



ATTACHMENTS

**Under Separate Cover
Council Meeting**

6.00pm Tuesday 27 April 2021

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Emissions Reduction Action Plan

**A plan to reduce Golden Plains Shire Council's
corporate greenhouse gas emissions to net zero**



Purpose

To provide Council with an overview of:

- The ‘emissions landscape’
- Where Golden Plains Shire Council is now in relation to emissions
- What we are doing already

To ask Council to support:

- Revising our net-zero emissions date
- Agree to the purchase of carbon offsets

Overview of how we will do this:

- Organise the purchase of carbon offsets
- Work with teams across Council to identify and prioritise specific actions to reduce emissions
- Investigate tools to capture and track our electricity and emissions data



Emissions Reduction Action Plan

Golden Plains Shire Council commissioned Ironbark Sustainability to develop a plan for the organisation to reduce emissions to net zero. This was based upon:

- Paris Agreement – a legally binding international treaty on Climate Change
 - By 2050 limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels
- Victorian State Government Targets
 - Inline with the Paris agreement - net zero for the state by 2050
- Councils Environment Strategy 2019-2027
 - Council is a zero-net emissions organisation and the community is low carbon by 2040



How are we looking to achieve this?

- Understand our own emissions
- Emissions are defined as:
 - Scope 1 – Directly emissions from owned or controlled sources
 - Scope 2 - Indirect emissions from the generation of purchased energy
 - Scope 3 - All indirect emissions (not included in scope 2) that occur in the value chain of the Council
- What are our Scope 1 and 2 emissions?
 - 2,015 tCO₂-e (tones of Carbon Dioxide equivalent)
 - However, it is worth noting that we have gaps in our data so that this number is likely an underestimate

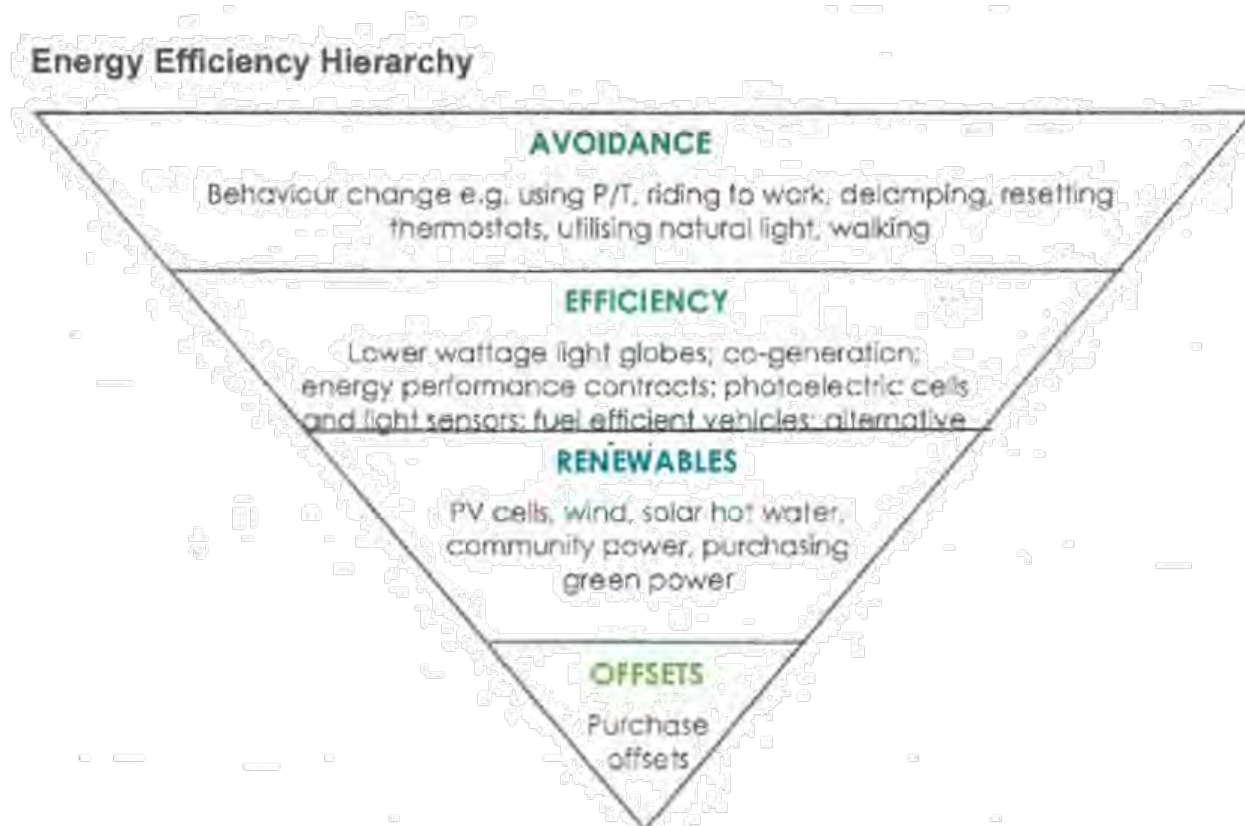


Data Capture

- Capturing electricity and emissions data currently is very difficult
- Systems to capture data exist (Azility, envizi, etc)
- Other Councils in the Barwon South West Region are currently looking into them



Hierarchy to reduce emissions



Options to reduce emissions

- Local Government Power Purchase Agreement
- Onsite Solar
- Environmentally Sustainable Design (ESD) guidelines for new buildings
- Energy Efficiency audits to identify specific emission profiles
 - This allows upgrades to existing buildings to lower emission profiles
- Street, Parks and Sports lighting LED upgrades
 - LEDs are longer lasting and more efficient compared with traditional metal halide lights typically used in large scale lighting.
- Fleet upgrades
- Offsets
 - A carbon offset is a reduction in emissions of carbon dioxide or other greenhouse gases made in order to compensate for emissions made elsewhere.



Emissions reduction activity: Building and Planning

- Energy efficiency audits in Council buildings
- Develop an Environmentally Sustainable Development (ESD) Policy
- Onsite Solar

Potential Action	Details	Estimated Upfront Cost (\$)	Estimated Payback Period
Onsite Solar	Bannockburn Cultural Centre 40kW Solar System (or equivalent); and assuming 25kW per year next 2 years targeting high daytime use facilities	170,000	6
Energy efficiency in buildings	Roll out energy efficient actions across Council sites	62,000	9
ESD Guidelines	Develop ESD Policy	75,000	9



Emissions reduction activity: Lighting

- Street Lighting LED upgrades
- Open space, parks and sports lighting

Potential Action	Details	Estimated Upfront Cost (\$)	Estimated Payback Period
Street lighting LED upgrades	Replace streetlights to LED and look at smart lighting options where possible	386,000	8
Open space, parks and sports lighting	Replace lights to LED and look at smart lighting options where possible	23,000	8



Emissions reduction activity: Fleet

- Develop a sustainable fleet policy

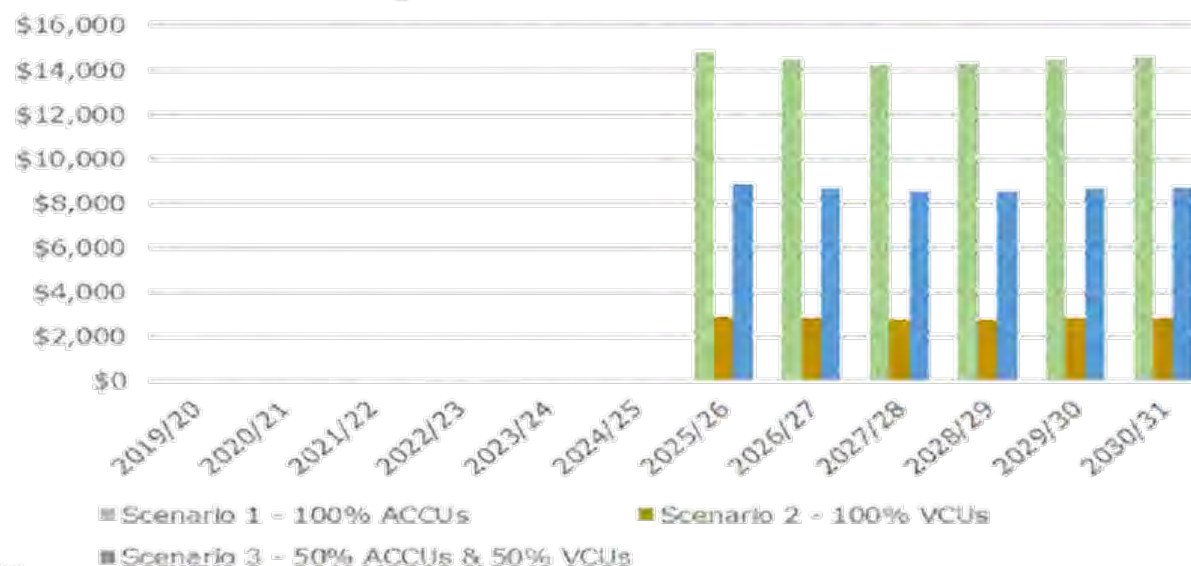
Potential Action	Details	Estimated Upfront Cost (\$)	Estimated Payback Period
Sustainable Fleet Operations Strategy	Develop sustainable fleet policy (includes driver training)	25,000	4



Offsets

- What are carbon offsets
- Verified Carbon Units (VCUs) and Australian Carbon Credit Units (ACCUs)
- Timelines to achieve net-zero emissions through the purchase of offsets

