OUR CLIMATE SAFE FUTURE

GREATER SHEPPARTON'S CLIMATE EMERGENCY ACTION PLAN

DRAFT

GREATER SHEPPARTON

Prepared by
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About Ironbark Sustainability
Ironbark Sustainability is a specialist consultancy that works with government and business around Australia by assisting them to reduce energy and water usage through sustainable asset and data management and on-the-ground implementation.
Ironbark has been operating since 2005 and brings together a wealth of technical and financial analysis, maintenance and implementation experience in the areas of building energy and water efficiency, public lighting and data management. We pride ourselves on supporting our clients to achieve real action regarding the sustainable management of their operations.

Our Mission
The Ironbark mission is to achieve real action on sustainability for councils and their communities.

Ironbark are a certified B Corporation. We have been independently assessed as meeting the highest standards of verified social and environmental performance, public transparency, and legal accountability to balance profit and purpose.

Contents

1.

Acknowledgement of Country

We, the Greater Shepparton City Council, acknowledge the Yorta Yorta Peoples of the land which now comprises Greater Shepparton. We pay respect to their tribal Elders, we celebrate their continuing culture and we acknowledge the memory of their ancestors.

2.

Mayor's Message

I am pleased to present the draft Climate Emergency Action Plan, our plan to prepare for a changing climate and to make the most of the opportunities it will bring.

This draft plan was developed with targeted community members to identify the key impacts of climate change, how we are responding and what else we need to do.

We have already seen the impacts climate change has had on our community, our environment, our economy and our health. We know that these impacts will become more frequent and severe in the future. Our young people have told us how concerned they are. Our Climate Safe Future outlines how Greater Shepparton will play our part in returning to a safe climate, one that shores up the future of our young people.

Please take the time to read and provide your feedback on this Climate Emergency Action Plan and have your say on how Council can support the Greater Shepparton municipality in taking climate action. Now is the time to take climate action to achieve a Climate Safe Future for Greater Shepparton.

Cr Kim O'Keeffe,
Mayor
September 2021

3.

Executive Summary

Our Climate Safe Future - Greater Shepparton's Climate Emergency Action Plan is underpinned by a strong partnership approach between the community and Council and supported by science-based evidence. This partnership approach will be central over the next 8 crucial years to ensure we all work together to guide community and Council action and meet our goals.

This plan does not stand alone but rather ties in with other local and regional strategies such as the GMID Resilience Strategy, Hume Regional Adaptation Strategy and Goulburn Broken CMA Regional Catchment Strategy.

2019 was a pivotal year for the community of Greater Shepparton's response to climate change. The youth of the area voiced their concerns and ideas to address local environmental issues through the Shepparton Statement. This was followed by a climate strike in November, outlining their concerns for their future and calling on all levels of government to act immediately to address the climate crisis. The broader community were also increasingly calling on local government and leaders to act decisively and immediately.

In response to the Black Summer bushfires and the community's calls to act urgently on climate change, Greater Shepparton City Council declared a Climate Emergency and adopted a 2030 net zero emission target on 20 March 2020. This Climate Emergency Action Plan (Action Plan) is a critical step in acting on this declaration, and taking urgent and immediate action to support the community in taking the necessary steps to adapt to climate change and to also aim for a 2030 net zero emissions target.

As part of the Action Plan's partnership approach, Council will act on the actions, which will support the community's response to the Climate Emergency. To ensure local relevance and support, Council involved community members in various stages of the Action Plan's development. Businesses, farmers, and community groups helped to identify key barriers and opportunities for climate action, and shared their knowledge on how they have adapted to climate change impacts already.

From this work, identified climate action programs tailored to the Greater Shepparton context and community needs were developed. Where data is available, it was used to model potential impacts of Council supported community action. This considers emissions trajectories in a business-as-usual scenario and estimates the additional emissions reductions that could be achieved through Council and community action. This process helped to identify actions with the most efficient use of Council resources and the greatest potential emission reductions. Where historic data of potential actions does not yet exist, Greater Shepparton can be on the front foot of climate action by taking up new and innovative approaches to show leadership and drive rapid change.

The Shepparton community stakeholders involved in the development of this Action Plan have proposed an aspirational target of net zero emissions by 2030 to reflect the urgency to act. Achieving this aspirational target will require a whole of community approach and stronger action by the state and federal government. This Action Plan builds on the work that Council and the community are already doing to reduce emissions and to prepare the region for a changing climate.

This Action Plan focuses on four Strategic Priorities to elevate climate change as a priority issue and to support the community in taking action:

Strategic Priority 1:
Demonstrating climate change leadership

Strategic Priority 2:
Accelerating the transition to net zero emissions communities

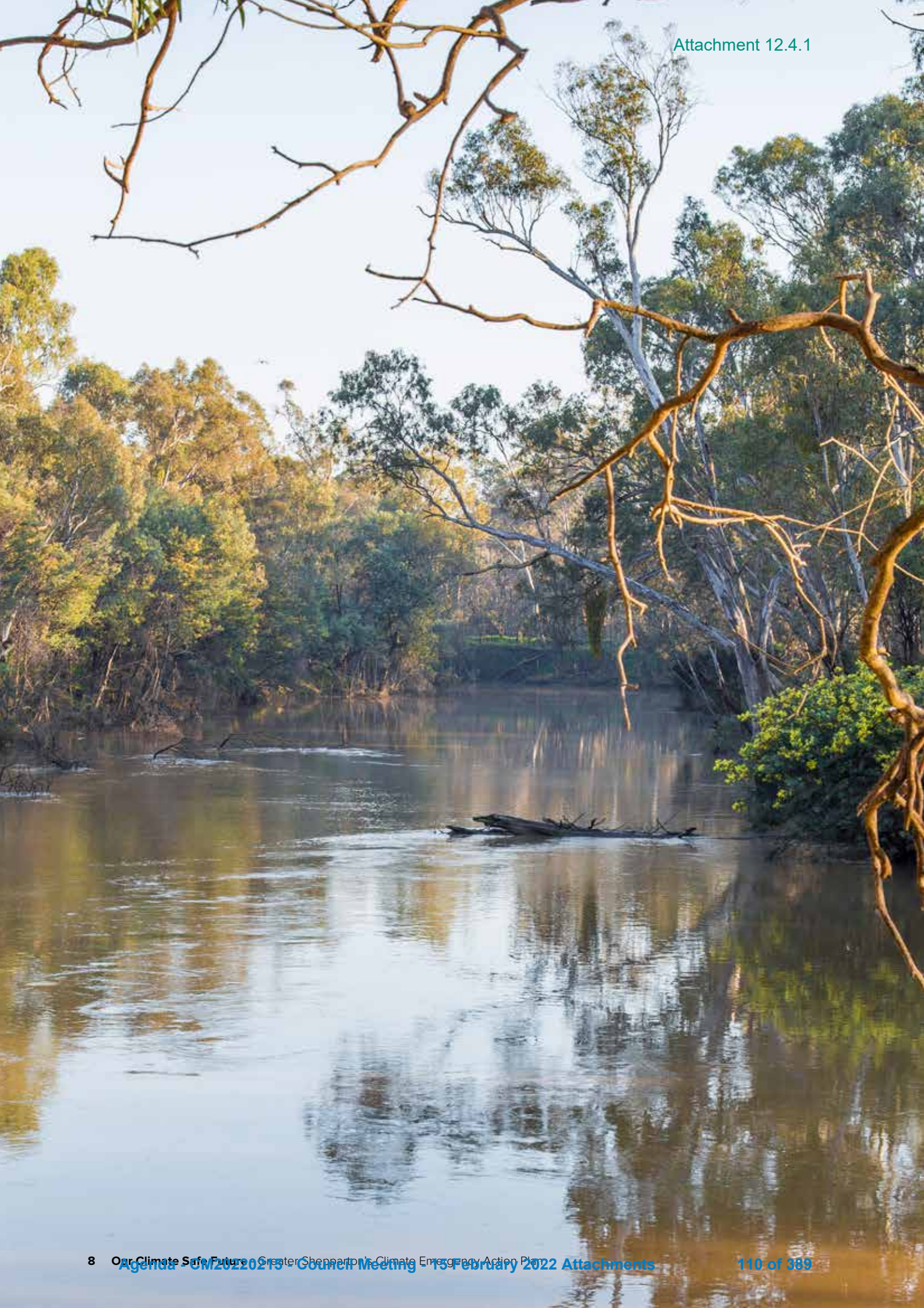
Strategic Priority 3:
Building a climate-resilient community

Strategic Priority 4:
Supporting a thriving, climate smart local agricultural sector

Across each of these Strategic Priority areas Council, residents, businesses, farmers and community groups have different roles to play in driving climate action. By working together and taking a partnership approach, Greater Shepparton can build a resilient, net zero emissions community.

The first three Strategic Priorities focus on driving climate action across the wider community. Actions in these priority areas address emissions from residential, commercial and industrial energy use and on-road transport. Strategic Priority 4 focuses on supporting the agricultural sector. Agriculture is the most economically significant sector in the region, and one of the largest sources of greenhouse gas emissions. In addition, it is impacted by climate change to an even greater extent than business and industry.

The Strategic Priority areas provide high level directions and actions that will be reported on annually and reviewed in 2025 in partnership with the community. Section 8 gives an overview of all action opportunities that were identified for the Action Plan.



4.

Context

4.1 Global Policy and Science

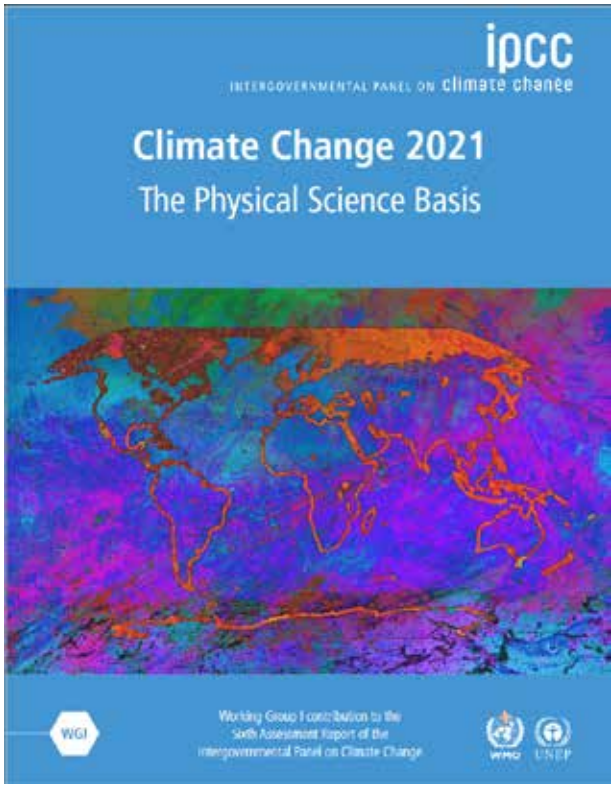
Climate change refers to long-term shifts in temperatures and weather patterns that can be natural or driven by humans. Since the 1800's, human activities such as the burning of fossil fuels have released greenhouse gases into the atmosphere at an unprecedented rate. These greenhouse gases are trapping the sun's heat within the Earth's atmosphere, causing the planet to become hotter[1] and the climate less stable.

Global temperatures have already risen by 1.1°C[2] over the last 100 years, and we are experiencing dangerous impacts now. We are seeing more frequent extreme weather events and their devastation in the form of bushfires, flooding and prolonged droughts.

It will take strong leadership, advocacy and commitment to achieve a net zero emissions future. We all have a part to play, and by working together in a global effort we can protect current and future generations from the worst impacts of climate change.

At the United Nations Framework Convention for Climate Change (UNFCCC) Paris Conference in 2015, the Australian Government signed an international agreement between 195 countries to keep any temperature rise "well below 2°C", and to drive efforts to keep warming below 1.5°C[3] higher than pre-industrial levels.

Current climate science tells us that warming beyond the 1.5°C threshold is likely to have increasingly severe social, economic and environmental impacts. This is especially the case for a water scarce continent like Australia. The IPCC's Special Report on Global Warming of 1.5°C states we must take significant action within the next 20 years to avoid a climate catastrophe and keep temperature rise under 1.5°C .



The latest IPCC Climate Report 'Code Red for Humanity' stresses that the internationally agreed threshold of 1.5°C is perilously close and that we are at imminent risk of hitting 1.5°C in the near term. The only way to prevent exceeding this threshold, is by urgently stepping up our efforts, and pursuing the most ambitious path. We must act decisively now, to keep 1.5°C alive.[4]

At the 2021 UNFCCC in Glasgow, Scotland, countries agreed to meet again in 2022 to pledge further cuts to emissions to keep temperature rises below this threshold. Current pledges, if met, will only limit global warming to about 2.4°C.

