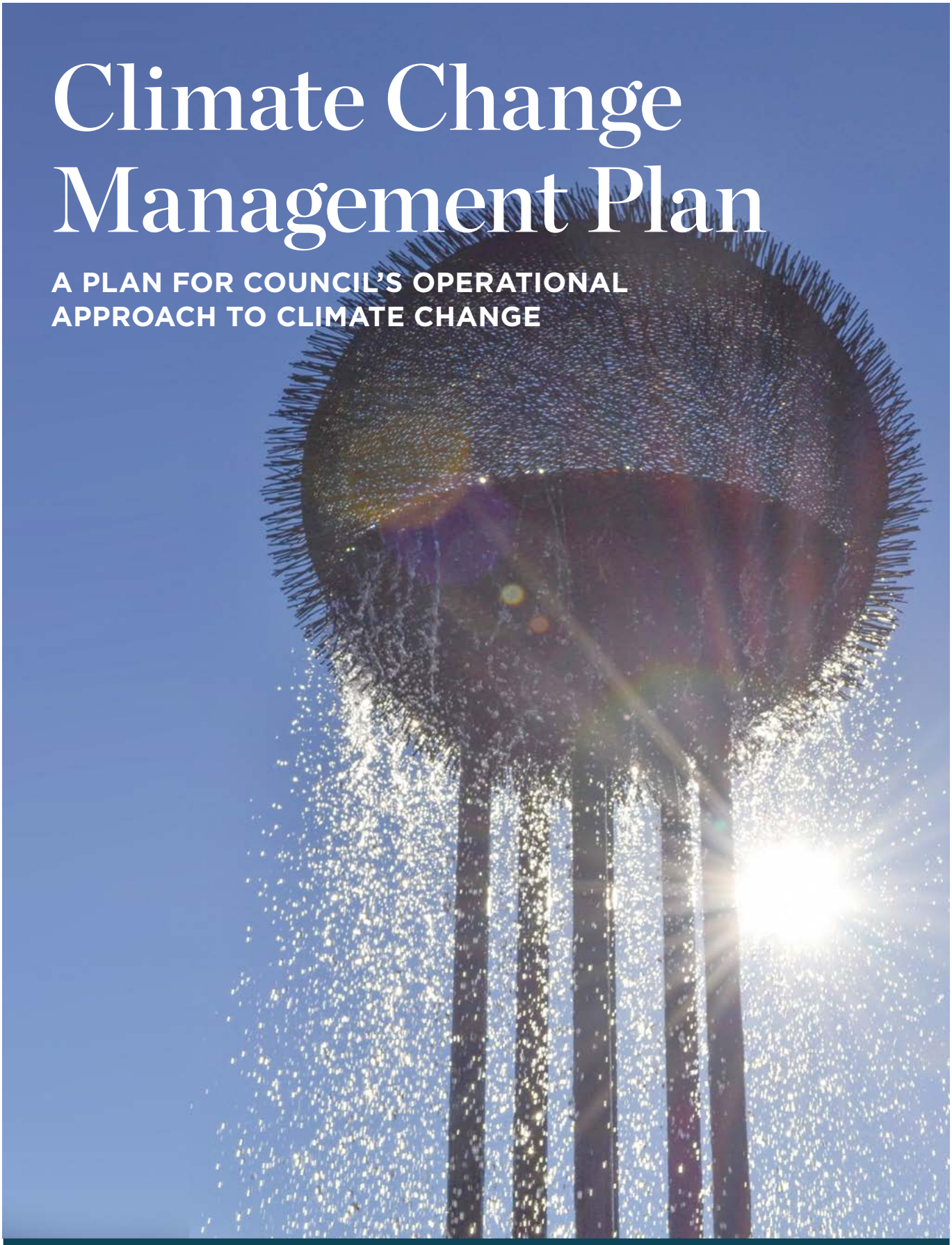
# Climate Change Management Plan

## A PLAN FOR COUNCIL'S OPERATIONAL APPROACH TO CLIMATE CHANGE



ORANGE CITY COUNCIL

Adopted
6 April 2021

ORANGE CITY COUNCIL
**CLIMATE CHANGE MANAGEMENT PLAN**

**Updated November 22, 2021**

Designed in-house by Orange City Council

# Executive Summary

Orange City Council acknowledges and respects the customs, traditions and knowledge of Aboriginal people and their unique relationship with the land, waterways and sea. We recognise our shared responsibility to Care for Country by addressing the causes of climate change that will impact on present and future generations and our environment.

This Climate Change Management plan for Council's operations summarises the drivers and actions that Orange City Council will take to reduce emissions from our activities and address the expected effects of climate change on Council over the next 5 years.

Orange City Council has actively addressed and adapted to climate change and mitigated our impacts through efficiency and environmental projects over time. However, Council has not previously presented these projects as climate mitigation or adaptation actions. It will now be presenting all projects as a consolidated climate and adaptation management plan.

Council is committed to implementing this plan to meet the objectives of Council's Climate Change Strategic Policy and is committed to reporting annually to the community on our progress in delivering these actions. By sharing the approach, we are aiming to mitigate and adapt to climate change while also setting an example and demonstrating what is possible. Not only do we aim to encourage the broader community, but we also aim to encourage other cities and towns to also work towards adapting to a changing climate and mitigating their impacts.