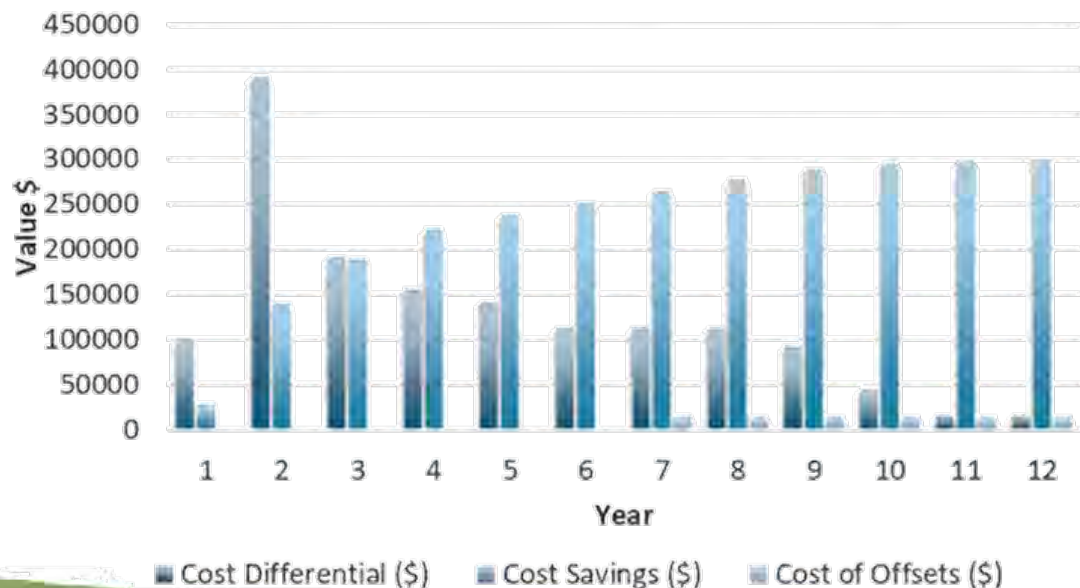
Projected Cost of Offsets



Costs and savings

- Projected cost of all actions: \$1.58 million (including offsets) over 12 years
- Projected savings of all actions: \$2.8 million over 12 years

Estimated costs and savings of ERAP



Council Pledge

- The [Climate Change Act 2017](#) legislates a target of net zero emissions by 2050 and emissions from the activities and operations of the Victorian Government
- Voluntary council pledges are associated with actions that will reduce emissions related to the performance of a council's powers and duties under the *Local Government Act 2020*
- This emissions reduction action plan is an example of a pledge we could make



Neighboring Councils

- Surf Coast Shire Council – ~16000 tCO₂-e, considering going carbon neutral in 2022.
- City of Greater Geelong - ~43,000 tCO₂-e, carbon neutral operations by 2025
- City of Ballarat ~42,000 tCO₂-e, carbon neutral by 2025
- Barwon Water (water corporation) - ~40,000 tCO₂-e, 100% renewable electricity by 2025 and net-zero by 2030.



Proposed way forward

In the April Council meeting Council officers will recommend:

- Based on the Ironbark Emissions Report Council approves the change of our corporate net-zero emissions date to from 2040 to 2026
- Council approves that \$10,000 is allocated from the Environment and Sustainability budget annually to purchase a mix of VCS and ACCU carbon offsets from 2025.
- Make a voluntary council pledge under the Climate Change Act for the above actions

The Environment and Sustainability team will

- Work with teams across Council to promote the Ironbark report and prioritise actions to reduce emissions
- Work with staff in Finance, IT and Facilities management to investigate tools to capture and track our electricity and emissions data





Golden Plains Shire Council Greenhouse Gas Emissions Reduction Plan





Prepared for

Golden Plains Shire Council

Version	Author	Date	Description of changes
V0a-f	Hannah Snape / Ronald Lee	24/04/2020	Draft Report and review
V1a	Ronald Lee	21/5/2020	Release Copy
V1b	David Collins/Ronald Lee	8/6/2020	Second release copy
V1c	David Collins	10/08/2020	Minor revisions

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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.



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1. Executive Summary

In 2019 Council engaged Ironbark Sustainability to develop the essential elements for a corporate greenhouse gas (GHG) Emissions Reduction Action Plan. The analysis included a corporate GHG emissions inventory for the baseline year 2018/19; analysis of appropriate emissions reduction targets for Council to 2030/31; and an understanding of the costs associated with various pathways.

Underpinning GHG emissions reduction target setting for governments is the Paris Agreement. 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 higher than pre-industrial levels. On this basis, the Victorian State Government has established a target of net zero emissions target by 2050 and there are currently thirty-three Victorian councils with zero carbon corporate operations targets.

This report is based on the above policy context and considers four pathways which sets the scene for Golden Plains Shire Council's proposed GHG emissions reduction target. The four pathways considered are:

- **Business-as-usual (BaU)** – this provides the GHG emissions trajectory if Council were to do nothing. This pathway includes the purchase of 100% of electricity through the Victorian Local Government Power Purchase Agreement (LGPPA) (See Figure 2).
- **Science-derived target (SDT) trajectory** - representing the minimum that Council should be aiming for to do its fair share of supporting Australia's commitment to the Paris Agreement and maintain global warming to within 2°C on pre-industrial levels, aiming for 1.5°C.
- **Net zero emissions by 2040/41** – Council's existing target for its organisational emissions. Comparing to Victorian councils surveyed with a zero-carbon target, Golden Plains Shire Council's current goal of net zero emissions by 2040 places Council in the bottom 30th percentile of this group.
- **Net zero emissions by 2025/26** – Proposed best practice target for Council in line with leading councils in Australia.

Figure 1 shows the emissions trajectory of the four pathways. If Council were to do nothing (BaU – brown line), the planned LGPPA expected to come online in 2023/24 will still mean that Council will exceed the SDT and achieve reductions of 46% on 2018/19 levels by 2030/31. The net zero emissions pathways have different future cost implications due to the ongoing annual budget required for the purchase of offsets to maintain net zero emissions. It should be noted that any council in Australia that currently achieves corporate carbon neutrality must do so with the use of carbon offsets.

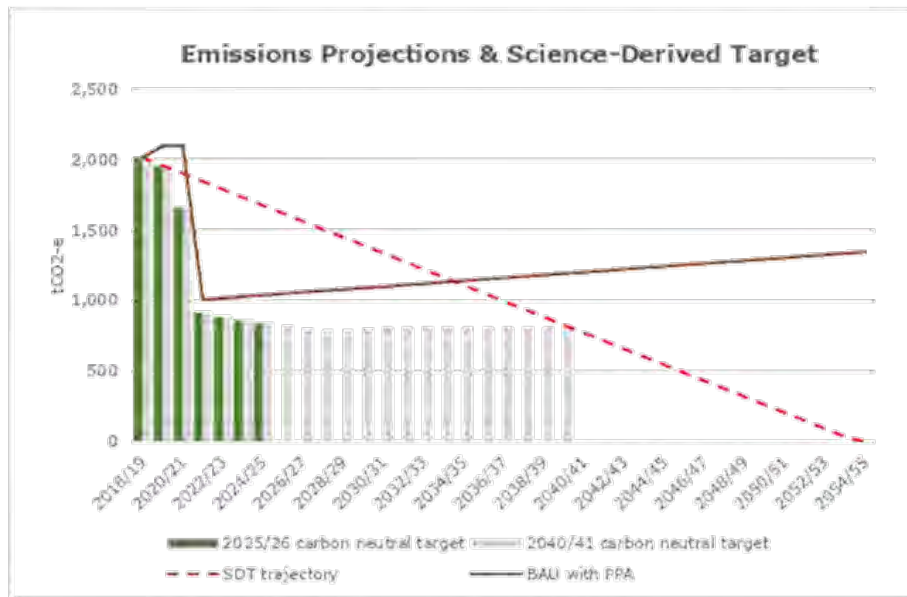


Figure 1: Emissions projections & science-derived target trajectory

1.1 Pathway Development Process

Modelling was prepared for the BaU trajectory for Council’s emissions which provides the GHG emissions trajectory if Council were to do nothing. This was then overlaid with planned actions to reduce emissions, including the purchase of 100% of electricity through the Victorian LGPPA. The BaU trajectory for Council’s emissions is at Figure 2.

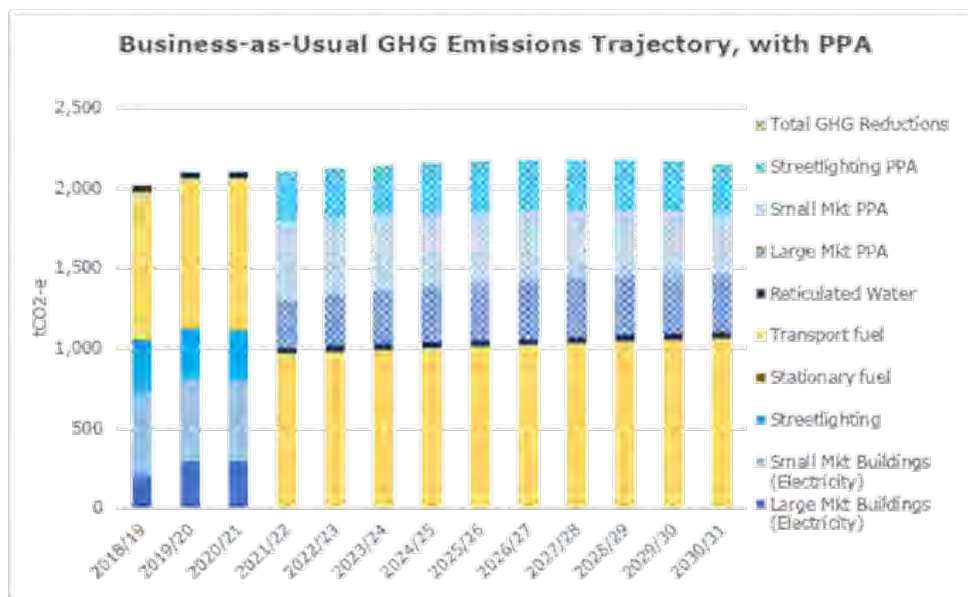


Figure 2: Golden Plains Shire Council business-as-usual trajectory considering PPA



Through a process of consultation with key Council stakeholders, opportunities to reduce emissions were identified and a cost-benefit analysis was prepared for the duration of the plan. Emissions reduction actions in this action plan include:

- Solar PV installations on key Council buildings;
- Energy efficiency measures in buildings;
- Ecologically Sustainable Development (ESD) Guidelines;
- Street lighting LED upgrades;
- Parks and open space lighting upgrades;
- Fleet upgrades to electric and petrol hybrid electric vehicles; and
- Sustainable Fleet Operations Strategy, incorporating actions such as driver training.