1 https://www.un.org/en/climatechange/what-is-climate-change
2 https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/
3 https://www.ipcc.ch/sr15/
4 https://www.un.org/press/en/2021/sgsm20847.doc.htm


PLANET
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PROFIT
PRICE
CARBON
SAVE
SAVE
OUR FUTURE

4.2 Greater Shepparton's Climate Emergency Declaration

Communities around the world have become increasingly concerned about the impacts of climate change, and the lack of government action to address the causes. There has been strong advocacy from different sectors of the community, particularly the youth, who insisted on action through the school climate strikes in 2019 and 2021, demanding politicians act on climate change. Locally, the Shepparton Statement is a message from the young people around Shepparton which allows their voices to be heard on climate change and the environment, reinforcing just how important action on the climate crisis is to them.

The world watched in distress as bushfires destroyed large areas of Australia in the 2019, a devastating reminder of events that could become the norm if we allow temperatures to increase by more than 1.5°C.

By declaring a Climate Emergency, Greater Shepparton joins more than 2,000 jurisdictions in 35 countries globally that have now declared a Climate Emergency, and more than 100 councils across Australia, representing over 9 million Australian citizens.

We are feeling the impacts now, the weather patterns we were used to can no longer be relied on and we are feeling the effects of hotter summers, more frequent and furious storms, unreliable rainfall and devastating bushfires. While climate change creates significant challenges, it also offers opportunities for our municipality including more comfortable housing, healthier lifestyles, more affordable energy, job creation leading to economic prosperity and beautiful and quiet towns.

With the declaration of a Climate Emergency, Council and community are preparing to meet the challenges head on and maximise our opportunities as we go, to keep Greater Shepparton liveable long into the future

4.3 About Greater Shepparton

The Greater Shepparton local government area covers 2,422 square kilometres, on the floodplains of the Goulburn and Broken Rivers in central Victoria. Known as Australia's Food Bowl, many businesses and industry are built around agricultural industries including dairy, horticulture, livestock and broad acre cropping.

The local economy has a Gross Regional Product (GRP) of $3.69 billion. Apart from agriculture, the economy also heavily supported by the health industry, retail and education sectors.

Shepparton has a cold semi-arid climate (Köppen climate classification: BSk)[16], with hot summers and cool winters. The hottest summer month is January, when the average maximum temperature is 31.8 °C. In winter, the weather becomes coldest in July when the minimum averages 3.4 °C and the maximum gets to 13.2 °C. On 7 February 2009, a maximum of 46.1 °C was recorded in the city.

Although the rainfall in Shepparton is fairly sparse, winter sees the most rain days. Rainfall is quite low throughout the year. Even with the wettest month being in November, the rainfall only averages 50.1 millimetres. The driest month in terms of rainfall and rain days is January, which receives an average of 27.5 millimetres over 4.6 days.

We have an enviable lifestyle with local public amenities that supports vibrant opportunities in sport, art, music and the environment.


RETAIL
AGRICULTURE
EDUCATION
HEALTH INDUSTRY
GRP
$3.69 billion

4.4 Climate Change in Victoria

Victoria is becoming hotter and drier due the impact of climate change. These impacts are already being felt by the Greater Shepparton community. Victoria's rainfall has declined over the last 30 years, in particular cool season rainfall, leading to a reduction in runoff and flows in our rivers. The greatest rainfall declines have been experienced in the Alpine region and in areas north of the Great Dividing Range[5].

Climate modelling conducted by the CSIRO indicate that Victoria will continue to become hotter and drier[6]. How much hotter and drier the State becomes depends on the action we take now.

A Business-as-Usual Future

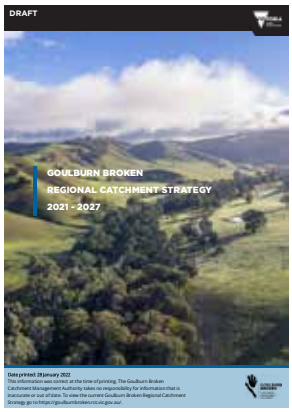
- Without significant reduction in global greenhouse gas emissions Victoria can expect a very hot and dry future.
- Under this scenario Victoria's average temperature is expected to increase by around 1.4˚C above pre-industrial levels by 2030; 2.3˚C by 2050 and 3.2˚C by 2070.

A Net Zero Emissions Future

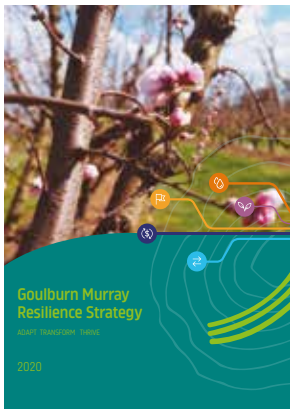
- If urgent and meaningful action is taken to reduce global emissions the worst impacts of climate change can be avoided.
- Under a low emissions scenario Victoria's average temperature is still expected to increase by around 1.4˚C by 2030 but greater temperature rises from that point may be avoided.
- Under this scenario Victoria's temperature rise could be limited to 1.5˚C by 2050 and 1.6˚C by 2070.

This data is based on projections from modelling. As the impacts of climate change have been felt around the world over the last decade, scientists have found that in many areas the climate is hitting these projections earlier than predicted. As an example, while Victoria is projected to have an average temperature increase of 1.4°C by 2030, the average Victorian temperature increase is already 1.2°C.

The responsibility of addressing climate change falls to all of us. Our region has been planning for climate change for some time and the urgency has resulted in a number of new strategies to which Our Safe Climate Safe Future compliments.



Goulburn Broken Catchment Management Authority Catchment Management Strategy 2021 -2027



Goulburn Murray Resilience Strategy

Yorta Yorta Whole of Country Plan 2021 – 2030

5 www.climatechange.vic.gov.au/__data/assets/pdf_file/0036/429876/Goulburn-Climate-Projections-2019_20200219.pdf

6 See above

4.5 Climate Change Impacts in Greater Shepparton

The geographic, social and economic characteristics of the region make Greater Shepparton highly exposed and vulnerable to the impacts of climate change:

GEOGRAPHIC

- Being in a climatic zone that already experiences hot summers, Shepparton is more likely to experience intense heat waves as a result of climate change[7]
- Rivers and wetlands make Shepparton more susceptible to flooding from extreme rain events

SOCIAL

- Approximately **4.5%** of population in public housing[8]
- Shepparton has the highest level of homelessness in regional Victoria[9]
- Approximately **25%** of Greater Shepparton's population could be considered more vulnerable to climate change impacts due to their age[10]

ECONOMIC

- Farmers' income directly impacted by changes to climate, including extreme weather damage to crops, or animal deaths

The health care and social assistance industry already employ more people in the local region than any other industry and face an increased burden under a hotter, drier future. This is due to climate change negatively impacting community health through respiratory illnesses, heat related illnesses, injury and mortality from extreme weather events and impacts on mental health[11]. In particular the regional agriculture and construction industries are highly vulnerable to the impacts of extreme heat.

7 https://www.abcb.gov.au/resource/map/climate-zone-map-vic

8 https://profile.id.com.au/shepparton/tenure

9 https://greatershepparton.com.au/bpi/planning/strategic-planning/strategic-strategies-and-reports/affordable-housing-strategy

10 https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/216

11 https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health

Greater Shepparton is a diverse community, home to many cultures. This means that there is a range of lifestyles that will be affected by climate change impacts in the area[12]. It also means that there is a need and opportunity to tailor community engagement and climate action to the specific needs of the various groups in Greater Shepparton. Culture not only influences people's understanding of climate change, but also the way they respond to climate change[13].

Also at risk is the unique environment of the Greater Shepparton region. Even though we have largely cleared landscape with only 2.5% of original native vegetation remains in the region, what remains plays a critical role in a functioning ecosystem throughout the state. The river systems, floodplains and wetlands in the area are important habitats and act as biodiversity corridors from the mountains to the Murray River. These ecosystems are fragile and susceptible to climate change impacts, such as flooding and drought. Climate change can shift important weather patterns that different plants, animals and habitats rely on. With more extreme climate change scenarios comes increased loss of species and further degradation of vegetation and water quality.

By taking action to reduce emissions now and transitioning to a net zero emissions community, many of these impacts can be greatly reduced and Greater Shepparton can help secure its future prosperity.

12 https://www.ohchr.org/Documents/Issues/CulturalRights/Call_ClimateChange/JMassey.pdf

13 https://www.sciencedaily.com/releases/2011/06/110629122755.htm

Greater Shepparton 2050 in a high emissions future

Hotter days and warmer nights:

- Much hotter with longer heatwaves
- Double the number of days over 35˚C per year

Drier in winter and spring:

- Predicted declines in rainfall of up to 22%
- Reduced surface flow to the Goulburn and Broken River system
- Reduced water availability for irrigation and dryland farming
- Agriculture will depend on new crop varieties better suited to hotter and drier climates

Greater flood and disease risk:

- More intense rainfall events and increased risk of flash flooding
- Increased flood events due to location close to the Goulburn and Broken Rivers and Seven Creeks
- Increased damage to houses and infrastructure
- New disease transmission, eg. Ross River virus outbreak after the 2017 Shepparton flood

Increased Bushfire Risk:

- Number of fire days with extreme fire danger to increase by 60%
- 11 more days of extreme fire danger per year by the 2050s

Loss of local flora and fauna:

- Increase pressure on flora and fauna
- Habitat changes that will negatively impact all species
- New bird and animals species migrating into the region, including invasive weeds and pests.

4.6 Municipal Emissions Snapshot

Greater Shepparton's Community emissions profile is derived from Snapshot[14] , currently the only online tool providing estimated emissions profiles for all municipalities in Australia. The data is developed according to the Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC) from a broad range of top down or state level data on greenhouse gas emissions and emissions sources.

Because the data behind the emissions is not currently at our local level, it is not suitable to use for a benchmark for Community emissions reduction target that will be monitored and reported against. Improvements to Snapshot methodology over time may enable tracking of Community emissions more accurately in the future

This emissions profile shows the estimated total emissions of greenhouse gases and sources of these emissions within the Greater Shepparton community. The greenhouse emissions are shown in carbon dioxide equivalent (CO2e). This is a measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

For example, the emissions factor potential for methane is 2 times greater than carbon dioxide. This means that emissions of 1 million metric tons of methane is equivalent to emissions of 28 million metric tons of carbon dioxide.[15]

Community emissions sources include non-residential buildings, residential buildings, transport, industrial and agricultural activities, and landfill waste.

The Greater Shepparton community released approximately 1,461,000 tonnes of CO2e in 2019. The largest source of emissions is industrial electricity and gas use, accounting for 30 per cent of all community emissions.

The second largest source of emissions is agriculture, generating 24 per cent of the total profile. It needs to be noted that there are additional emissions from the agriculture sector that are captured in other sections of the profile. For example, use of farm machinery is captured in transportation for tractor fuel use, and stationary energy for farm electricity use.

Energy consumption by residents is the third largest source of emissions, followed by commercial energy use, on-road transportation and waste.

Figure 1. Greater Shepparton Community Emissions Snapshot 2019

14 snapshotclimate.com.au

15 http://www.cleanenergyregulator.gov.au/NGER/About-the-National-Greenhouse-and-Energy-Reporting-scheme/global-warming-potentials


McFadyen


DRIVING
TOWARDS
ZERO
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GREATER
SHEPPARTON

4.7 Net Zero Emissions by 2030

The Shepparton community and stakeholders involved in the development of this Action Plan recognise the urgency to act and have proposed an aspirational target of net zero emissions by 2030. This target is not designed to be monitored and reported upon, rather it is a recognition of what is required to address the climate emergency. Council stands behind the community and supports this target.

The target broadly aligns with the Shepparton community's contribution to limit the temperature increase to 1.5°C above preindustrial levels under the Paris Agreement. The target is also in line with other Victorian councils' net zero emissions by 2030 municipal targets[16].

At this point in time, the target is not designed to be monitored and reported upon, rather it is a recognition of what is required by the community to address the climate emergency.

Council will support this aspirational community target through implementing and reporting on the actions in this plan such as partnering with others, including advocating to other levels of government for much stronger climate action and investment in our region.

Achieving the ambitious target of net zero emissions by 2030 will require substantial action by the state and federal government beyond currently planned actions and targets, as well as from the Greater Shepparton community. Partnering with others, including advocating to other levels of government for much stronger climate action, are a critical part of Council's Climate Emergency response, and of the role of local government in driving that change.

4.8 How We Are Responding

Council's response

Fueled by increasing community and organisational concern about the health, livelihood and community impacts of climate change, Council declared a Climate Emergency in March 2020. This declaration highlights the need to act and paves the way for ambitious actions by Council and the community. This Action Plan is a critical step in acting on this declaration.

