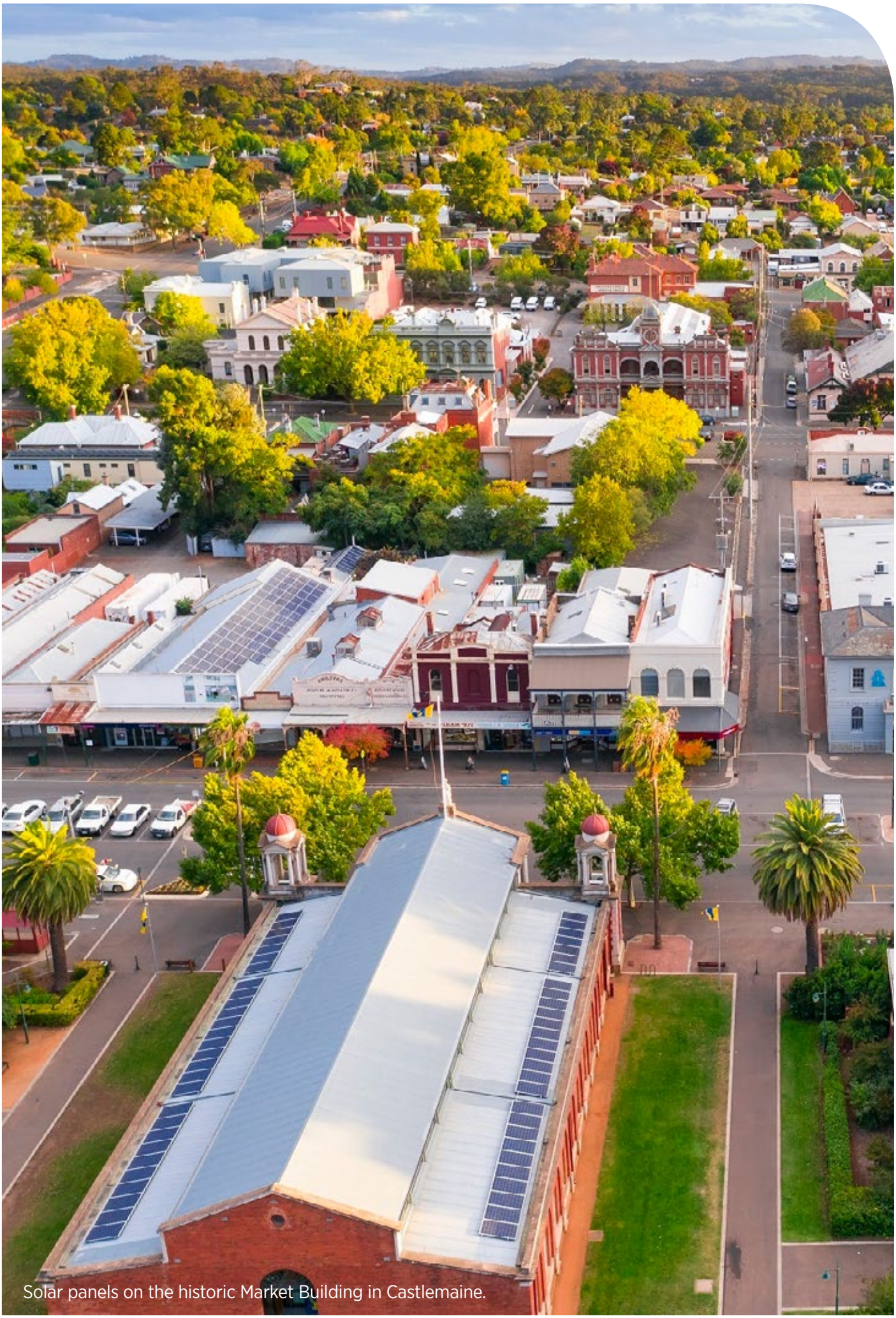
Note 2

Where further work is required to determine the ongoing capital and operating expenditure needed to reduce emissions, this is indicated as TBD (to be determined). The amount to be spent will be informed by a cost-benefit analysis and will not exceed the cost of offsetting (doing nothing) or the other expected savings or earnings.

Note 3

The range of costs reflects two options: 1) upgrading only the lights that we own and manage and 2) upgrading the complete set of lights, including those owned by Department of Transport. Note that option 2) includes smart lighting controls and will result in greater cost savings overall.

Estimates in the planning documentation show that for implementation of the complete project with smart controls would be paid back in 6 years, saving us $590,000 over 20 years. In addition, by paying all the upfront capital costs of upgrading not just our lights, but also those of the Department of Transport, we would earn an additional $60,000 of payments over four years.



Solar panels on the historic Market Building in Castlemaine.