If Council is to implement the full scope of the action plan, emissions reductions of 60% (on 2018/19 levels) and total savings of \$2.8 million by 2030/31 can be achieved.

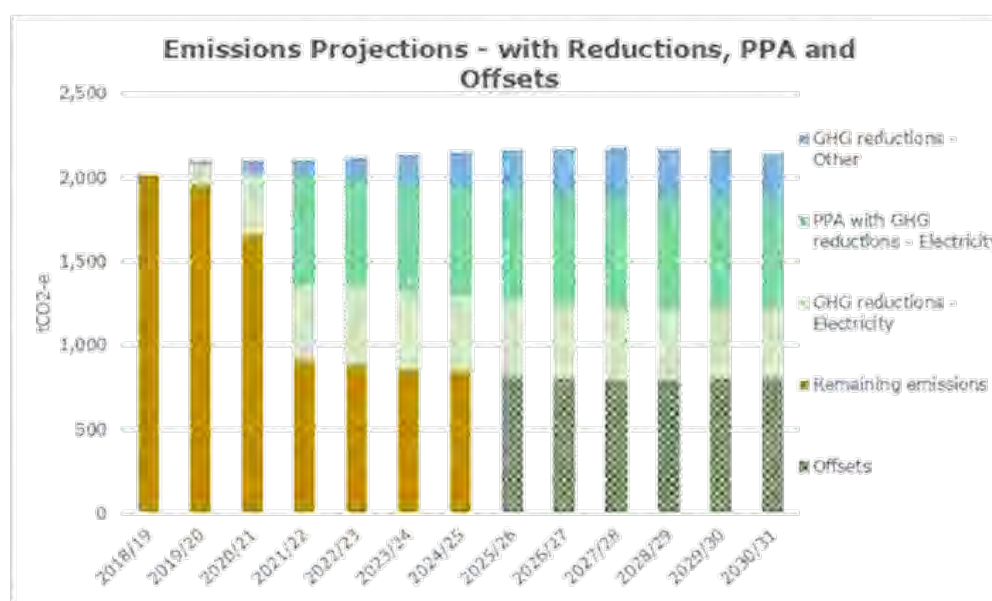


Figure 3: GHG emissions pathway, net zero emissions from corporate operations by 2025/26

Council has requested Ironbark model a pathway for achieving net zero emissions from corporate operations by 2025/26. This proposed target is more ambitious than Council's existing target of net zero emissions by 2040/41 and aligns Council with carbon neutral goals of leading Victorian councils. Net zero emissions would be achieved by:

- Purchasing 100% electricity through the Victorian LGPPA (as planned);
- Implementing all emissions reductions actions to achieve an additional 34% emissions reductions; and
- Purchasing carbon offsets to cover the remaining emissions – approximately 800 t CO₂-e (tonnes of carbon dioxide equivalents) per annum.



To achieve and maintain this target to 2030/31, Council would reduce its cost savings from \$1.22 to \$1.29 million through the purchase of offsets.

The net zero emissions pathway by 2025/26 is shown at Figure 3.

1.2 Recommendations and Next Steps

The key recommendations for Council are summarised below:

- Based on the analysis provided in this report, including the corporate science-derived target, benchmarking and predicted impact of actions with positive financial outcomes, it is recommended that Council revise its targets to achieve:
 - 30% emissions reductions on 2018/19 levels by 2025/26 through the implementation of the action plan in this report;
 - 100% electricity from renewable sources by 2025/26 through the procurement of LGPPA.
- Seek Council endorsement and budget commitment to deliver this action plan;
- Closely consider the role of offsets, net zero emissions and Climate Active certification in Council's future climate planning. In particular, this should include the consideration of how the money spent on such actions could instead contribute to real, local action via community programs;
- If Council is seeking to align with the Climate Active guidelines, Council will need to review its emissions boundary and start accounting for additional emissions sources deemed relevant under the standard;
- Set up action plan monitoring system to ensure progress is on track to meeting the target;
- Perform 3-year strategy reviews to ensure Council's target is aligned to the latest research and climate science. Revise if necessary.



2. Introduction

Within the Victorian Local Government Act 2020, an overarching governance principle for councils is that:

'the economic, social and environmental sustainability of the municipal district, including mitigation and planning for climate change risks, is to be promoted'.

This sets the scene for councils to look at emissions of both the whole district and their own operations. This plan is focused on the operational emissions of Golden Plains Shire Council as an organisation and the steps that can be taken to reduce them.



In January 2019 Golden Plains Shire Council endorsed the Golden Plains Shire Environment Strategy 2019-2027 (the Environment Strategy). This strategy provides a framework for the management of various aspects of the Golden Plains environment. Theme 4.2 of this strategy is focussed on climate change adaptation and mitigation and key actions under that theme are:

- Develop a Climate Change Action Plan; and
- Reduce Council Emissions.

Council engaged Ironbark Sustainability to prepare a corporate greenhouse gas (GHG) emissions inventory, calculate science-derived target (SDT) for Council's corporate operations and deliver an action plan for emissions reductions.

Council's corporate inventory for 2018/19 was developed with the intent of setting a baseline to which Council's corporate emissions can be reduced and measured to mitigate the effects of climate change. A science-derived target was also developed to set the context for the minimum Council should do to support global efforts. The process undertaken by Ironbark and results of the analysis are presented in this report.





3. Goals, Objectives and Targets

As stated in the Environment Strategy, the overarching goal for this action plan is to,

Foster a community that understands the impacts of climate change, responds positively to future climatic conditions and actively reduces their greenhouse emissions.

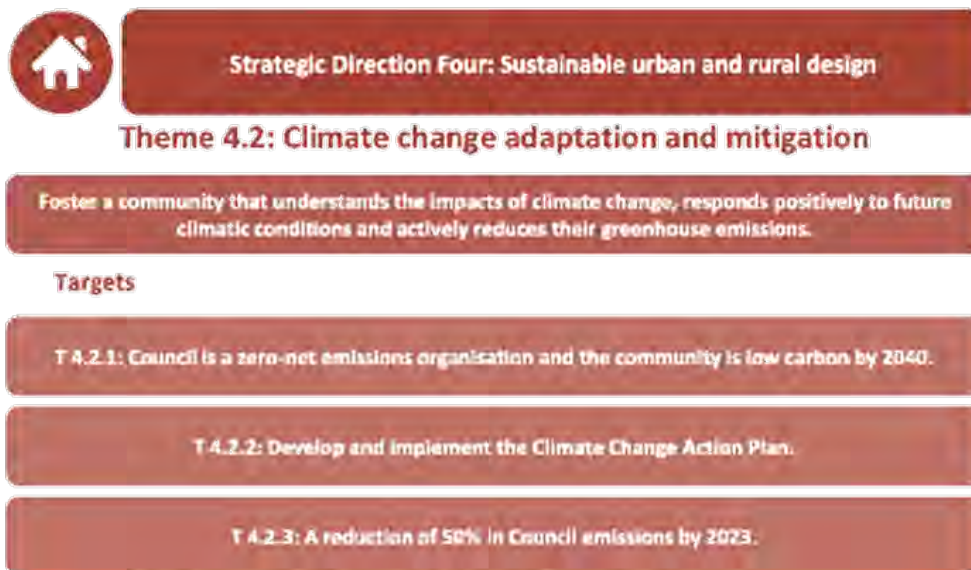


Figure 4: Excerpt from Golden Plains Shire Environment Strategy 2019-2027

The focus of this action plan is on the mitigation component of that goal and on Council's corporate emissions.

The Council Plan for 2017-2021 states that Council are going to:

- Plan, resource and strengthen Council and community capacity to effectively respond to current and future challenges related to the natural environment including climate change, water, biodiversity and emergency management; and
- Aim to further reduce the volume of waste going to landfill and explore innovative waste management and resource recovery mechanisms through regional partnerships.

With core actions including:

- Support and encourage community resilience to respond to a changing climate and the impact of natural disasters; and
- Define a pathway to achieving carbon neutrality for Council operations.



3.1 Action Plan Objectives

In this report, Council has requested an action plan to achieve net zero emissions by 2025/26 in line with some of the leading councils as detailed in Table 3. The objectives for this action plan have been summarised based on background research and ongoing consultation with Council's Sustainability Team:

- Understand the resource and budget implications of achieving best practice emissions reduction targets;
- Provide leadership to the community in achieving emissions reductions;
- Make better decisions on fleet upgrades and undergo a transition towards an electrified fleet over a period of ten years;
- Complete the transition of Council's streetlights to energy efficient alternatives;
- Ensure solar photovoltaic (PV) installations are on all major buildings and new buildings;
- Use the opportunities presented by the projected growth of the Bannockburn area to deliver sustainable public spaces, infrastructure and street trees; and,
- Demonstrate collaboration between Golden Plains Shire Council and the community and/or other government agencies on tackling climate change.

3.2 Emissions Reduction Targets

Council has stated preliminary targets of achieving:

- Net zero emissions for corporate operations by the year 2040; and
- Interim targets have also been stated, for meeting a 25% reduction in emissions from corporate operations by the year 2021 and a 50% reduction in emissions by 2023.

At the time of this report, the baseline year had yet to be established. As part of this work, the 2018/19 GHG emissions inventory developed by Ironbark will form the baseline for Council.

Ironbark has calculated the remaining carbon budget allocated to Council. This provides an understanding of the required rate of emissions reductions, based on leading science by the Intergovernmental Panel on Climate Change (IPCC). It also aligns Council's efforts with those stated under the Paris Agreement, to which Australia is signatory. The Paris Agreement explicitly references the role of cities in reducing GHG emissions.

3.2.1 Background to Science-derived Targets

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 higher than pre-industrial levels. This Paris Agreement, entered into force on 4 November 2016, explicitly recognises and engages local and subnational governments and their critical role in supporting the transformation, including setting goals and strategies aligned with the science.