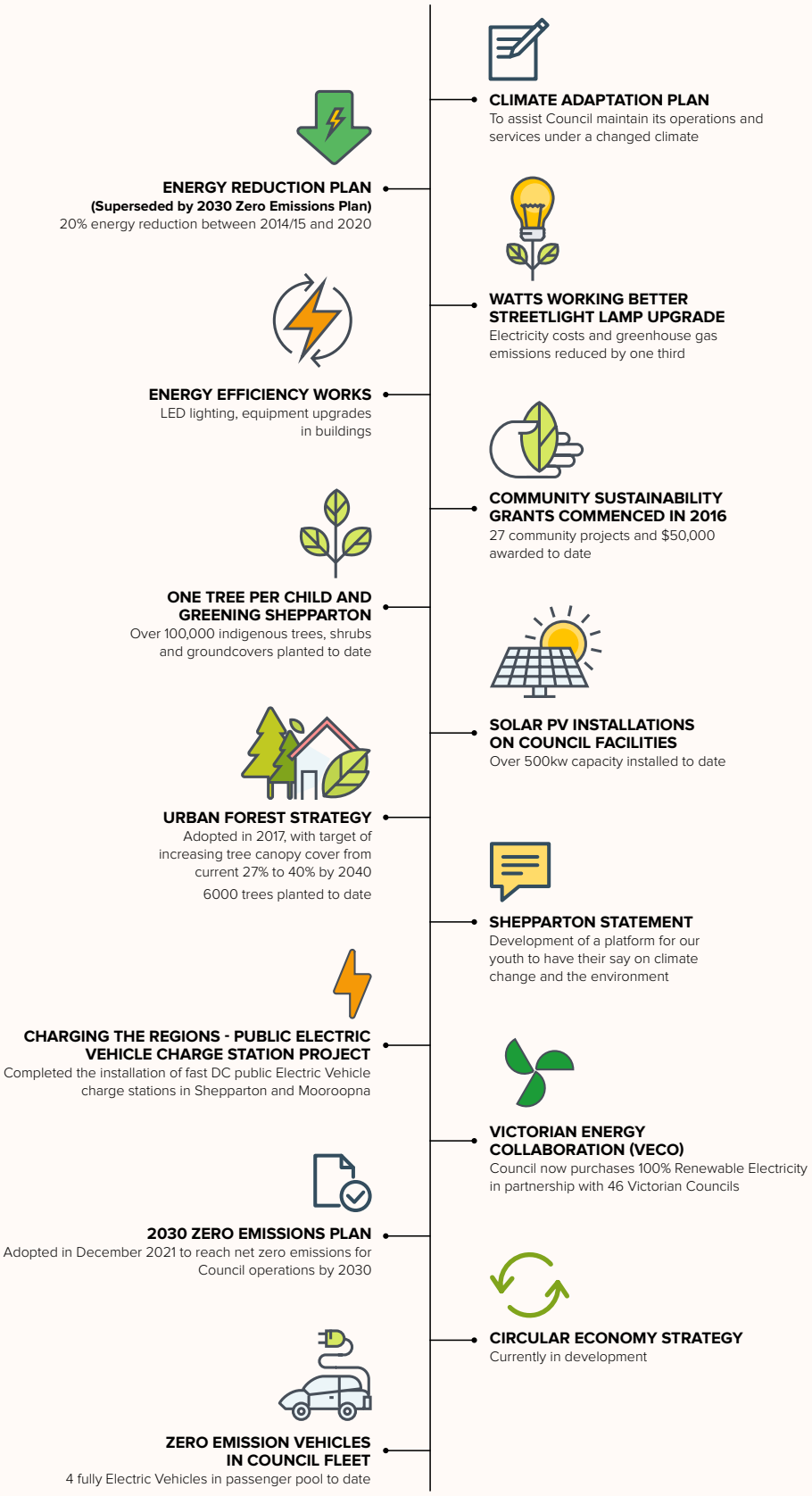
Greater Shepparton City Council is already taking significant action to respond to the Climate Emergency by reducing carbon emissions through implementation of Council's 2030 Zero Emissions Plan and building resilience to climate change impact through implementation of Council's Climate Adaptation Plan. Council has installed 500kW of solar on Council facilities, introduced electric vehicles into the passenger fleet, upgraded lighting and equipment in buildings, and changed streetlights to LEDs to reduce greenhouse gas emissions significantly. This is in addition to over $50,000 worth of community sustainability grants awarded, and the greening of Shepparton through the planting of over 100,000 native plants.

Council recognises the impact of waste on the Climate Emergency. In response, the Waste and Resource Recovery Management Strategy 2013-2023 will be reviewed and replaced with a Circular Economy Strategy that will focus on new solutions on waste and recycling, the key philosophies of reuse and repair, but also energy recovery.

This Action Plan will help Council and the Greater Shepparton community to step up our response to climate change and ensure a prosperous future for our region. Actions within this Plan will build off the work that Council has already been doing to reduce emissions and build the resilience of the municipality to climate change.

16 Alpine Shire Council, Frankston City Council, Kingston City Council, Monash City Council, Banyule City Council, Hepburn Shire Council, Yarra City Council, Knox City Council, Mount Alexander Shire Council, South Gippsland Shire Council.

Council Plans and Actions



Community's response

Driven by concern for the climate, livelihoods, cultural protection and economic prosperity, the Greater Shepparton community has long been at the forefront of climate action. In 2021, the Yorta Yorta Nation Aboriginal Corporation collated thousands of years' worth of knowledge and experience to create the Yorta Yorta Whole-of-Country Plan.

There are many active groups and initiatives within the community such as

Local business and industry are also adapting to climate change, by incorporating renewable energy such as solar power into their operations, switching to electricity instead of gas where possible, and netting crops to create microclimates and protect against pests and weather.

5.

Climate Emergency Action Plan

The purpose of this Action Plan is to support Greater Shepparton transition to a decarbonised, thriving economy and build a vibrant and resilient community[17]. A strong focus of the Action Plan is to engage with the community, build partnerships, and to further understand what adapting to a changing climate looks like to the Greater Shepparton community.

This Action Plan gives priority to the Climate Emergency by inspiring transformational change within Council and the community. It will also encourage households and businesses to act on the Climate Emergency. Council understands its role in helping facilitate actions can only be achieved in partnership with the community. This includes an ongoing conversation between Council and the community to understand how the community is affected by and adapting to climate change and identifying opportunities to thrive.

While Council has a critical role to play in reducing emissions and adapting to climate change within the municipality, it is important to acknowledge that Council cannot do this alone, and is reliant on State and Federal Government for support. Similarly, Council cannot implement the programs in this Action Plan without community and stakeholder investment. Emissions reductions at this scale will require significant contributions from residents, businesses and industry, and the state and federal governments. It will also require broader societal and structural changes that are beyond Council's influence.

5.1 State and Federal Government's role in Climate Action

The State and Federal Governments hold the crucial role of enabling and supporting Local Governments and Communities to deliver the actions necessary for a climate safe future, firstly through the review or development of policy and legislation to allow appropriate Climate Action, then through grants and funding to support mitigation and adaptation projects and activities. Ongoing engagement with Local Governments and industry, business and agricultural sectors and groups will be crucial for development of policies, appropriate planning of projects and services and for adequate resourcing to implement these.

5.2 Council's Role in Climate Action

Council is uniquely positioned to drive community emissions reductions, because of its leadership role within the region, local understanding and context, and its established community and stakeholder networks. Council already provides numerous support services to the community, ranging from planning and infrastructure, to funding opportunities. If well directed, these services can be used to motivate and facilitate community climate action. Council can support the community by ensuring that all community members are included in the Climate Emergency actions, and empower everyone with the opportunities to contribute.

The programs in this Action Plan highlight key action areas within Council's sphere of influence that can significantly reduce emissions in the region. Council will also aim to influence action beyond its control through advocacy and leadership. Please refer to the Section 6.1 on Demonstrating Climate Leadership.

17 Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks. https://www.c2es.org/content/climate-resilience-overview/

5.3 The Community's Role in Climate Action

The community has a vital role in reducing emissions and adapting to a changing climate. While the actions outlined in this Action Plan are addressed to Council as a leading agency in facilitating action, the Action Plan is designed to be implemented in partnership with the community. It is the Greater Shepparton community including individuals, businesses, farmers and community groups that will be driving change on the ground. The opportunities discussed in this Action Plan have been designed to be inclusive, mutually beneficial, and scalable on both a community and individual level.


Let's plant
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6.

Climate Emergency Strategic Priorities

Council's response to the Climate Emergency focuses on four Strategic Priorities to elevate climate change as a priority issue and to support the community in taking action:

Across each of these Strategic Priority areas Council, residents, businesses, farmers and community groups have different roles to play in driving climate action. By working together and taking a partnership approach, Greater Shepparton can build a climate-resilient, net zero emissions community. Making sure no one is left behind, the implementation of these strategic priorities will aim to be an inclusive and holistic process for Greater Shepparton's diverse community, with the support of Council.

Not only is agriculture one of the most economically significant sectors in the region, but it is also one of the largest sources of greenhouse gas emissions for Shepparton. The agriculture sector is also directly impacted by climate change, to an even greater extent than business and industry, and as a major exporter is exposed to international pressure to reduce emissions.

The Strategic Priority areas provide high level directions and actions. The detailed programs will be designed in collaboration with relevant community stakeholders.

The following Sections 6.1 to 6.4 discuss the Strategic Priorities in more detail. The table in Section 8 gives an overview of all action opportunities that were identified for the Action Plan. The table also includes existing actions that are already underway.

6.1 Strategic Priority 1: Demonstrating climate change leadership

Why is this a priority?

Australia needs greater leadership on climate change to mobilise communities, accelerate action and drive innovative solutions that can address the Climate Emergency.

The Action Plan demonstrates the potential for Council as an organisation to have a meaningful impact on community emissions within Greater Shepparton. It is however important to understand the emissions reduction potential of the actions in the Action Plan, within the context of the wider policy and societal changes required.

Achieving net zero emissions by 2030 will require substantial action by the state and federal government beyond currently planned actions and targets, as well as from the Greater Shepparton community. Through advocacy and demonstrating climate change leadership Council will encourage these stakeholders to drive climate action which meets the scale and urgency required. Demonstrating climate change leadership will lay the foundation for change to deliver the other Strategic Priority actions.

One way to influence the public and private sector is through strong and targeted advocacy to major stakeholders and other levels of government. Advocating for regulatory or systemic changes will also ensure that community voices are broadcasted to organisations that may have little understanding of Greater Shepparton's local context. Importantly, advocacy is an opportunity for Council to communicate local knowledge and barriers to achieving large scale emissions reductions, and support actions that can have a meaningful impact.

Feedback from the steering committee and stakeholder groups in the development of this Action Plan reinforced community expectation that Council will lead and influence action by example. These opportunities not only showcase the technologies and solutions that are locally available and appropriate but continue to foster a community that is innovative, climate smart and proactive in reducing emissions.

Priority Action Areas:

Advocate for greater climate action at federal and state levels

- Better electricity infrastructure
- Decarbonised transport system
- Higher Environmentally Sustainable Design (ESD) standards for new buildings

Support local innovative climate change solutions

- Funding for testing and trialing of local innovative solutions
- Local enterprises to investigate opportunities for sustainable innovations
- Show leadership through trialing new and innovative solutions for Council operations

How will this strategic priority be achieved?

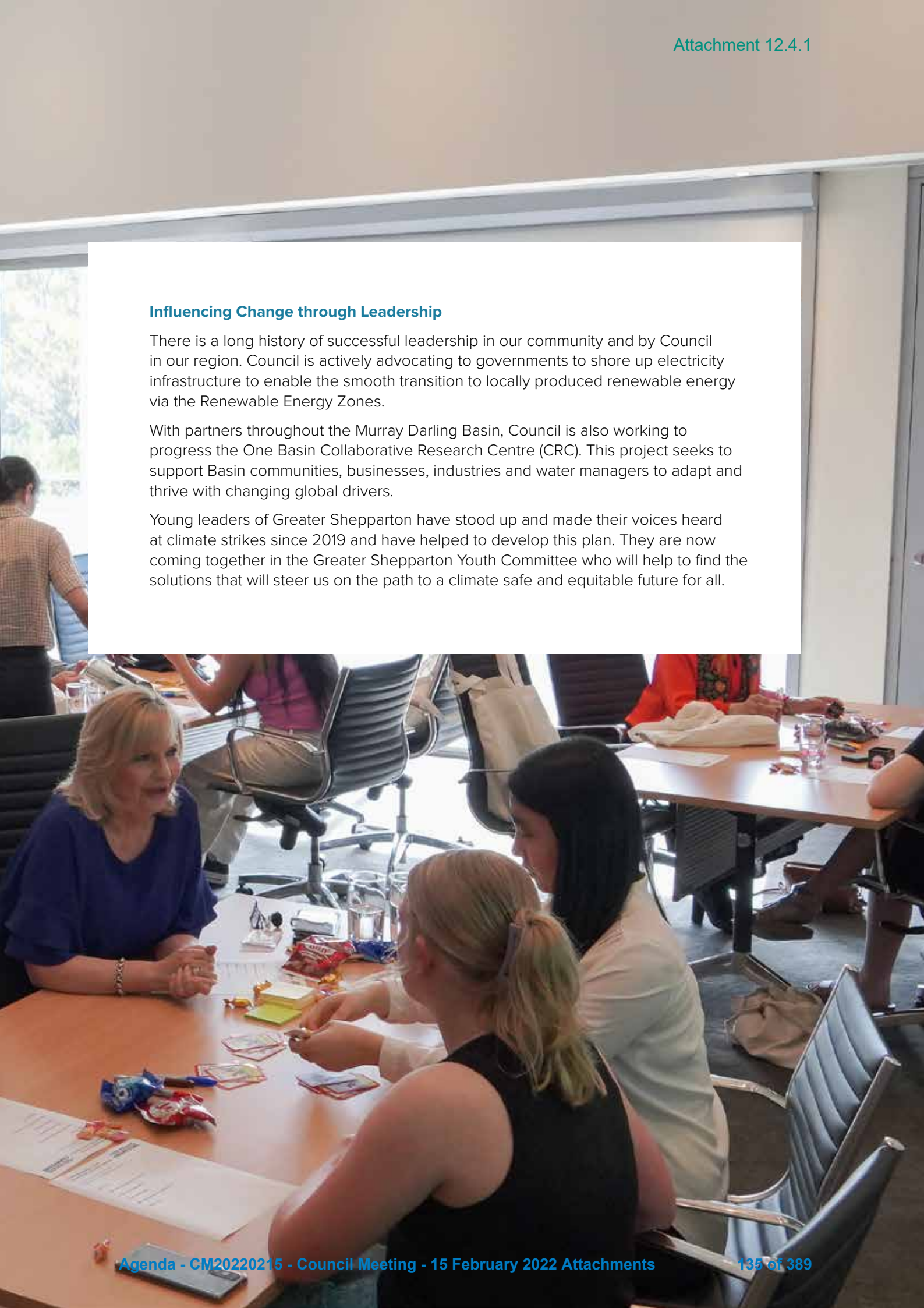
- Community and Council can advocate for changes in policies, regulations, and investments by other levels of government and large organisations
- Advocacy can come in the form of direct communication with authorities, by supporting council alliances, or local businesses joining relevant alliances – such as the Climate and Health Alliance for the medical sector, or the Green Building Council for the construction sector

Greater Shepparton City Council is leading the charge

Council has provided dedicated electric vehicle fast charging bays to help Greater Shepparton transition to low and net zero emissions vehicles, and support residents and visitors to work towards being a net zero emissions community .

With the new fast charging bays in central locations in Mooroopna and Shepparton, Council hopes to attract private charging business investment, encourage more locals to use electric vehicles, and create a welcoming environment for EV users who may visit from out of town. These charging bays are in addition to four already installed at the Shepparton Art Museum, and one at Tallis winery, Dookie.

Council is dedicated to taking positive steps to assist the region to shift to low or net zero emissions transport, and making the changes needed to create a climate resilient community. Council has also demonstrated commitments to the corporate 2030 net zero emissions target by introducing electric vehicles into passenger fleet, to reduce greenhouse gas emissions and improve air quality.



Influencing Change through Leadership

There is a long history of successful leadership in our community and by Council in our region. Council is actively advocating to governments to shore up electricity infrastructure to enable the smooth transition to locally produced renewable energy via the Renewable Energy Zones.

With partners throughout the Murray Darling Basin, Council is also working to progress the One Basin Collaborative Research Centre (CRC). This project seeks to support Basin communities, businesses, industries and water managers to adapt and thrive with changing global drivers.

Young leaders of Greater Shepparton have stood up and made their voices heard at climate strikes since 2019 and have helped to develop this plan. They are now coming together in the Greater Shepparton Youth Committee who will help to find the solutions that will steer us on the path to a climate safe and equitable future for all.

6.2 Strategic Priority 2: Accelerating the transition to net zero emissions communities

Why is this a priority?

Almost two-thirds of Greater Shepparton's emissions come from electricity and gas use, with transport and waste producing another 15 per cent. Technology already exists for residents and businesses to transition to net zero emissions energy generation and transport. Moving towards a more circular economy will not only help reduce waste, and waste emissions. It will also deliver benefits such as attracting new industry to the area, creating jobs, improving the security of the supply of raw materials, increasing competitiveness and stimulating innovation.

Greater Shepparton can expect its levels of emissions to be drastically reduced in a manner that is cost-effective and mutually beneficial across the community through collaboration between Council, residents and businesses. This strategic priority is key to restoring a safe climate.

Priority Action Areas:

Support residents and businesses in reducing emissions

- Increase public awareness and local understanding of climate change impacts and the value of addressing them through emissions reductions programs
- Promote knowledge sharing and education on energy efficient and renewable energy technology, or alternative energy systems
- Support best-practice Environmental Sustainable Design (ESD)

Invest in sustainable and alternative transport

- Support the community to adopt electric vehicles and sustainable transport options through a better transport network

Help drive a circular economy

- Look at closed loop local waste solutions to reduce waste to landfill and recycle available materials
- Develop, adopt and implement circular economy strategy

How will this strategic priority be achieved?

- Successful action by Council will come in the form of strong leadership, advocacy, partnerships and support to the community.
- Residents will be informed of schemes that can help them adopt renewable technologies and reduce energy use
- Utilising the region's supportive spirit and leveraging off existing community networks will also open discussions about innovative and locally appropriate solutions for the community

Different roles of Council, the community, and business, include:

Council:

- Promote local, state and federal government funding opportunities
- Encourage discussions on emissions reduction opportunities across the community
- Deploy resources to ensure high ESD standards are upheld
- Celebrate and incentivise best-practice sustainability initiatives

Community:

- Actively participate in discussions on local sustainability initiatives, technologies and programs
- Engage with Council on capital works community infrastructure projects that support low-emissions transport, such as bicycle paths and electric vehicle charging stations

Businesses:

- Investigate, and invest in large scale and impactful renewable energy projects such as Power Purchase Agreements, microgrids and Virtual Power Plants
- Promote climate change leadership to customers and clients


GREEN: ORGANIC

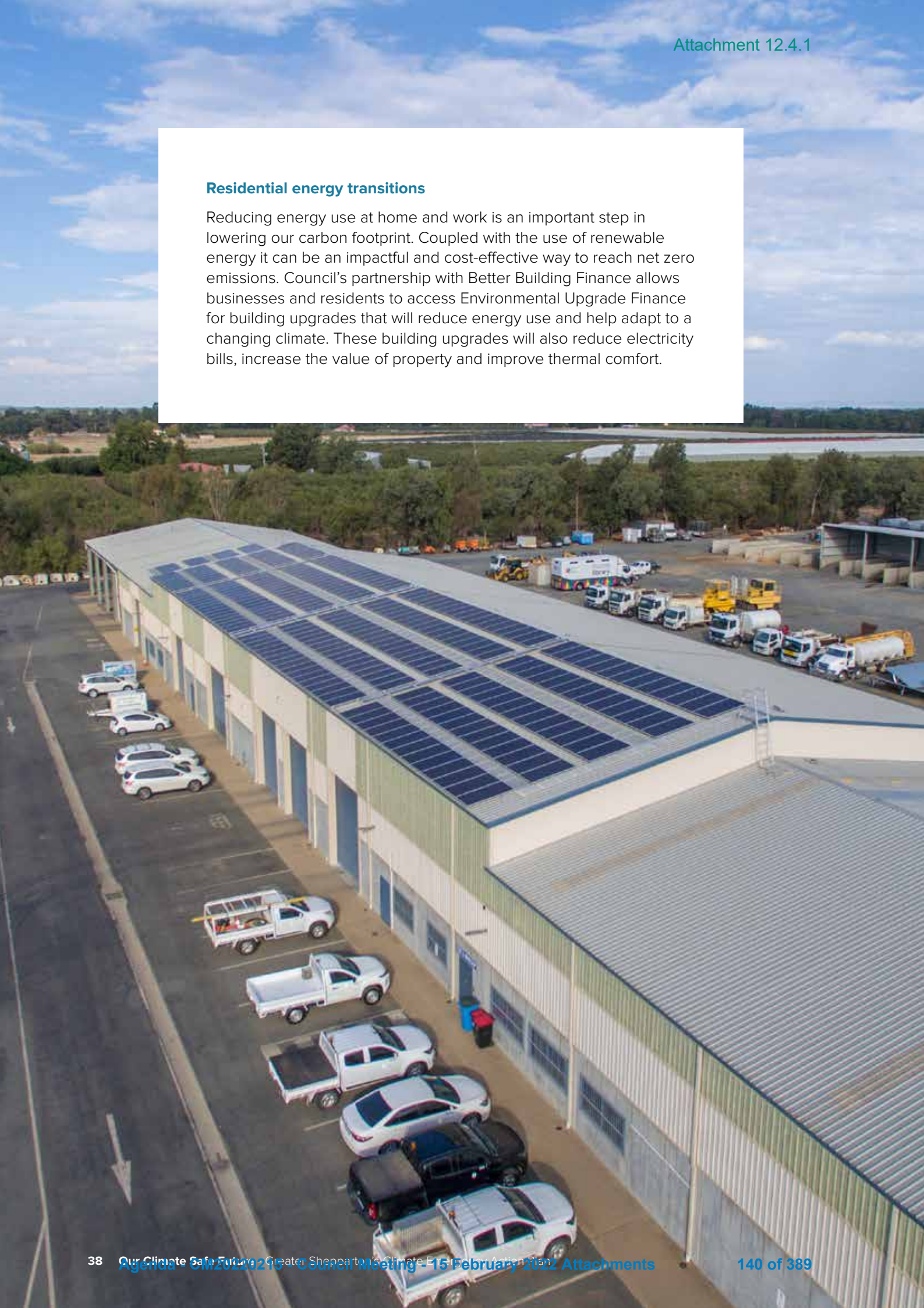
Alternative Fuel Options

One third of Australia's emissions comes from the transport sector. A quarter of all Victorian truck registrations are located in Greater Shepparton. A significant reduction in our emission will come from moving from fossil fuel powered transport to net zero emissions fuel such as hydrogen.

Council is partnering with Goulburn Valley Water in a consortium of local businesses to undertake a state government funded feasibility study to understand the demand for renewable hydrogen, quantify the amount of fossil fuel can be replaced, the cost to implement and emissions abated. In addition, the project will identify opportunities to replace gas and improve the reliability of the electricity supply through renewable hydrogen.

Residential energy transitions

Reducing energy use at home and work is an important step in lowering our carbon footprint. Coupled with the use of renewable energy it can be an impactful and cost-effective way to reach net zero emissions. Council's partnership with Better Building Finance allows businesses and residents to access Environmental Upgrade Finance for building upgrades that will reduce energy use and help adapt to a changing climate. These building upgrades will also reduce electricity bills, increase the value of property and improve thermal comfort.



Sustainable and alternative transport options

Transitioning the way in which we move around the municipality is critical in reaching our net zero target. Council can support our community to drive less, walk and bicycle more and utilise public and community transport.

There is a growing shift to alternative modes of getting around in the community. Already there are centrally located electric vehicle chargers available for public use. Greater Shepparton has a variety of bike paths and routes that the community can utilise to reduce emissions by cycling or walking. Using bikes or walking to get around also improves the health of the community.

Council has already been successful in lobbying the State Government for faster and more frequent Vlocity trains to Melbourne and upgrades to associated road infrastructure. Council will continue to perform this advocacy work with the next focus on review to upgrade existing bus networks.