Climate science tells us that warming beyond 1.5°C threshold is likely to have increasingly severe social, economic and environmental impacts, not





least on a water scarce continent like Australia. As of October 2018, the IPCC announced that there were no longer any scenarios for remaining within this temperature increase-range without the use of carbon removal technologies.

In becoming a signatory to the Paris Agreement, Australia now has a limited, established carbon budget within which to operate in order to meet its commitment. The development of science-derived targets for councils enables us to understand the scale of action that is required at a municipal level to stay within this budget.

An emissions reduction target for an organisation, entity or community is considered "science-derived" or "science-based" when it is aligned with the broader emissions reduction required to keep global temperature increase below 2°C compared to preindustrial temperatures, as described in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

3.2.2 Golden Plains Shire Council Carbon Budget

The carbon budget for Golden Plains Shire is outlined in Table 1 and a detailed explanation is provided in Appendix C: Methodology.

Table 1: Golden Plains Shire Council corporate science-derived target

Remaining carbon budget (t CO ₂ -e)	72,400
Required rate of reduction (t CO ₂ -e per year)	57
Required rate of reduction (% of emissions)	2.8
Runway (years)	36*

* Based on Council's emissions in FY18/19 of around 2.0 kt CO₂-e, if Council were to keep emitting at this level, Council will expend its carbon budget of 72.4 kt CO₂-e in 36 years or by year 2053 – we have termed this duration Council's carbon "Runway".

Overall, Australia as a country must reduce emissions by around 3.8% per year in order to meet our commitment to the Paris Agreement and maintain global warming to within 2°C on pre-industrial levels, aiming for 1.5°C. The reason that Golden Plains Shire has a lower target than this is because as an organisation, Council is responsible for a proportionally small number of emissions, jobs and fleet. Essentially, climate change is a very large problem and Golden Plains Shire Council's corporate emissions represent only a very small contribution to that problem.

Table 2 shows the comparison between Council's preliminary targets, the revised target based on the action plan in this report (Section 6) and the science-derived target. The reductions are based on the baseline – FY2018/19 emissions level.

Table 2: Targets comparison

Milestone Year	Council's Preliminary Target	Council's Revised Target*	Science-derived Target
2021	25% reduction	18% reduction	7% reduction
2023	50% reduction	56% reduction	13% reduction
2040	Net zero emissions	Net zero emissions*	60% reduction



*This is based on the action plan presented in this report where Council will have achieved net zero emissions by 2025/26

When considering this target, it is important to remember that this is the **minimum amount** that Council must reduce emissions by in order to be compliant with the Paris Agreement and international climate science. Reducing emissions by a greater degree demonstrates leadership to the community and is a positive news story. The intention of a science-derived carbon budget for a council's corporate emissions is to provide a framework for setting targets. It allows a clear understanding of the scale of action that is genuinely required, and it is a valuable communication tool to demonstrate that a fair share of action is being undertaken.

It is also important to remember that Council's corporate operations typically comprise around 1 to 2% of community emissions. Understanding the challenge in front of Australia as a country, this then makes it clear that the challenge for Golden Plains Shire lies beyond Council's corporate emissions.

Based on the target comparison there are two key pathways that Council could consider:

- Continue to pursue existing target of net zero emissions by 2040 and share with the community that Council is achieving well beyond the required fair share of reductions.
- Revise Council's target to exceed Council's science-derived target and a bottom-up calculation of the impact of actions as detailed in Section 5, noting that this will still result in significantly more ambitious greenhouse gas savings in line with other best practice councils. If this option is chosen, Council's attention and resources may be directed towards supporting the Golden Plains community in municipal-wide emissions reductions.

3.3 Benchmarking

The science-derived target is the **bare minimum** and many councils aim to exceed the SDT by achieving net zero emissions earlier than 2050. Any remaining excess carbon budget from Council's corporate emissions can be considered as Council's contribution to the community to achieve its broader community SDT. There are already a handful of leading councils that are carbon neutral, with others having far more ambitious targets than both the State and Federal Governments as shown in Table 3. It should be noted that any council in Australia that currently achieves corporate carbon neutrality must do so with the use of carbon offsets.

Of the thirty-three councils with zero carbon corporate operations targets in Victoria, eight have separate renewable energy targets. Of note are Moira and Surf Coast Shire Council who have kept the zero-carbon target of 2050 but added an earlier renewable energy target.

Table 3: Federal, state and local government targets

Government	Target
Federal Government	26-28% below 2005 levels by 2030 (under the Paris Agreement)^
Victorian State Government	Aspiration for net zero emissions by 2050
Australian councils	According to the Ironbark et al survey (2018): <ul style="list-style-type: none"> • 19% of all Australian councils provided public corporate emissions targets. Other councils may have targets but might not display them. • 81% of the 98 councils who undertook the survey had or intended to have a corporate emissions target
Victorian councils (79 total)*	60 (76%) councils have a corporate emissions reduction target.



Government	Target
	<ul style="list-style-type: none"> • 33 (42%) have a corporate zero carbon target • 27 (34%) have emission reduction targets (not zero carbon) <ul style="list-style-type: none"> ◦ 23 (85%) of these have target years of 2022 or below*** ◦ 3 (11%) have a target year of 2030 ◦ 1 council has a renewable energy target year of 2050 <p>Of the 33 councils that have a corporate zero carbon target:</p> <ul style="list-style-type: none"> • 19 (58%) are by 2025 • 4 are by 2030 • 5 are by 2040 • 5 are by 2050 • 16 (48%) of these also had additional renewable energy or emission reduction targets
Carbon neutral councils under Climate Active	City of Brisbane, City of Sydney, Moreland City Council, City of Randwick, City of Yarra and City of Melbourne
Examples of leading councils aiming to be carbon neutral earlier than 2050 without Climate Active certification**	City of Fremantle – carbon neutral claim since 2009 Ballarat City Council – zero emissions by 2025/26 Port Phillip City Council – zero net emissions by 2027/28 Byron Shire Council – net zero emissions by 2025/26 Noosa Shire Council – net zero emissions by 2025/26

^Note that the Climate Change Authority has recommended reductions by 2030 of between 40 and 60% below 2000 levels in its 2015 reports to the Minister for the Environment on Australia’s future greenhouse gas emissions reduction targets

*As of May 2019. Research provided by Surf Coast Shire Council

**The targets listed in this category shows the exact language used by each council

***This would indicate that these targets are most likely up for renewable in the next year. It would be ideal to update this study to see whether some of these councils will choose net zero carbon targets

With reference to the table above Golden Plains Shire Council’s current goal of net zero emissions by 2040 places Council in the bottom 30th percentile of Victorian councils surveyed with a zero-carbon target.



4. Council's Corporate GHG Inventory

Council's corporate emissions are those resulting from Council's own operations. The following emission sources have been included using data provided by Council and/or their suppliers:

Stationary Energy:

- **Electricity - Council** emissions produced through the electricity used by buildings that Council owns and operates
- **Electricity - Community** emissions produced through the electricity used by buildings that Council owns but which are not under Council's operational control
- **Electricity - Street Lighting** emissions produced through the electricity used by streetlights that Council pays the bills for
- **Diesel** - for emissions created through diesel fuel consumed
- **Petrol** - for emissions created through petrol/unleaded fuel consumed
- **LPG** - for emissions created through LPG fuel consumed

Transport:

- **Diesel - Fleet** emissions created through the diesel fuel consumed by Council's fleet
- **Petrol - Fleet** emissions created through the petrol/unleaded fuel consumed by Council's fleet
- **LPG - Fleet** emissions created through the LPG fuel consumed by Council's fleet

Water:

- **Water for buildings** emissions produced through the processes associated with delivery of water to Council facilities, and disposal of wastewater

4.1 Emissions Summary

Council's total emissions for FY2018/19 have been calculated as 2,016 t CO₂-e. Further detail is outlined in Table 4.

Table 4: Council's corporate GHG inventory

Sector	GHG Emissions (tCO ₂ -e)	Percentage of total emissions
Transport fuels	919.77	45.6%
Stationary fuels*	7.31	0.4%
Electricity	735.83	36.5%
Street lighting	310.27	15.4%
Water	42.38	2.1%
Total	2,015.56	100%

*Stationary fuels relate to fuel consumption (LPG, diesel or unleaded) for heating, cooking or electricity generation.

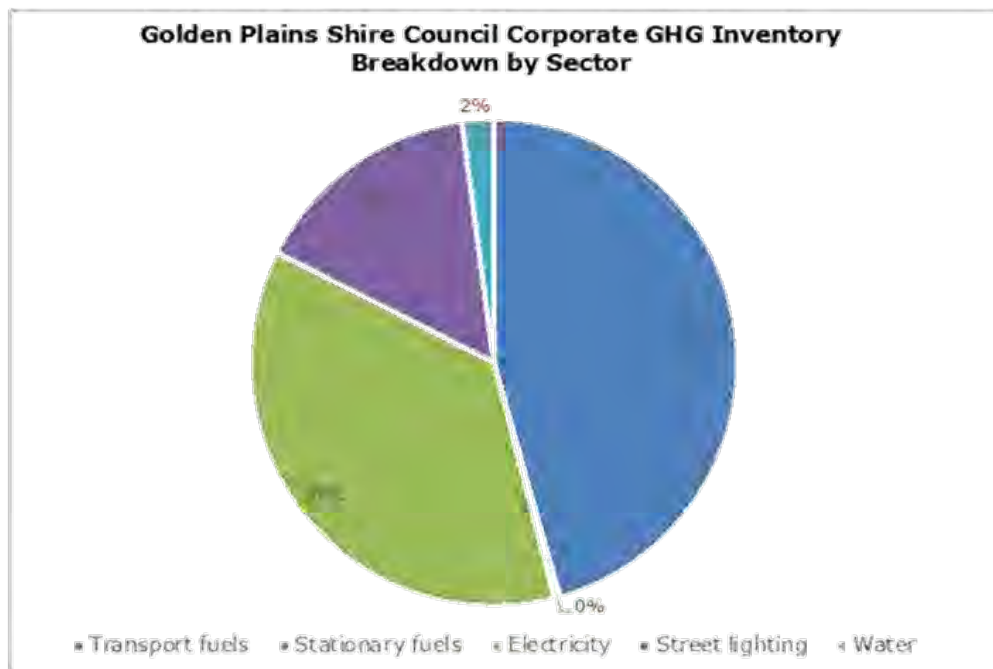


Figure 5: Golden Plains Shire Council's corporate GHG inventory breakdown by sector

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5. Emissions Reductions Opportunities

This section outlines the costs, savings and abatement opportunities associated with various Council actions to reduce greenhouse gas emissions. These are divided into key groups of actions as described in Table 5.