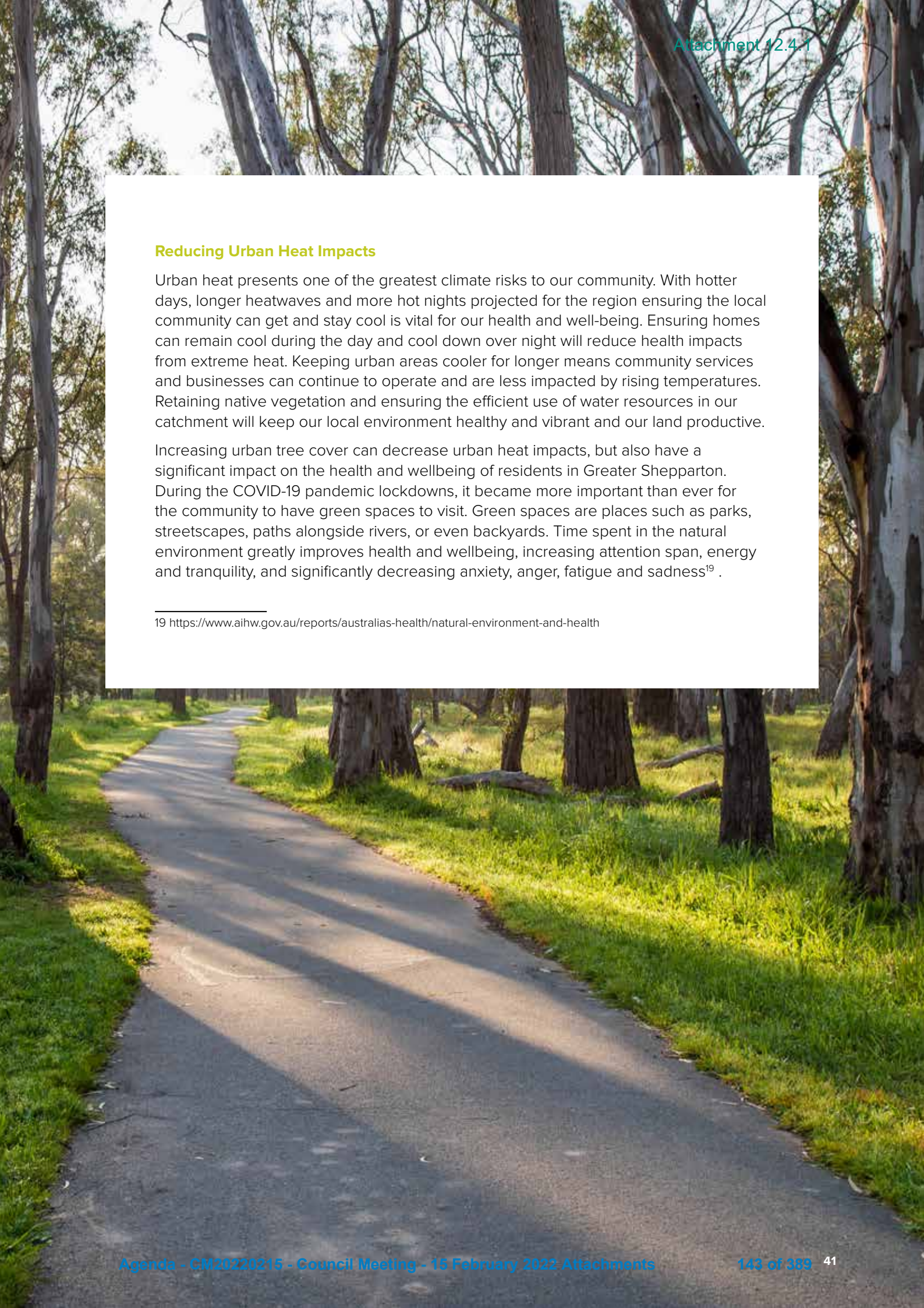
6.3 Strategic Priority 3: Building a climate resilient community

Why is this a priority?

Climate change is expected to make Greater Shepparton hotter and drier and to increase the frequency of extreme bushfire weather, damaging storms and flash flooding events. These weather events already do, and will continue to, negatively impact the people of Greater Shepparton and the region's biodiversity. Human activities, including those that are contributing to climate change, are driving species to extinction at a significantly higher rate than ever before[18].

Creating a community that is prepared for, and can cope with, climate-disasters when they occur will help protect the health and well-being of the local community. It will also provide assurance for our young people by laying down a pathway to deal with the causes of climate change and how we can ensure they have as many opportunities in their lives as we have had. It is well documented that a healthy environment is crucial for a healthy community. The natural environment provides a suite of ecosystem services such as soil health, pollination, water filtration and cooling our urban environment. Enhancing the natural environment can ensure the survival of the indigenous plants and animals that reside in and around Greater Shepparton.

18 https://www.pnas.org/content/114/30/E6089



Reducing Urban Heat Impacts

Urban heat presents one of the greatest climate risks to our community. With hotter days, longer heatwaves and more hot nights projected for the region ensuring the local community can get and stay cool is vital for our health and well-being. Ensuring homes can remain cool during the day and cool down over night will reduce health impacts from extreme heat. Keeping urban areas cooler for longer means community services and businesses can continue to operate and are less impacted by rising temperatures. Retaining native vegetation and ensuring the efficient use of water resources in our catchment will keep our local environment healthy and vibrant and our land productive.

Increasing urban tree cover can decrease urban heat impacts, but also have a significant impact on the health and wellbeing of residents in Greater Shepparton. During the COVID-19 pandemic lockdowns, it became more important than ever for the community to have green spaces to visit. Green spaces are places such as parks, streetscapes, paths alongside rivers, or even backyards. Time spent in the natural environment greatly improves health and wellbeing, increasing attention span, energy and tranquility, and significantly decreasing anxiety, anger, fatigue and sadness[19] .

19 https://www.aihw.gov.au/reports/australias-health/natural-environment-and-health

Priority Action Areas

Reduce Urban Heat

- Increase urban tree canopy cover and enhance diversity of tree species, including with more climate resilient species
- Develop local planning guidelines to include climate adaptation guidance through the Council planning and permitting process
- Advocate for integration of Environmentally Sustainable Design (ESD) principles

Enhance the natural environment

- Work in partnership with Yorta Yorta Nation to foster respect for and connection to Country
- Continue to advocate for efficient utilisation of water resources and environmental health for Goulburn and Broken river systems
- Planning amendments and incentives for native vegetation retention and afforestation
- Work in partnership with Yorta Yorta Nation to investigate and implement traditional burning practices for biodiversity outcomes on Council owned land

Reduce Urban Flood Risk

- Develop and implement an integrated water management plan, including stormwater, drainage, sustainable water use and re-use to reduce stormwater runoff and mitigate road flooding
- Maintain accurate and up to date flood modelling, in line with climate science and projections for the region

Build community resilience to new climate risk

- Integrate climate risk into development of community plans
- Develop a community awareness campaign to educate the community in preparedness, including preparing for climate risks
- Investigate the opportunity to strengthen local planning provisions to increase community climate resilience.

How will this strategic priority be achieved?

A partnership approach between Council, community and business is needed to build a climate resilient Greater Shepparton and enact change across public and private land. Different roles of Council, the community, and business, include:

Council:

- Maintaining and enhancing infrastructure and assets (including trees) on public land
- Advocating for stronger planning guidelines and design standards
- Facilitate environmental upgrade finances to support home and business upgrades (e.g.)

Residents and community groups:

- Maintaining trees and native vegetation on private land
- Upgrading homes to improve thermal efficiency, comfort and reduce costs
- Increasing awareness of how climate change may impact their family and local community

Private sector:

- Enhancing urban forests, green spaces and water sensitive design for new developments
- Increasing Environmentally Sustainable Design (ESD) performance of new housing

Urban Forestry

In addition to improving the character and amenity of the region, green spaces provide important environmental and socio-economic benefits that can improve health and well-being, support strong local economies and vibrant local communities.

Built up areas of cities can be up to 7°C warmer than surrounding areas. By increase urban tree coverage the impact of urban heat islands can be greatly reduced. Urban trees can also provide shading for buildings in summer, reducing the need for air-conditioning and saving energy, money and reducing emissions. Trees can also protect asphalt pavements from heat, reducing the need for regular maintenance.

Urban forests improve people's physical and mental health by reducing heat stress, encouraging physical activity, and offering recreational opportunities. Green infrastructure on commercial sites has been found to encourage economic activity by attracting customers who stay longer and return more frequently.

6.4 Strategic Priority 4: Supporting a thriving, climate ready local agricultural sector

Why is this a priority?

Agriculture is one of the pillars of the Greater Shepparton economy and is highly exposed to climate change impacts, including extreme temperature, storms, water scarcity and an influx of pests, diseases, and weeds. Agriculture also accounts for almost a quarter of local emissions of which around 40% is methane. Supporting the agricultural sector to reduce emissions and build resilience to climate change will not only help ensure a thriving sector but a safe and prosperous future for the local region.

Climate ready agriculture includes proven practical techniques such as mulching, intercropping, conservation agriculture, crop rotation, integrated crop-livestock management, agroforestry, improved grazing, and improved water management and innovative practices such as better weather forecasting, more resilient food crops and risk insurance.

Some of the larger operators in Greater Shepparton are already investing to mitigate and adapt to climate change such as on farm renewable energy generation, soil moisture monitoring, crop protection and innovative ways of reducing pesticide use.

Investigating innovative new technologies and crops or products can open up new revenue streams for farmers, with some investments in climate ready technology helping to save farmers costs, as well as emissions.

Farmers in Greater Shepparton are well placed to provide insight into suitable climate action for the region. This is because of their close understanding and monitoring of ecological changes. While most Australian industries are exposed to the impacts of climate change, local farmers will continue to see first-hand the impacts of a changing physical environment. Under various BOM and CSIRO projections (2015)[20] achieving productive yields in this sector will be made harder by climate change in the future and will require significant adaptation responses. Reducing the incidences of these events and adapting to their ongoing presence is key to the industry's success and the region's prosperity.

20 https://publications.csiro.au/rpr/pub?pid=csiro:EP154327

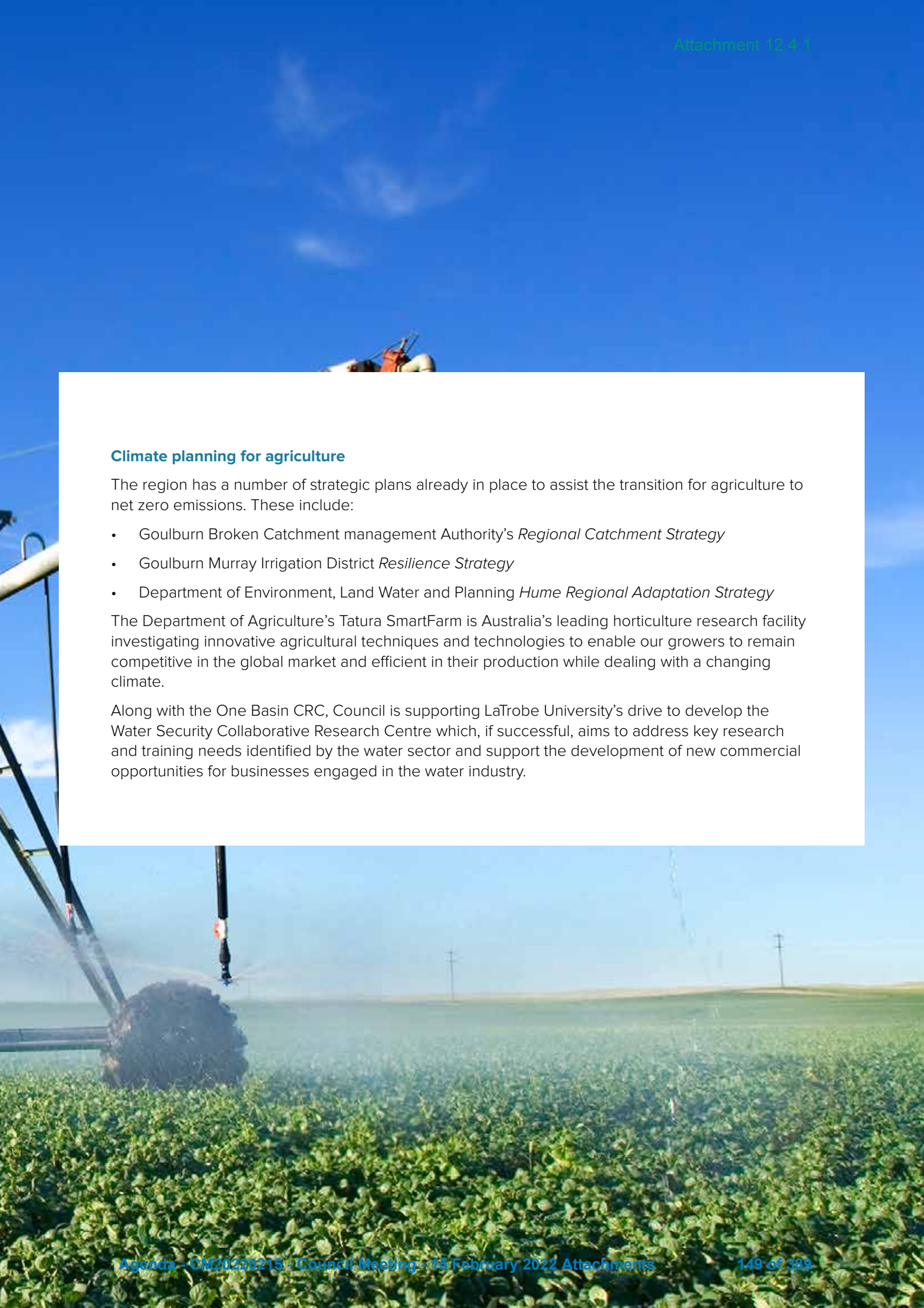
Energy efficiency investments for Agriculture

Energy is one of the largest costs to farmers. A survey of Victorian famers found that barriers that prevent or discourage investment in energy efficiency measures include high costs, difficulty keeping up with new technology and the need for demonstrated results. To address these barriers, the Victorian Government announced a $30 million dollar extension to the Agriculture Energy Investment Plan[21] in November 2020.

This plan can assist farmers and businesses to become more resilient and energy efficient, through enhancements to energy efficiency and energy productivity. Farmers can explore alternative energy options and help to make Victoria's agricultural sector more internationally competitive, while protecting local jobs. This could be through purchasing new, more energy efficient equipment such as pumps or lighting or installing own-generation capacity, such as solar panels.

In West Gippsland, a family-owned dairy farm has used the financial support from the Agriculture Energy Investment Plan to install a 60-kilowatt solar system to power the dairy, which has reduced their quarterly energy costs by almost two thirds. Any excess power generated by the solar system is sold back to the grid.

21 https://agriculture.vic.gov.au/support-and-resources/funds-grants-programs/agriculture-energy-investment-plan/about-the-plan



Climate planning for agriculture

The region has a number of strategic plans already in place to assist the transition for agriculture to net zero emissions. These include:

- Goulburn Broken Catchment management Authority's *Regional Catchment Strategy*
- Goulburn Murray Irrigation District *Resilience Strategy*
- Department of Environment, Land Water and Planning *Hume Regional Adaptation Strategy*

The Department of Agriculture's Tatura SmartFarm is Australia's leading horticulture research facility investigating innovative agricultural techniques and technologies to enable our growers to remain competitive in the global market and efficient in their production while dealing with a changing climate.

Along with the One Basin CRC, Council is supporting LaTrobe University's drive to develop the Water Security Collaborative Research Centre which, if successful, aims to address key research and training needs identified by the water sector and support the development of new commercial opportunities for businesses engaged in the water industry.

Priority Action Areas

Improve land management practices to reduce climate impacts on agriculture

- Encourage knowledge sharing and keep track of innovative measures to adapt to a changing climate
- Practical support (including independent advice) to individuals and industry to take up technologies that enhance the total value chain from paddock to processing

Reduce agricultural emissions

- Partner with other agencies and organisations to educate on carbon farming, low methane feedstock, renewable energy and more
- Investigate feasibility of utilising agricultural by-products for high value products including as a source of energy (incorporating closed loop system)

Buy local:

- Support Shepparton farmers by purchasing local produce
- Stock Council owned food service outlets with locally grown food to reduce emissions from food miles

How will this strategic priority be achieved?

Leveraging off existing professional networks, collaboration between local suppliers, retailers and farmers will see innovative practices trialled and promoted in the local region. Given the region's standing as being Australia's food bowl, the impacts of development in this industry will extend beyond Greater Shepparton City's boundaries.

Different roles of Council, the community, and farming business, include:

Council:

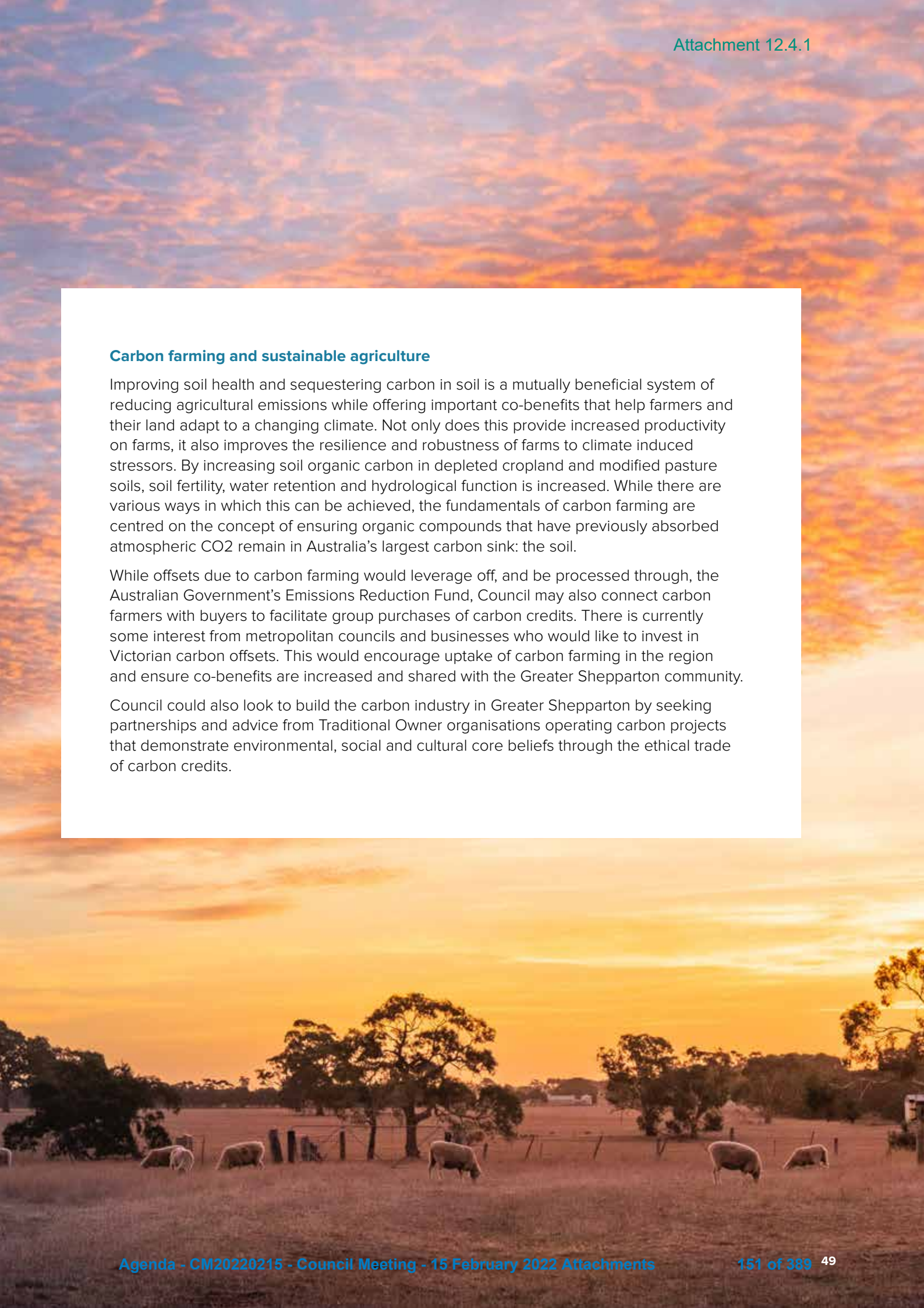
- Promote partnerships between private sector organisations and industry groups to support sustainable farming practices
- Advocate to other levels of government to support farmers to transition to climate ready agriculture practices through research, financial and regulatory support.
- Investigate green infrastructure that offers adaptation and mitigation benefits

Community:

- Maintaining trees and native vegetation on private land
- Support local industry by buying local and sustainably produced food

Farms:

- Trialling and sharing resources on innovative farming methods
- Investing in renewable energy generation and energy efficient machinery and appliances
- Work with the private sector to identify lucrative and sustainable market trends including carbon market



Carbon farming and sustainable agriculture

Improving soil health and sequestering carbon in soil is a mutually beneficial system of reducing agricultural emissions while offering important co-benefits that help farmers and their land adapt to a changing climate. Not only does this provide increased productivity on farms, it also improves the resilience and robustness of farms to climate induced stressors. By increasing soil organic carbon in depleted cropland and modified pasture soils, soil fertility, water retention and hydrological function is increased. While there are various ways in which this can be achieved, the fundamentals of carbon farming are centred on the concept of ensuring organic compounds that have previously absorbed atmospheric CO2 remain in Australia's largest carbon sink: the soil.

While offsets due to carbon farming would leverage off, and be processed through, the Australian Government's Emissions Reduction Fund, Council may also connect carbon farmers with buyers to facilitate group purchases of carbon credits. There is currently some interest from metropolitan councils and businesses who would like to invest in Victorian carbon offsets. This would encourage uptake of carbon farming in the region and ensure co-benefits are increased and shared with the Greater Shepparton community.

Council could also look to build the carbon industry in Greater Shepparton by seeking partnerships and advice from Traditional Owner organisations operating carbon projects that demonstrate environmental, social and cultural core beliefs through the ethical trade of carbon credits.

Turning farm bio-waste into high value energy products

Given Greater Shepparton's large agricultural industry, an opportunity exists to investigate options to turn a range of farm waste (including horticulture) into heat, electricity, biogas, liquid fuels, fertilisers and other products. Crop remnants left over from plantation harvesting and dairy liquid waste, as well as some waste currently going to landfill and sewerage can be processed into a range of high value products.

Not only do such processes provide opportunities to farmers to turn bio-waste into secondary income streams, they also assist in reducing waste and emissions associated with disposal. Importantly, they support a closed loop economy – which means they are fostering a culture of upcycling and utilising materials that otherwise may have been considered a burden to farm operations.

Organisations interested in exploring bio-energy opportunities can seek funding from the Australian Renewable Energy Agency (ARENA). This can leverage off previously sponsored programs across the country in similar fields and subsidise ongoing Emissions Reduction Fund (ERF) credits, making these investments both financially and environmentally rewarding. For example, ARENA have already funded quite a few research projects that explore how waste can be turned into biofuels to be used in the transport sector. Local processing facilities can manufacture these fuels to meet Australia's heavy demand and reliance on air travel, long-distance road freight and rail and marine freight to generally lower the emissions associated with the sector.

Another example is using biomass to replace traditional fossil-fuel reliant plant machinery. This system is successfully being used in Albany, Western Australia to heat a council-run aquatic centre and utilises waste from timber plantations to power a boiler to heat water in the centre's pools. This has meant that the facility has effectively transitioned away from gas boilers and saves the City of Albany about $50,000 a year.

7.

Monitoring, Reporting and Review

In partnership with the community, Council will start implementing the Action Plan in 2022-2023. Council will report annually on the key achievements, highlights and challenges for the implementation of programs. These updates and lessons learnt will be shared with the community in Councils' Annual Report.

Through ongoing monitoring Council will review the uptake and effectiveness of specific actions and redirect course if necessary. This will allow Council and community to ensure that resources are used effectively to achieve the best outcome.

The Action Plan will be reviewed in 2025 and updated based on the success of programs and taking into account Federal and State Government policy, funding opportunities, technology accessibility and other collaborative opportunities. The Action Plan will expire in 2030, the year of the aspirational target of achieving net zero emissions for the municipality.

8.

Identified Action Opportunities

Tables 1-4 outline the emissions reduction and climate change adaptation opportunities for the Greater Shepparton Climate Emergency Action Plan. The opportunities are organised and numbered based on the Strategic Priority areas they fall under. These opportunities were identified through evidence-based action planning and Council, community and stakeholder engagement. While some key advocacy actions are highlighted in the table, Council will support all actions through continued and targeted advocacy.

In the tables below, the Action column describes the action Council can take to support the community in reducing emissions and adapting to a changing climate. The Primary Benefit is the main advantage arising from the action, while the Co-benefit column lists some of the co-benefits that can be expected. Timeframe displays the estimated timing of each action. Impact represents an estimate of how impactful the action is expected to be in reducing emissions or enhancing climate resilience. The Cost column gives a high-level estimate of the annual cost.

Keys for ranges

Timeframes:

(S) Short

(M) Medium

(O) Ongoing

Scale of Impact

★★★ **High**

(systematic long-term change and/or impact beyond municipal scale and/or expected emissions reductions high)

★★ **Medium**

(municipal wide impact and/or addressing multiple emission sources and/or expected emissions reductions medium)

★ **Small**

(addressing small section of the community and/or minor emission sources and/or expected emissions reductions small)

Innovative solutions that require more research, feasibility studies and pilot projects to get a better understanding of potential cost and impact.