Where possible, detailed data has been used and the highest level of accuracy possible has been strived for, however the financial and environmental analysis provided throughout this section of the report has been conducted at a high-level and includes a number of assumptions. These assumptions are provided in detail at Appendix A.

Table 5: Description of Energy Efficiency Actions

Action	Description
Onsite Solar	<p>Installing solar photovoltaics at the point of use, for example on the rooftop of a Council building.</p> <p>Council has recently undertaken a Civic Centre upgrade in Bannockburn which includes an 80kW system to come online in May 2020. A 40kW solar system was installed at "The Well" Smythesdale Business, Health and Community Hub in 2015.</p> <p>Projects considered for this analysis include:</p> <ul style="list-style-type: none"> • 40kW system for the Bannockburn Cultural Centre (or other public facility), to come online during 2020/21 • 50kW of solar capacity to be added over 2021/22 and 2022/23 targeting other priority community facilities.
Energy efficiency in buildings	<p>Energy efficiency in buildings includes simple measures to install energy efficient lighting, gap sealing and insulation. It also includes larger projects such as upgrading heating, ventilation and air conditioning (HVAC) systems and operational controls.</p>
ESD Guidelines	<p>Development of an ESD Policy or Guidelines. This has potential to achieve improvements in energy efficiency of between 10-20% on new buildings and renewals.</p>
Street lighting LED upgrades	<p>Replacing old, inefficient streetlights with LEDs. This includes residential streets, major roads and decorative lighting.</p> <p>Council has upgraded streetlights to LED in the past but there is still opportunity for large-scale reductions in this area. For this analysis it has been assumed that all standard streetlights will be upgraded to LED over the next two years to 2021/22 with smart lighting enabled for major roads.</p>
Open space, parks and sports lighting	<p>Replacing metered lighting in open spaces, parks and sports fields with energy efficient options.</p> <p>Council has already completed upgrades on a handful of ovals and has others planned, though delayed due to the COVID-19 pandemic.</p> <p>For this analysis it is assumed that all open space lights are to be upgraded to LEDs over the next two years to 2021/22. Sports lighting actions have not been included.</p>
Fleet upgrades	<p>Transitioning Council's passenger fleet to electric vehicles and transitioning utility vehicles to more fuel-efficient options over ten years.</p>



Action	Description
Sustainable Fleet Operations Strategy	Development of a strategy for reducing emissions from Council's fleet. The development of this strategy would include a detailed analysis of possible actions, but may include driver training, telematics and working with contractors to reduce fuel consumption.

5.1 Cost-benefit Analysis of Opportunities

Table 6 provides a high-level overview of the energy efficiency projects that have been considered in this analysis. It is important to note that for a number of actions that are ongoing throughout the twelve-year period (2019/20 to 2030/31), not all savings will be realised. This may make the business case appear different to what would be expected based on the payback period provided. As an example, the ESD policy will see costs incurred every year up to 2030/31, however the savings associated with expenditure in 2030/31 will not be reflected.

In the interest of consistency and comparison of the twelve-year position, Ironbark has presented the information as it is calculated, with details included in the second column ("Details").

The detailed year on year budget required, cost savings and GHG savings are provided in Appendix B.

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Table 6: Cost and benefits of emissions reductions opportunities

Action	Details	Total cost differential to 2030/31	Total savings to 2030/31	Payback period (years)	Annual abatement at 2030/31 (t CO ₂ e/year)
Onsite solar	<ul style="list-style-type: none"> Bannockburn Civic Centre 80kW solar system Public facility 40kW Solar System; and assuming 25kW per year next 2 years targeting libraries, community centres and kindergartens/schools 	\$170,000	\$726,000	2.8	190
Energy efficiency in buildings	<ul style="list-style-type: none"> Roll out energy efficient actions for major facilities Roll out energy efficient actions for small market facilities 	\$62,000	\$83,000	9.0	20
ESD Guidelines	<ul style="list-style-type: none"> Develop ESD Policy 	\$75,000	\$113,000	8.0	40
Street lighting LED upgrades	<ul style="list-style-type: none"> Replace 462 full cost & 94 cost shared Cat P streetlights to LED Replace decorative Cat P streetlights to LED Replace 28 full cost & 88 cost shared Cat V streetlights to LED Replace decorative cat V streetlights to LED Smart enabled standard Cat V streetlights 	\$386,000	\$751,000	6.2	150
Open space, parks and sports lighting	<ul style="list-style-type: none"> Replace 32 side-entry 80W MVs to 14W LED; Replace 12 2x36W T8s to 20W LED; Replace 58 18W T8s to 10W LED; Replace 6 decorative 80W MVs to 14W LED 	\$23,000	\$42,000	6.5	10
Fleet upgrades	<ul style="list-style-type: none"> Replace passenger vehicles to EV Replace 17 utes to a greener alternative gradually Install telematics units in 3 passenger vehicles, 4 utes & 6 trucks 	\$764,000	\$816,000	11.2	240
Sustainable Fleet Operations Strategy	<ul style="list-style-type: none"> Develop sustainable fleet policy (includes driver training) 	\$12,500	\$268,000	0.6	50
Total		\$1,492,500	\$2,799,000		699.15



5.2 Power Purchase Agreements

A power purchase agreement (PPA) is a contract between an electricity buyer and seller. In the context of this report, PPAs refer to an agreement that the buyer will ensure that a certain amount of energy is generated from renewable sources, such as large-scale solar or wind farming.

The Victorian Greenhouse Alliances have established a Local Government Electricity Contract Working Group to help Victorian councils save money and reduce greenhouse gas emissions through their electricity contracting. The Working Group is developing a PPA for Victorian councils to procure low-cost renewable energy from 2020/21, at the conclusion of the current retail contracts.



Golden Plains Shire Council will be including 100% of electricity consumption in the Victorian Local Government and will be voluntarily retiring all LGCs, meaning that the electricity consumption will be considered carbon neutral.

5.3 Carbon Offsets

Council does not currently purchase carbon offsets. However, in order to be considered net zero emissions for corporate operations, this will be necessary.

When offsetting carbon emissions there are a number of options available. The most obvious and common way to offset emissions is to purchase offsets. These offsets vary greatly in price and in quality, but there are a number of reputable providers. There are five types of eligible offsets under the Climate Active Program and it is recommended that Council purchases any one or a combination of these.

Council may choose to purchase the offsets that are generated in Australia (Australian Carbon Credit Units (ACCUs)) or cheaper offsets that are generated by international projects such as Verified Carbon Offsets (VCUs), or a combination of both. According to the latest quotes from offset brokers, spot prices for ACCUs had reached on average \$18.

Council has requested that three scenarios for purchasing offsets are considered:

1. 100% ACCUs
2. 100% VCUs
3. 50% ACCUs and 50% VCUs

Many councils have a preference for purchasing Australian offsets due to perceived superior quality and because there is greater knowledge of the regulation surrounding the production of these offsets. However, on the other hand VCUs can typically be purchased at a much cheaper rate than ACCUs. Information on prices for international offsets is at Figure 6. For the purpose



of this analysis, the price of VCUs has been assumed as \$3.50/tCO₂-e, as this is in-line with offsets recently purchased by Australian councils and deemed to be of appropriate quality for achieving Climate Active accreditation.

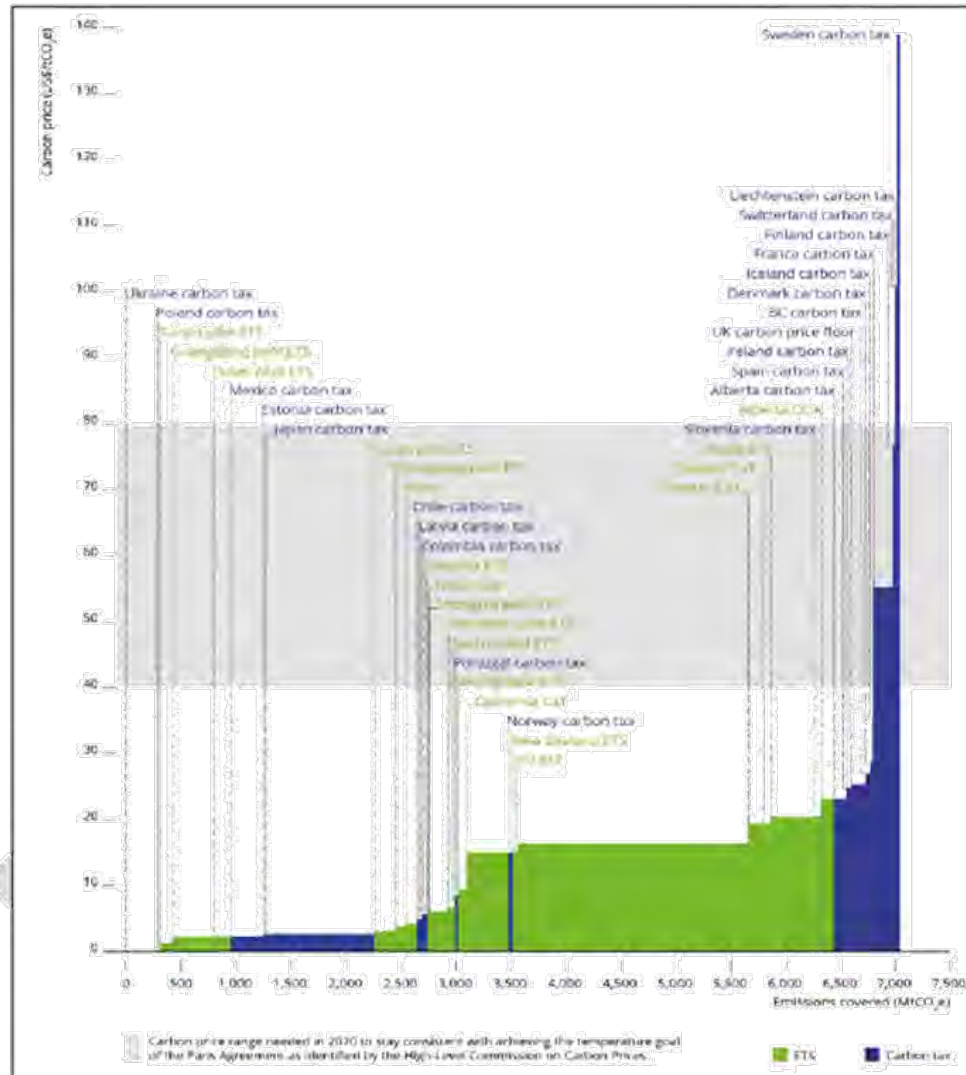


Figure 6: International carbon prices as of May 2018¹

¹ State and Trends of Carbon Pricing 2018, World Bank Group



6. Pathway Analysis

6.1 Emissions Projections

In order to understand Council’s emissions trajectory and the real impact of emissions reduction actions, it is important to first understand what the business-as-usual trajectory is. For this analysis, calculation of the business-as-usual trajectory for Council considered:

- Consideration of new buildings and facilities that are included in the new works program;
- Increased use of facilities due to population change;
- Improvements in efficiency of appliances and technology; and
- Changes to the state emissions factor.

Figure 7 shows the emissions trajectory for Golden Plains Shire Council. This trajectory does not take into consideration any emissions reductions activities or offsets that will be implemented by Council.

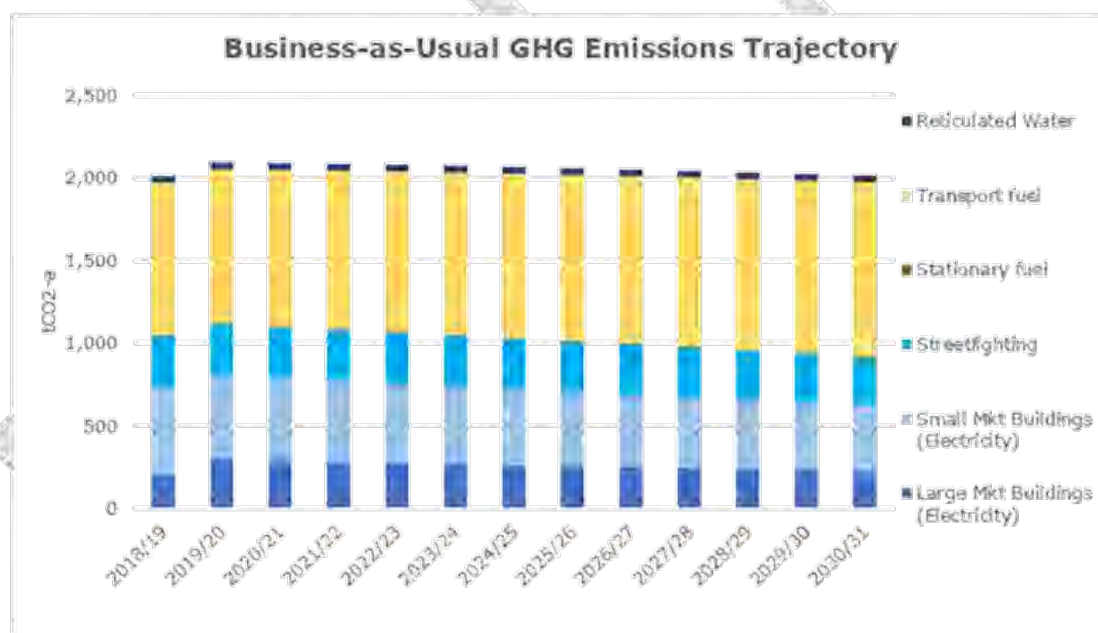


Figure 7: Golden Plains Shire Council business-as-usual emissions trajectory with no actions implemented

In reality, there are a number of emissions reductions activities that are already planned and budgeted, which will form part of “business-as-usual” (BAU) for Council. The BAU trajectory, adjusted for PPA is at Figure 8.

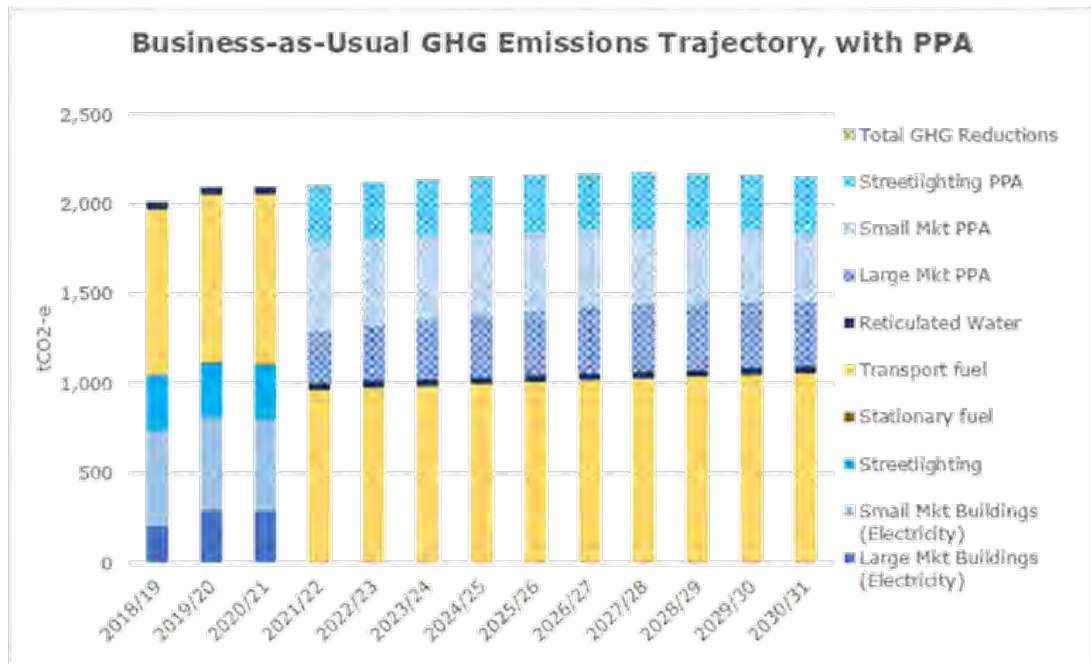


Figure 8: Golden Plains Shire Council business-as-usual trajectory considering PPA



7. Emissions Reduction Pathway

The emissions reduction pathway for Golden Plains Shire Council is shown at Figure 9. By implementing the full scope of actions explored in this analysis, purchasing 100% of electricity from the Victorian LGPPA and purchasing carbon offsets, Council can achieve net zero emissions by 2025/26.

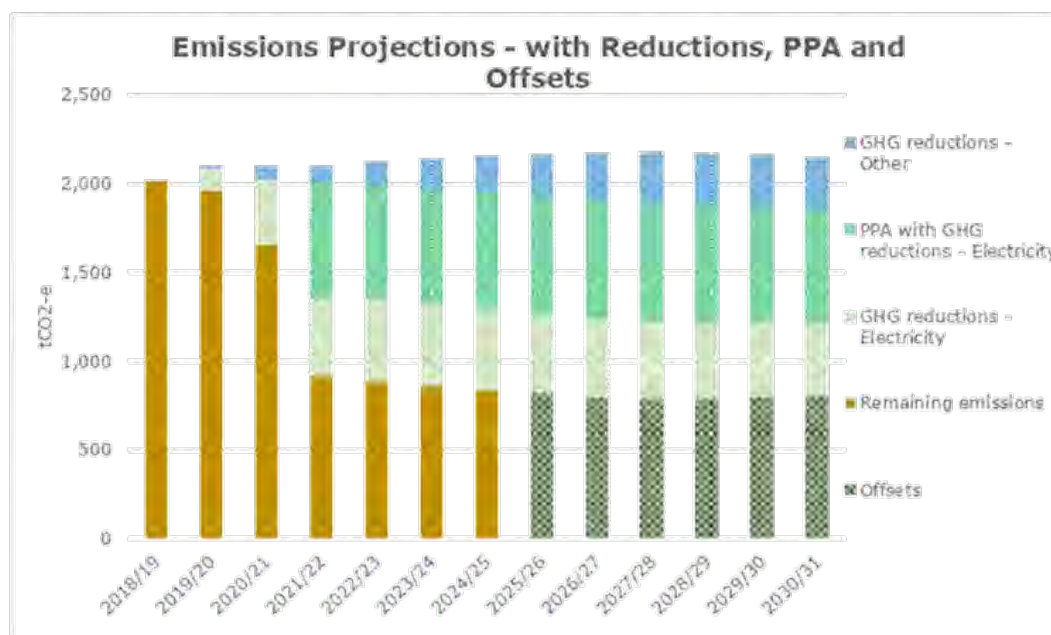


Figure 9: Emissions reduction pathway for Golden Plains Shire Council

The cost of achieving this pathway varies depending on the carbon offset scenario pursued by Council. These scenarios are explored at Section 7.1.



7.1 Carbon Offset Scenarios

Based on a price of \$18/t CO₂-e for ACCUs and \$3.50/t CO₂-e for VCU, Figure 10 shows the total cost of purchasing offsets over the action plan period for the three offset scenarios requested.