Indicative Annual Budget

$ - $1 to $50k

$$ - $50k to $150k

$$$ - $150k+

Table 1: Strategic Priority 1
Demonstrating Climate Change Leadership

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Advocate for greater climate action at federal and state levels						
1.1	Advocate for greater climate action at federal and state levels including better electricity infrastructure, net zero emissions transport options, and higher Environmental Sustainable Design (ESD) standards for new buildings	Emissions reduction	Leadership, Economic impact, Community resilience	S	★★★	Staff Time
1.2	Advocate for flood modelling to be a State responsibility to ensure consistency across LGAs	Reduced flood risk	Risk reduction	S	★★★	Staff Time
Support local innovative climate change solutions						
1.3	Support local businesses and farmers in trialling innovative climate change solutions	Emissions reduction	Leadership, Economic impact	O		Staff time
1.4	Investigate the potential of large scale solar on suitable agricultural land	Renewable energy	Energy security	M		Staff Time
1.5	Work with agencies and organisations to showcase best-practice in the regional agricultural sector	Renewable energy + emissions reduction	Leadership	S	★	Staff Time
1.6	Advocate for and investigate local net zero emissions community energy solutions (e.g. Solar PV, wind power)	Emissions reduction	Leadership, Energy security	S	★	Staff Time
1.7	Show leadership through new and innovative solutions for Council operations, eg Electric vehicles, recycled content in building materials	Emissions reduction	Leadership, Economic impact, Community resilience	S		Staff Time
1.8	Develop and implement the circular economy strategy	Emissions reduction	Leadership, Reduced waste	S	★★	Staff Time
1.9	Demonstrate Council commitment to responding to the climate emergency via public displays of actions, impacts and solutions in Council facilities and sharing learnings with the community.	Knowledge sharing	Leadership, Capacity building	O	★★	$ Staff Time

Table 1: Strategic Priority 1
Demonstrating Climate Change Leadership

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
1.10	Implement the Climate Emergency Communication and Engagement Strategy	Climate leadership	Knowledge sharing	S	★★	$ Staff Time
1.11	Support youth of Greater Shepparton to be informed and act on climate change	Knowledge sharing	Leadership, Capacity building, Community resilience	O	★★	Staff Time
1.12	Encourage and facilitate best practice sustainable and zero emission industrial development	Emissions reduction	Leadership, Economic impact	M		$$$
1.13	Investigate the feasibility of a green industrial precinct	Emissions reduction	Leadership, Economic impact	M		$$ Staff Time
1.14	Investigate the potential for supporting closed loop principles	Emissions reduction	Reduced waste to landfill, Capacity building	S		$$
1.15	Council recognises the primary interest and knowledge of Yorta Yorta Nation in relation to climate change and will work with Yorta Yorta Nation to incorporate this knowledge into Councils Climate Emergency Response	Healthy landscape	Knowledge sharing	S	★★★	Staff Time
1.16	Review Our Climate Safe Future actions and municipal target in 2025	Leadership, Capacity building, Community resilience	Knowledge sharing	M	★	Staff Time

Table 2: Strategic Priority 2
Accelerating the transition to net zero emissions communities

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Support residents and businesses in reducing emissions						
2.1	Improve communication and engagement with residents on net zero opportunities, in line with the Climate Emergency Communication and Engagement Strategy	Awareness raising	Emissions reduction, Community resilience	S	★	Staff Time
2.2	Support and promote new and existing energy efficiency and renewable energy programs to assist residents, students, renters and low socio-economic groups, to make their homes more energy efficient and heatproof.	Reduced heat impact	Community health and well-being, Reduced energy cost, Reduced emissions	M	★	Staff Time
2.3	Investigate programs to encourage landlords to install energy efficiency and renewable energy where tenants share the benefits	Emissions reduction	Energy efficiency, Reduced energy costs	M	★★	Staff time
2.4	Investigate the feasibility of a community climate change hub to act as a focal point for mitigation and adaptation solutions	Awareness raising	Leadership, Knowledge sharing	S		$$
2.5	Promote financial support for energy efficiency such as Environmental Upgrade Agreements (EUAs) and grants	Climate finance	Reduced energy costs, Energy efficiency	M	★★	Staff Time
2.6	Expand the EUA program to provide finance for energy efficiency and adaptation upgrades to both residential and commercial buildings	Climate finance	Energy efficiency, Community resilience	S	★★	Staff Time
2.7	Educate and support Council officers to embed climate change action into their existing work with businesses	Emissions reduction	Leadership, Network building, Knowledge sharing	S	★	$ Staff Time
2.8	Through partnerships, facilitate knowledge sharing and collaboration between commercial and industrial stakeholders (e.g. on topics such as group power purchase agreements, renewable energy)	Emissions reduction	Reduced energy costs, Knowledge sharing, Network building	O	★★★	Staff Time

Table 2: Strategic Priority 2
Accelerating the transition to net zero emissions communities

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Invest in sustainable and alternative transport						
2.9	Promote low emission transport options such as car sharing, commuter cycling, and public transport	Emissions reduction	Improved air quality, Reduced noise pollution, Improved mobility, Public health	M	★	$
2.10	Investigate the installation of electric vehicle and carshare infrastructure such as designated, accessible parking areas	Emissions reduction	Leadership, Improved mobility	M	★	$
2.11	Ensure new development and precinct plans include shaded areas to enable active transport, including network of bike paths in vegetated areas	Reduced urban heat	Community health and well-being, Resilient urban landscapes	S	★	Staff Time
2.12	Provide low emission/active transport infrastructure (bike lanes/electric bike charging stations)	Emissions reduction	Community health and well-being, Improved air quality	M	★★	$$$
2.13	Provide assistance and streamlining of electric vehicle charge point installation to third parties	Emissions reduction	Improved air quality, Leadership	M	★★	Staff Time
Help drive a circular economy						
2.14	Develop, adopt and implement circular economy strategy in partnership with community and business stakeholders	Emissions reduction	Circular economy	S	★★	Staff Time
2.15	Council to run a trial and review infrastructure design guidelines to require all building materials for roads, paths, kerb & channel, and concrete to use high recycled content to show leadership to the community and support a circular economy	Emissions reduction	Circular economy	M	★★	Staff Time

Table 2: Strategic Priority 2
Accelerating the transition to net zero emissions communities

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Regulate and enforce Green Building design						
2.16	Work within existing planning process to ensure a consistent standard of Environmentally Sustainable Design (ESD) for building applications	Energy efficiency	Reduced energy costs, Reduced emissions	M	★★	Staff Time
2.17	Increase the enforcement of National Construction Code (NCC) and planning requirements for new residential buildings and developments	Energy efficiency	Reduced energy costs	M	★★	Staff Time
2.18	Implement and enforce higher ESD standards for residential and commercial developments if approved by the planning minister (e.g. net zero emissions developments)	Emissions reduction	Reduced energy costs, Environmental protection, Energy efficiency	M	★★	Staff Time
2.19	Advocate for integration ESD principles in the Local Government Infrastructure Design Manual	Energy efficiency	Reduced heat impacts, Reduced energy cots	S	★	Staff Time
2.20	Promote performance or high energy rated buildings and ESD standards within the community	Energy efficiency	Reduced emissions, Energy efficiency	M	★	$
2.21	Investigate grants to support positive ESD outcomes in commercial developments	Emissions reduction	Reduced energy costs, Reduced emissions	M	★	Staff Time

Table 3: Strategic Priority 3
Building a climate-resilient community

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Reduce urban heat						
3.1	Increase urban tree canopy cover and enhance diversity of tree species, including with more climate resilient species that provide ecosystem services	Reducing urban heat	Improved biodiversity, Community health and well-being	O	★★	$$
3.2	Enhance open spaces such as parks and bus stops to provide further protection and relief from sun and extreme heat, including more sheltered and shaded areas and provision of drinking water stations	Reducing urban heat	Community health and well-being	O	★★	$$
3.3	Review the Landscape Plan Guide 2017 for Development Proposals in City of Greater Shepparton, the Shire of Campaspe and the Shire of Moira in line with the climate emergency declaration.	Reducing urban heat	Resilient urban landscapes, Community health and well-being	S	★★	Staff Time
Enhance the natural environment						
3.4	Continue to advocate for efficient utilisation of water resources including environmental health for the Goulburn and Broken rivers systems	Healthy waterways	Ecosystem protection, Increased Biodiversity	M	★★★	Staff Time
3.5	Actively monitor key habitat and native vegetation areas for new and invasive species	Healthy landscapes	Ecosystem protection, Increased Biodiversity	S	★★	$
3.6	Collaborate with neighbouring councils and the Goulburn Broken Catchment Management Authority to share weed management knowledge and experiences to prepare for emerging threats	Healthy landscapes	Knowledge sharing	S	★★	Staff Time
3.7	Undertake planning scheme amendments to strengthen the local planning policy of the Greater Shepparton Planning Scheme and the significance of native vegetation	Healthy landscapes	Ecosystem protection, Increased Biodiversity	M	★★	$$

Table 3: Strategic Priority 3
Building a climate-resilient community

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
3.8	Work in partnership with Yorta Yorta Nation to investigate and implement traditional burning practices for biodiversity outcomes on Council owned land	Healthy landscapes and reduced fire risk	Ecosystem protection, Increased Biodiversity	O	★★	$
3.9	Work in partnership with Yorta Yorta Nation to foster respect for and connection to Country	Healthy landscapes and reduced fire risk	Knowledge sharing	O	★★	Staff Time
3.10	Advocate to the state government to strengthen the planning scheme to protect and enhance the extent of native vegetation	Healthy landscapes	Biodiversity, Carbon sequestration	O	★★★	Staff Time
3.11	Provide access to information on the benefits of retaining native vegetation and biodiversity	Healthy landscapes	Knowledge sharing, Biodiversity, Ecosystem protection	M	★★	Staff Time
3.12	Continue to support the Goulburn Murray Irrigation District Regional Resilience Strategy to increase the resilience of natural assets in the Greater Shepparton region	Healthy landscapes	Biodiversity, Carbon sequestration	S	★★	Staff Time
Reduce urban flood risk						
3.13	Work with partners to enhance flood warning and emergency response	Emergency Management	Reduced flood risk, Community health and well-being	S	★★★	$
3.14	Develop and implement integrated water management plan for Greater Shepparton, including stormwater, drainage, sustainable water use and re-use to reduce stormwater runoff and mitigate road flooding	Reduced flood risk	Water efficiency	M	★★	$$
3.15	Maintain accurate and up to date flood modelling, in line with climate science and projections for the region	Reduced flood risk	Emergency Management, Community health and well-being	O	★★★	$

Table 3: Strategic Priority 3
Building a climate-resilient community

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Build community resilience to new climate risks						
3.16	Review location, capacity and accessibility of 'cool places' within the community to ensure accessibility to vulnerable residents across the LGA	Community health and well-being	Community health and well-being	S	★★	$
3.17	Enhance recruitment drive for more volunteers to assist with emergency events	Community Resilience	Emergency Management, Community health and well-being	S	★	$
3.18	Develop a community awareness campaign to educate the community in preparedness, including to new climate risks	Community Resilience	Emergency Management, Community health and well-being	S	★★	$
3.19	Investigate the opportunity to strengthen local planning provisions to increase community climate resilience.	Reducing urban heat	Reduced energy usage, Reduced flood risk	S	★★	Staff Time
3.20	Advocate to the state government to continue to support vulnerable community members to make improvements to their homes to better cope with extreme weather	Community health and well-being	Emissions reduction, Reduced energy costs, economic benefit	S	★	Staff Time
3.21	Support introduction of community batteries and micro-grids to provide increased resilience to short-term power outages for local residents and businesses	Energy security	Emissions reduction, Reduced energy costs	M	★★	Staff Time
3.22	Integrate climate adaptation into development of community plans	Community Resilience	Emergency Management, Community health and well-being	S	★★	Staff Time

Table 3: Strategic Priority 3
Building a climate-resilient community

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
3.23	Expand community grants program to provide ongoing support to the Greater Shepparton community to implement projects that build resilience to climate change and reduce emissions and other environmental impacts	Community Funding	Energy Efficiency, Community resilience	S	★	$
3.24	Advocate for the Infrastructure Design Manual, Urban Design Manual and Landscape Guidelines to require increased climate resilient liveability outcomes - cycling paths, shared path connections, bus transport, green spaces and to reduce car usage	Community Resilience	Community health and well-being, Emissions reduction,	S	★★★	Staff Time
3.25	Review the Heatwave Plan, Fire Management Strategy and Flood Emergency Management Plan	Community Resilience	Emergency Management, Community health and well-being	O	★★	Staff Time
3.26	Improve access to reliable, easy to understand climate change data and projections to inform community planning and action	Climate data	Climate risk reduction, Community resilience	M	★★	Staff Time

Table 4: Strategic Priority 4
Supporting a thriving, climate smart local agricultural sector

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Improve land management practices to reduce climate impacts on agriculture						
4.1	Maintain knowledge on best practice sustainable agricultural policies, practices, and technologies	Emissions reduction	Reduced emissions	S	★	Staff Time
4.2	Provide access to information on current and emerging smart agriculture initiatives to farmers and other relevant stake-holders	Emissions reduction + regenerative agriculture	Reduced emissions, Knowledge sharing	O	★	Staff Time
4.3	Continue to work with the Goulburn Murray Climate Alliance to utilise tools and outcomes from programs such as the Climate Smart Agriculture Development Program into strategic planning and regional investment	Climate resilient agriculture	Water efficiency, Land productivity	S	★★	$
Reduce agricultural emissions						
4.4	Partner with other agencies and organisations to facilitate knowledge sharing on sustainable agriculture topics (carbon farming, low methane feedstock, large scale solar and more)	Renewable energy + emissions reduction	Improved soil quality, Biodiversity	M	★★	Staff Time
4.5	Work with partners to investigate feasibility of utilising agricultural by-products for high value products including as a source of energy (incorporating closed loop system)	Waste reduction	Circular economy, Supplementary income	S		$
Buy local						
4.6	Stock council owned food service outlets and events with locally grown foods where possible to reduce emissions from food miles and show leadership	Emissions reduction	Circular economy, Promotion of local produce, Leadership	S	★	Staff Time

Table 4: Strategic Priority 4
Supporting a thriving, climate smart local agricultural sector

Action ID	Action	Primary Benefit	Co-benefits	Timeframe	Scale of Impact	Resources
Advocacy and support						
4.7	Continue to work with the state government and the community to resolve the approval and capacity for large scale renewable energy generation.	Renewable energy	Supplementary income	M	★★	$
4.8	Continue to advocate for efficient utilisation of water resources into the future	Water security	Economic security, Environmental protection	S	★★★	Staff Time
4.9	Work with partners and support existing groups such as AgVic, local growers groups, universities and LandCare network to educate farmers on carbon farming solutions	Carbon sequestration	Supplementary income, Improved soil quality, Biodiversity	S	★	Staff Time
4.10	Support farmers and landowners access to regional and state government programs such as the Victorian Carbon Farming Program	Climate Finance	Improved farm management practices	S	★	Staff Time
4.11	Advocate to local and regional education partners to in-crease agriculture and land management knowledge, including on whole of property planning approaches, AgTech, precision agriculture, nutrient budgeting and other emerging practices	Climate resilient agriculture	Improved farm management practices, Water efficiency, Reduced inputs	S	★★	Staff Time

9.