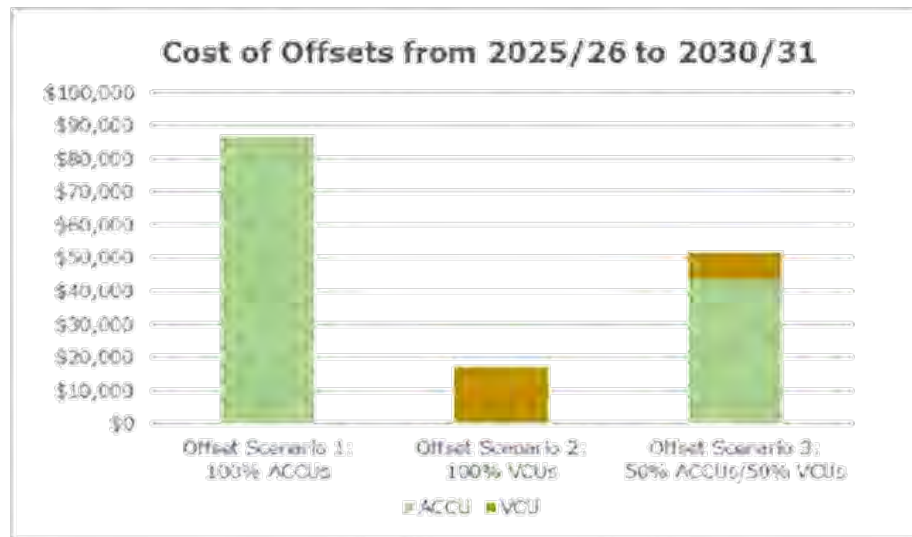


Figure 10: Cost of offsets from 2025/26 to 2030/31

The projected cost of offsets per annum to maintain net zero emissions is shown in Figure 11.

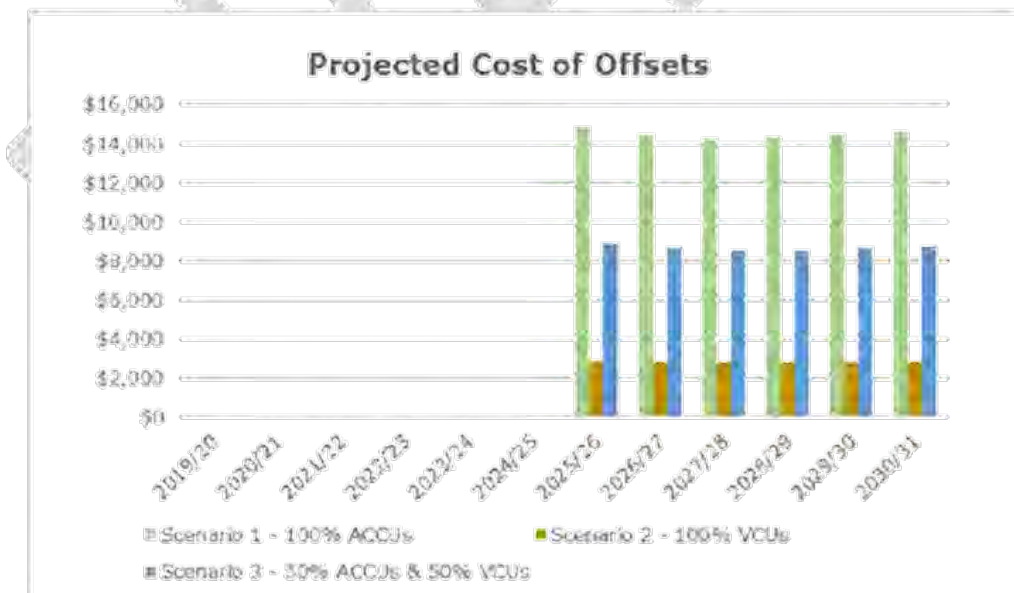


Figure 11: Projected cost of offsets



The simple costs and savings associated with achieving net zero emissions by 2025/26 is at Table 7. The total cost for implementing the full scope of actions is \$1.49 million over the period to 2030/31. Savings from reduction actions is around \$2.80 million. Based on the offsets that Council chooses to purchase from 2025/26, the net financial position at 2030/31 ranges from \$1.22 to \$1.29 million.

Table 7: Financial position at target completion

Offset scenarios	2019/20 to 2030/31			
	Total Cost of Actions	Cost of Offsets*	Savings	Financial Position
Scenario 1 - 100% ACCUs	\$1.49 million	\$86,714	\$2.80 million	\$1.22 million
Scenario 2 - 100% VCUs		\$16,861		\$1.29 million
Scenario 3 - 50% ACCUs & 50% VCUs		\$51,788		\$1.26 million

*This is based on \$18/t CO₂-e for ACCUs and \$3.50/t CO₂-e for VCUs

7.2 Climate Active Program (Carbon Neutral Certified)

Councils can also opt to be certified carbon neutral under the federal government’s Climate Active Program (formerly the National Carbon Offset Scheme). This is the same as a zero net emissions target except that it includes the costs associated with achieving certification under Climate Active. There is no impact on the emissions pathway.

The simple costs and savings associated with achieving a carbon neutral target is shown at Table 7. Achieving carbon neutral certification under Climate Active comes with additional costs and resources associated with certification such as:

- Preparation of Climate Active submission documents (Climate Active Inventory development and Public Disclosure Statement)
- Annual certification fee
- Technical assessment by a registered consultant
- One off Independent audit of Climate Active inventory in the baseline year



Additionally, for Council to align with Climate Active, the corporate inventory developed in this report requires additional emissions sources to be included. The Climate Active standard states that all emissions sources should be included subject to a “relevance test”.

The associated annual cost of Climate Active certification is estimated at around \$15,000 to \$20,000 (Estimated cost of preparing Climate Active submissions documents, inventory preparation, certification fees and technical assessment). Because these costs are relatively low when compared with the overall costs and savings that are achieved in Council’s action plan, the high-level financial position is similar.



7.2.1 Climate Active Certification – Pros and Cons

The Australian Government's Carbon Neutral Program is used to certify organisations such as local governments to comply with Climate Active. Becoming certified carbon neutral is an excellent communication tool and provides a terrific platform for robust emissions reporting and third-party verification. However, Council would be advised to carefully consider approaching certified carbon neutrality, as there are some important, long term implications to Council's budget.

Currently, any attempts to become carbon neutral for organisations involves the purchasing of carbon offsets to bring any remaining emissions down to zero. It also involves costs in the reporting and compliance with Climate Active. By committing to certified carbon neutrality, Council would be adding an additional, ongoing expense to the budget. Whilst offsets are well regulated and contribute to global emissions reductions, it is important that all avenues to directly reduce emissions from operations and in the community are pursued.

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8. Recommendations and Next Steps

The outcomes of this analysis are intended to be used as a tool to frame decision-making, so they may be used and interpreted as suitable to Council. The key learnings from this analysis are as follows:

- If Council progresses with BaU including emissions reduction activities that are already planned and budgeted (i.e. the purchase of 100% electricity through the Victorian LGPPA), reductions of 46% will be achieved by 2030/31.
- There are a number of actions explored in this analysis that would provide significant emissions reductions as well as a positive financial outcome for Council. If implementing all actions as well as purchasing 100% of electricity via the Victorian LGPPA Council will reduce emissions by around 60% and save a total of \$2.80 million by 2030/31.
- If Council chooses to pursue a target of net zero emissions it will be necessary to implement all actions and purchase carbon offsets. This may include the purchase of ACCUs, VCU's or a combination of the two. This outcome would result in reductions of 100% and would reduce Council's overall savings by \$1.22 to \$1.29 million by 2030/31.

The key recommendations for Council are summarised below:

- Based on the analysis provided in this report, including the corporate science-derived target, benchmarking and predicted impact of actions with positive financial outcomes, it is recommended that Council revise its targets to achieve:
 - 30% emissions reductions on 2018/19 levels by 2025/26 through the implementation of the action plan in this report
 - 100% electricity from renewable sources by 2025/26 through the procurement of LGPPA.
- Seek Council endorsement and budget commitment to deliver this action plan.
- Closely consider the role of offsets, net zero emissions and Climate Active certification in Council's future climate planning. In particular, this should include the consideration of how the money spent on such actions could instead contribute to real, local action via community programs.
- If Council is seeking to align with the Climate Active guidelines, Council will need to review its emissions boundary and start accounting for additional emissions sources deemed relevant under the standard.
- Set up action plan monitoring system to ensure progress is on track to meeting the target.
- Perform 3-year strategy reviews to ensure Council's target is aligned to the latest research and climate science. Revise if necessary.



Appendix A: Assumptions for Modelling

General Assumptions

- Electricity price is based on submission by Council
- Emissions factors are sourced from the National Greenhouse Accounts Factors – August 2019

Business-as-usual Projections

Business-as-usual (BAU) ten-year emissions projections included the following assumptions:

- Buildings efficiency Improvements (electricity and gas) of 0.1% per year
- Street lighting efficiency Improvements of 0.1% per year
- Vehicle efficiency improvements of 1.0% per year
- Improvements to state emissions factor, in line with targets proposed by the Victorian State Government
- Increase in energy portfolio, in line with Council's new works budget and with consultation with Council's Sustainability Team
- Population growth in line with regressions from ABS population data
- The impact of population growth on Council's corporate emissions is at a level of 80%

Energy Efficiency Actions

Area	Assumptions
Street Lighting	<ul style="list-style-type: none"> • OMR (maintenance) prices are for 2019/20 as stipulated in the Powercor Public Lighting Charges Schedule. • Capital costs (hardware) are based on Ironbark's experience of current industry pricing for 1,000 – 5,000 units. This information is commercial in confidence. Council may have access to these numbers after discussion with Ironbark or if they are party to the MAV Supplier Panel. • Capital costs (installation) are based on Ironbark's involvement in public tenders for installation throughout Victoria, projects where councils have tendered directly through distribution businesses, and discussions with relevant stakeholders in the sector (for example, councils, installers, distribution businesses, the Public Lighting Approvals Network or PLAN). This information is commercial in confidence. • Total project costs include materials (e.g. the lights), labour (the installation), project management, potential expertise and/or consultants. It does not include community education or Council staffing costs. • Operating hours of lights are averaged out to 11.94 hrs per day in Vic. • Written Down Value and Avoided Costs are regulated values.
Parks & open space lighting actions	<ul style="list-style-type: none"> • Data was not available for council's open space lighting stock. The number of parks, open space and car park lights and associated