Glossary

Adaptation: Adapting to climate change is adjusting to current or expected climate change and its effects. Adaptation helps individuals, communities, organisations and natural systems to manage the impacts of climate change. It involves taking practical actions to adjust to the changing climate which protect and build our resilience.

Aspirational Target: An aspirational target typically involves something memorable or easy to communicate. It may not consider if this target is necessary, or what is needed to achieve the target. The primary motivation for this target is to establish a common rallying point, motivate stakeholders and provide a common dialog about definitions of success.

Australian Renewable Energy Agency (ARENA): ARENA is a government funded agency to support the transition to renewable energy in Australia. The organisation provides support for sustainability innovation projects by supplying funding, research grants and education resources for renewable energy projects.

Business-As-Usual (BAU): In the context of climate change mitigation, BaU refers to the normal trajectory of the uptake of actions that impact or respond to global warming. Essentially, these are the actions that we expect will occur without additional directed action to reduce emissions or respond to climate change.

Biodiversity: Biodiversity is the biological variety and variability of all forms of life on earth. This includes the individual plants and animals that form our ecosystems, and the variation of these ecosystems as a whole. Biodiversity is both essential for our existence and intrinsically valuable in its own right because it offers the fundamental building blocks for the many goods and services that a healthy environment provides.

Capacity building: The process in which individuals, communities or organisations improve or obtain skills and knowledge, and learn how to effectively use tools, equipment, and resources to ensure they have sufficient capability to deal with the impacts of climate change[22].

Carbon credit: An instrument that represents ownership of one metric tonne of carbon dioxide equivalent that can be traded, sold, retired, etc. If a company is regulated under a cap-and-trade system, they most likely have an allowance of credits they can use toward their cap. If they use fewer emissions (credits) than they are allocated, they can trade, sell, hold, or do whatever they like with the credit. Please also see relevant information under carbon offsets below.

Carbon offsets: Offset units are used to compensate for emissions an organisation produces and to bring their carbon footprint down to zero. Offset units are generated by projects that reduce, remove or capture emissions from the atmosphere such as reforestation, renewable energy or energy efficiency. Carbon credits and carbon offsets both represent the emission of a certain amount of carbon into the atmosphere. But carbon credits represent the right to emit that carbon, whereas carbon offsets represent the production of a certain amount of sustainable energy to counterbalance the use of fossil fuels. So a carbon offset derived from a third-party certified project usually generates a carbon credit.

Carbon sequestration: The long-term storage of carbon in plants, soils, geologic formations, and the ocean.

Circular economy: A system in which all resources are highly valued and remain in the system through Re-Use, Re-Purposing and Recycling. It also tends to prefer keeping this economy wholly local, and utilising what is available locally.

22 https://climate-adapt.eea.europa.eu/metadata/adaptation-options/capacity-building-on-climate-change-adaptation#:~:text=Capacity%20building%20is%20often%2C%20if,to%20do%20their%20work%20competently.

Climate change and global warming: These are the changes in the state of the climate that can be identified and persist for an extended period, typically decades or longer. Normally, we compare this change against the climate during the pre-industrial, before fossil fuels were released in great quantities. These changes in the climate may be natural, such as through variations in the solar cycle. Human activities have been the main driver of climate change since the 1800's, primarily due to burning fossil fuels like coal, oil and gas. Burning fossil fuels generates greenhouse gas emissions that trap heat against the Earth, trapping the sun's heat and causing global warming[23].

Climate Emergency declaration: Is a response by governments world-wide to the catastrophic changes to the climate brought about by human activity that poses a dangerous threat to all life on the planet. This declaration is an admission that humanity is in a Climate Emergency and is a way to set priorities to mitigate and adapt to climate change.

Closed loop principle: This is process in which a product or material can used, reused and then turned into new products or materials indefinitely without losing its qualities during the process or recycling or reuse. It can also be converted back into raw material. For example, an aluminium can be recycled to create new cans with little material degradation or waste as part of the process.

Community batteries: Community batteries are larger sized battery units embedded in the network that allow for shared battery storage. Community batteries enable customers to store the excess power generated during the day by their rooftop solar cells for use later in the evening, when demand on the electricity network is higher. It means that customers can use more of the power that they generate. This drives down energy bills for participating customers, lessens dependence on coal-powered energy, and helps stabilise the flow of energy on the grid[24].

Community emissions: Community emissions are the total sum of emissions that a city, region or municipality produces. This includes emissions associated with all sectors present within a community such as transport, industry, commercial and residential.

CO2e: Also known as 'carbon dioxide equivalent', this is a measure used to quantify the emissions associated with various greenhouse gases on the basis of their global warming potential. CO2e is a measure that was created by the United Nations' Intergovernmental Panel on Climate Change (IPCC) in order to make the effects of different greenhouse gases comparable because every gas has a different global warming potential[25].

COP26: The UK hosted the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow on 31 October – 13 November 2021. The COP26 summit brought parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change.

Ecosystem services: Natural systems that directly or indirectly benefit humans or enhance social welfare.

Emissions abatement: The reduction of the amount of greenhouse gases that are produced when fossil fuels are burned or harvested. This reduction occurs due to the actions of our community and goes beyond a business-as-usual scenario.

Emissions Reduction Fund (ERF): The Emissions Reduction Fund (ERF) is a voluntary scheme that aims to provide incentives for a range of organisations and individuals to adopt new practices and technologies to reduce their emissions. It works by allowing participants to earn carbon credit units off these practices, which can then be sold to create income.

23 https://www.un.org/en/climatechange/what-is-climate-change

24 https://www.endeavourenergy.com.au/your-energy/batteries-explained

25 https://klima.com/blog/CO2-vs-CO2e-what-is-the-difference/

Emissions reduction: Reducing the amount of greenhouse gases emitted into the atmosphere from human activities.

Energy efficiency: Energy efficiency essentially means using less energy to perform the same task. For example, energy efficient appliances such as refrigerators or air conditioners can perform the exact same function while using less electricity, which means CO2e emissions and money can be saved.

Energy security: Energy security relates to how the power system or electricity grid reacts to events that may influence it, including the grids capability to react to and recover from events such as faults[26].

Environmentally Sustainable Design (ESD): Design of buildings and infrastructure that meets the needs of owners, occupants and the environment through high performance, energy and resource efficiency. ESD aims to reduce impacts on the environment in the construction and use of buildings and improve the comfort of the inhabitants.

Environmental Upgrade Agreements (EUAs): Also known as Environmental Upgrade Finance, EUAs are a type of loan that are available to businesses and homeowners to make their properties more sustainable and climate resilient. The funding can be used for things such as energy efficiency upgrades or installation of home sprinklers for bushfire protection. Under these loans, lenders (financial institutions) provide finance to the property owner for the upgrade and the property owner repays the loan through council rates.

Extreme heat: Typically categorised as temperatures over 35 degrees Celsius, extreme heat refers to high temperatures that are much hotter or humid than average. Because average temperatures vary across the world, this is a relative measure.

Forest Fire Danger Index: Is a measure developed by the CSIRO that takes into account vegetation dryness, air temperature, wind speed and humidity to communicate fire risk.

Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC): Created by a partnership of leading sustainability organisations, the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC) provides a robust framework for accounting and reporting community greenhouse gas emissions. It is a city's tool to calculate city-wide greenhouse gas emissions and use this inventory to support climate action planning.

Greenhouse Gas (GHG) Emissions: These are emissions released by the process of consuming fossil fuels and the production of materials. Through the process of the greenhouse effect, these gases remain in our atmosphere and trap the sun's heat, increasing the temperature of the earth. Greenhouse gases refer to the sum of seven gases that have direct effects on climate change: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The data are expressed in CO2 equivalents (CO2e) and refer to gross direct emissions from human activities[27].

Intergovernmental Panel on Climate Change (IPCC): The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change. As a branch of the United Nations, it was created to provide policymakers with regular scientific assessments on climate change and it's implications and future risks. As an authoritative global body, it also suggests various adaptation and mitigation options to reduce the impacts of climate change.

26 https://www.cleanenergycouncil.org.au/advocacy-initiatives/energy-transformation/energy-security

27 https://data.oecd.org/air/air-and-ghg-emissions.htm

Low methane feedstock: As 15% of the world's total greenhouse emissions come from livestock production, finding ways to make animal farming more efficient, and reduce emissions is very important. Livestock produce methane, which is a greenhouse gas almost 28 times more powerful than carbon dioxide. There have been trials undertaken by the CSIRO using a seaweed-based feedstock, and it was found that not only did the seaweed drastically reduces the greenhouse gas contribution from agriculture, but there is also a strong indication it increases livestock productivity.[28]

Microgrid: A microgrid can be defined as an independent power network that uses local, distributed energy resources to provide grid backup or off-grid power to meet local electricity needs. At the most basic level, microgrids are "micro" (small) and offer a "grid" (an interconnecting system of links).[29]

Mitigation: Climate change mitigation is about reducing or eliminating the causes of climate change. While this includes actions such as reducing emissions that increase the greenhouse effect, they also include those that can capture and sequester carbon from the atmosphere.

Net zero emissions: Refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere.

The Paris Climate Conference and the Paris Agreement: Approved by 196 parties, including the European Union, at COP21 in Paris in 2016, the Paris Agreement refers to a set of goals to reduce emissions with the ultimate goal of preferably limiting global warming to 1.5 degrees Celsius compared to pre-industrial levels, and ultimately limit global warming to 2 degrees.

Power Purchase Agreement (PPA): A PPA is an agreement between an independent power generator and a purchaser for the supply and sale of energy. Normally, this will be between a large organisation, such as a city council or company and a renewable energy electricity supplier such as a local wind farm. PPAs ensure that all the electricity purchased comes from a specific source at an agreed price.

Renewable energy: Renewable energy is energy that is collected from renewable sources that are naturally replenished or infinite. These sources include sunlight, wind, water and geothermal heat. Energy can be harnessed from these on a small (residential) medium (community) or large (commercial) scale to provide energy that does not produce any emissions in its creation.

Resilience: Resilience is the capacity of an asset, individual or community to absorb the acute and built-up shocks and stresses associated with climate change. It also includes our ability to 'bounce-back' or respond to climate change.

Solar PV: Solar PV, or solar photovoltaics are the rooftop solar panels you see on homes and businesses, producing electricity from solar energy (the sun) directly.[30]

Virtual Power Plant (VPP): A VPP is a network of decentralised, power generating units such as wind farms, solar parks and energy storage solutions that can be used to supply electricity either back to a grid or directly to a community. Virtual power plants allow renewable energy to be injected into the grid with lightning speed to address frequency and voltage imbalances, local disruptions or disturbances and keep the network stable.[31]

28 https://www.csiro.au/en/research/animals/livestock/futurefeed

29 https://microgridnews.com/what-is-a-microgrid/

30 https://theconversation.com/explainer-what-is-photovoltaic-solar-energy-12924

31 https://arena.gov.au/blog/what-are-virtual-power-plants-and-why-do-they-matter/

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