Area	Assumptions
	<p>emissions reduction actions were inferred based on similar municipalities around the region.</p>
Buildings and Facilities	<ul style="list-style-type: none"> • Savings available for energy efficiency improvements have been calculated based on the available budget and a seven-year payback on Investment for large and small buildings. • Solar PV installation costs are \$1.00/Watt • Conversion rate for solar is 3.6kWh/kW/day • 90% of onsite solar generation reduces directly translates to a reduction in grid-supplied electricity • An ESD Policy would be applied in the following scenarios and have the following impact: <ul style="list-style-type: none"> ◦ 10% reduction in emissions from new minor buildings ◦ 20% reduction in emissions from new major buildings ◦ 2% increase in capital cost for new buildings ◦ 20% reduction in emissions through renewal of existing buildings ◦ Existing buildings are renewed at a rate of 2% per year (i.e. 50-year lifespan)
Fleet	<ul style="list-style-type: none"> • 16 passenger vehicles to be replaced by electric vehicles in a staged approach between 2020/21 and 2030/31 • 9 diesel utility vehicles to be replaced by greener alternatives in a staged approach between 2020/21 and 2030/31. Greener alternatives have been informed by the Green Vehicle Guide • Capital cost of cars is at market price in March 2020 • Fuel efficiency of EVs has been sourced from Charge Together Vehicle Guide • Maintenance cost of vehicles sourced from RACV • Combined impact of sustainable fleet policy and driver training achieves savings of 5% across the entire vehicle fleet per annum

Carbon Offsets and Carbon Neutrality

The following assumptions to carbon offsets have been applied:

- ACCUs are purchased at a price of \$18.00/t CO₂-e
- VCU are purchase at a price of \$3.50/t CO₂-e



Appendix B: Cost Benefit Analysis

Provided as an Excel file with this report

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Appendix C: Methodology

8.1 Corporate GHG Inventory

Ironbark has provided the GHG inventory tool manual and delivered a training webinar to Council to develop the GHG inventory.

8.2 Corporate Science-derived Target

8.2.1 Global Carbon Budget

The IPCC, the leading authority on current climate change scientific knowledge, has developed long-term emission scenarios which show a range of potential emissions trajectories and impacts based on highly detailed and rigorous modelling. These scenarios indicate the maximum total emissions allowable to limit the increase in global average temperatures to 2°C, which is considered the threshold for avoiding dangerous climate change. The IPCC reports that for climate stabilisation to occur (2°C), industrialised countries need to reduce their greenhouse gas emissions by approximately 85% by 2050.

Based on the above, the world's "carbon budget" is the total volume of greenhouse gases that can be emitted while providing a degree of confidence that temperature rise will be limited to a relatively safe and manageable 2°C. The accepted global carbon budget established by the IPCC is 1,701 Gt CO₂-e for the period 2000-2050.

8.2.2 National Carbon Budget

There is no international agreement on the division of the global carbon budget between countries. In apportioning a national carbon budget, there are a number of approaches. The Australian Climate Change Authority (CCA) has used an approach that they consider fair and equitable. This approach ensures that:

- developing countries are initially allowed an increased per-capita carbon budget to allow for additional emissions whilst they grow their economy; and,
- high per-capita emitters (such as Australia) are allowed time to adjust to their reduced carbon budget, rather than setting them up to fail with an allowance that is considerably lower than their current emissions.



Based on this methodology, CCA recommended a national carbon budget of 10.1 Gt CO₂-e for the period 2013-2050. As at July 2018, 7.5 Gt CO₂-e of this budget remains.

Australia's current targets for reducing greenhouse gas emissions are 26-28% reductions on 2005 levels by 2030. In its 2015 reports to the Minister for the Environment on Australia's future greenhouse gas emissions reduction targets, the CCA recommends Australia commit to the following science-based targets:

- A 2025 target of 30% below 2000 levels; and
- Further reductions by 2030 of between 40 and 60% below 2000 levels.

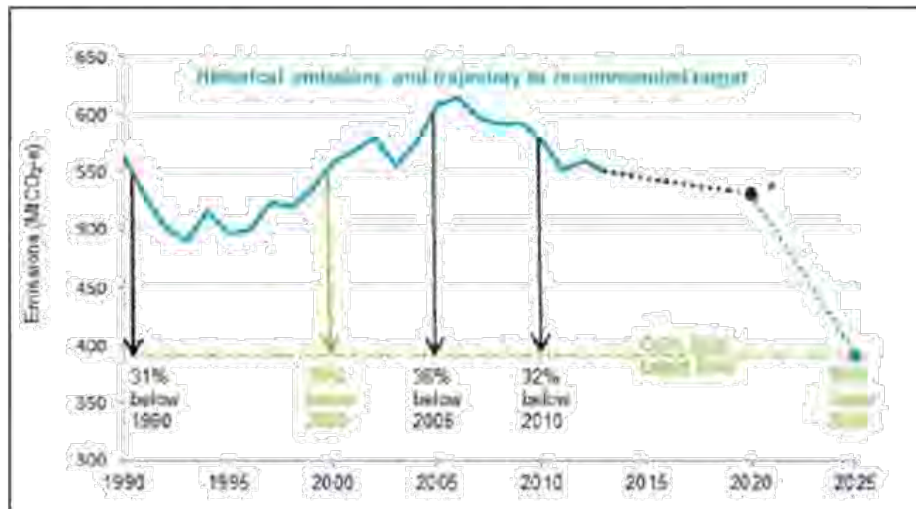


Figure 12: Historical emissions and trajectory to recommended target

Source: CCA 2015, *Final Report on Australia's Future Emissions Reduction Targets*, <https://goo.gl/s4CYvb>

8.2.3 Golden Plains Shire Carbon Budget

In determining an organisational budget for greenhouse gas emissions, there are again a number of methodologies that can be employed. In developing a science-derived target for Golden Plains Shire Council, Ironbark has applied the following considerations:

- Australia's remaining carbon budget is the CCA's national carbon budget minus all emissions that have occurred since the budget was derived, per the National Greenhouse Gas Inventory.
- The carbon budget is then scaled to Golden Plains Shire Council according to specific characteristics of the organization, including:
 - Number of employees
 - Fleet data
 - Total corporate GHG Inventory.

8.3 Opportunities Analysis

Data for this analysis has been drawn from Council's corporate GHG inventory, further documentation provided by Council, and expert research. In particular the following pieces of work provided crucial inputs to the analysis:

- Council's corporate consumption data on electricity, fuel and water;
- Council's corporate emissions data for all relevant sectors;
- Council's response to Ironbark's questionnaire;
- Interview with Council's facilities manager;



- Details of energy efficiency and solar actions to date;
- Details of electricity committed to Victorian Local Government Power Purchase Agreement; and
- Close consultation with Council's Sustainability Team.

Where gaps in data were identified, assumptions were applied. These assumptions have been based on research, sector averages and comparison with similar councils. All assumptions are detailed at Appendix A.

8.3.1 Calculating Business-as-Usual Trajectory

In order to understand Council's emissions trajectory and the real impact of emissions reduction actions, it is important to first understand what the business-as-usual trajectory is. For this analysis, calculation of the business-as-usual trajectory for Council considered:

- Consideration of new buildings and facilities that are included in the new works program;
- Increased use of facilities due to population changes;
- Improvements in efficiency of appliances and technology; and,
- Changes to the state emissions factor.

8.3.2 Compiling Planned Actions

Information was collected to inform the impact of planned and additional future actions that could influence progress towards Council's emissions. This included an understanding of the actions that have already taken place, such as street lighting upgrades, that Council has implemented over recent years.

Planned actions were identified through Council's budget, discussions with Council's sustainability team and professional review. These actions were included in analysis of costs, benefits, trajectories and targets.

8.3.3 Calculating Costs and Impacts

Using the information available through data collection, research and expert analysis, Ironbark calculated the costs, savings, greenhouse gas reductions and payback periods for each of the planned and additional actions.

These figures were plotted to 2030/31. The results of these models were represented in energy transition pathway graphs and summary tables of cost, savings and greenhouse gas impacts.

8.3.4 Modelling the Emissions Reduction Pathway against Targets

Once the costs and impacts of actions were prepared, the outcomes were used to determine the modelled emissions reduction pathway against Council's targets and the science-derived target.

Through this process, Ironbark also considered the efficacy of planned actions, planned purchased renewables (through commitment to the Victorian Local Government PPA and



Regional PPA) and the gap that would need to be filled by carbon offsets in order to achieve the targets.

8.4 Inclusions and Exclusions

8.4.1 Sectors

There are multiple approaches to carbon accounting for organisations that affect what is included or excluded based on operational control, financial control or other boundaries. For the purpose of this analysis, emissions sectors have been considered in line with previous corporate emissions inventories. This ensures consistency in accounting practices. This included emissions from the following sources:

- Electricity for public lighting;
- Electricity for buildings and facilities under Council's operational control;
- Council's fleet including passenger vehicles, light commercial vehicles, heavy vehicles and plant equipment;
- Waste generated by Council; and
- Supply of water.

8.4.2 Emissions Scopes

Emissions scopes are used to refer to emissions in terms of where they are generated and where they are released. They are defined as follows:

- **Scope 1** emissions are defined as "direct emissions from owned or controlled sources" and are emissions created when Council burns a fuel in an owned asset such as fleet burning diesel, E10 or petrol or a building using natural gas.
- **Scope 2** emissions are defined as "indirect emissions from the generation of purchased energy" and include electricity purchased for Council-owned and operated assets.
- **Scope 3** emissions are defined as "all indirect emissions (not included in scope 2) that occur in the value chain of the reporting entity (Council)". These include electricity purchased for Council owned but not occupied buildings, electricity purchased for street lighting, emissions associated with water use and emissions from the extraction and production of fuels (including diesel, E10 or petrol, natural gas and electricity).

This analysis incorporates scope 1, 2 and 3 emissions. To support Council's aspiration to be carbon neutral, it is necessary to include scope 3 emissions. Additionally, it is considered best practice to include all scope emissions in carbon accounting. Previous corporate greenhouse gas inventories by Council have included scope 3 emissions.