## Priorities for action:

This plan describes the actions we will take to understand our operational emissions, reduce emissions from our operations, understand climate change risks and adapt to climate change.

We will address these sectors through the following:

1. Understanding Council's operational emissions
2. Developing a low carbon culture
3. Working towards Council events without emissions
4. Reducing emissions from our buildings and facilities
5. Opting for carbon-neutral goods and services
6. Reducing emissions from waste
7. Reducing emissions from transport
8. Prioritising adaptation actions

# Contents

# 1. Introduction

## 1.1. Purpose

**The purpose of this plan is to outline:**

- The role of Council in adapting and mitigating impacts of climate change to Council.
- Council's approach to adapting to and mitigating the impacts of Climate Change.
- Sources of further information for Council employees and others and,
- To provide the mechanism to implement Council's Climate Change Strategic Policy.

## 1.2. Scope

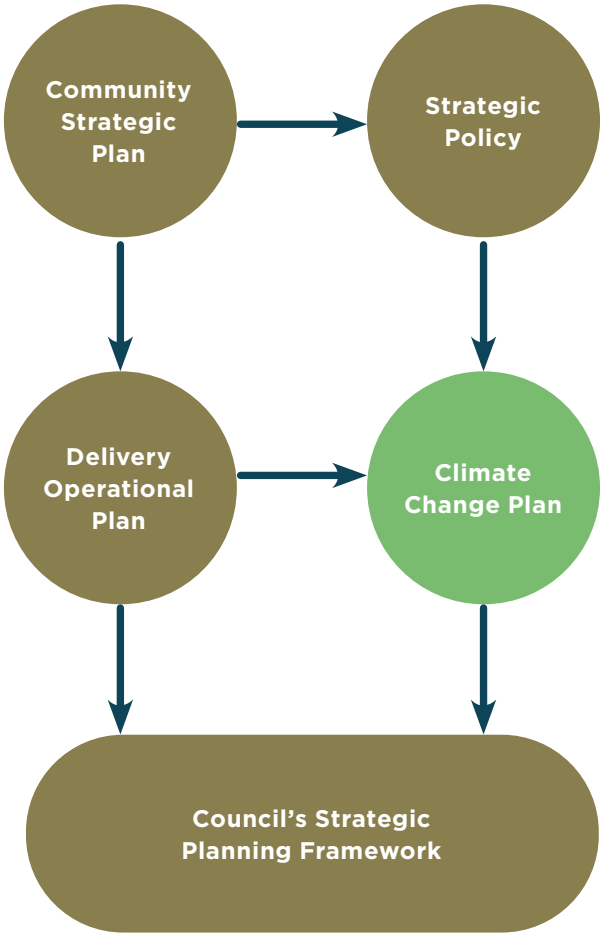
- This Plan applies to Council activities throughout the Orange Local Government Area.
- This Plan outlines Council's commitment in relation to Climate Change Adaptation and Mitigation actions.

## 1.3. Definitions

- **Adaptation** - An action which addresses climate change impacts, aiming to reduce vulnerability to the effects of climate change.
- **Cadia Valley Operations**- One of the largest gold mines in the world, located 25 kilometres south-west of Orange.
- **Carbon Sink**- Anything that accumulates and absorbs more carbon than it releases as carbon dioxide, thereby lowering the concentration of carbon in the atmosphere. Examples include vegetation and the ocean.
- **CO2-e-** Carbon dioxide equivalent, standard unit for measuring emissions.
- **Fugitive Emissions**- Emissions of gases or vapours from pressurised equipment due to leaks and other unintended or irregular releases of gases, mostly from industrial activities.
- **GHG (Greenhouse Gas Emissions)** - The emission into the earth's atmosphere of various gases, especially carbon dioxide, that contribute to the greenhouse effect.
- **Implementation-** The process of putting decisions regarding climate change into action and effect e.g. Climate change related policy.
- **Mitigation** - Actions which attempt to lessen the impact of climate change e.g. Reduce and curb greenhouse gas (GHG) emissions and negative contributions to climate change.
- **NARCliM-** The NSW and ACT Regional Climate Modelling (NARCliM) Project.

## 1.4 Relationship to Other Plans

Orange's Community Strategic Plan 2018-2028 (CSP) is the highest level of planning that our Council will undertake. This Climate Change Plan links to the CSP, the Delivery Operational Plan (DOP), the Local Strategic Planning Statement (LSPS) and the Development Control Plan (DCP). The CSP and DOP inform the implementation of this Plan, the LSPS and DCP provide mechanisms to implement elements of this plan.



# 2. Context

## 2.1. Global

### KYOTO PROTOCOL

The Kyoto Protocol operationalises the United Nations Framework Convention on Climate Change by committing industrialised countries to limit and reduce greenhouse gases (GHG) emissions in accordance with agreed individual targets. The convention itself asks those countries to adopt policies and measures on mitigation and to report periodically. The Kyoto Protocol was adopted on 11 December 1997. Owing to a complex ratification process, it entered into force on 16 February 2005. Currently, there are 192 parties to the Kyoto Protocol including Australia.

### THE COPENHAGEN CLIMATE CHANGE CONFERENCE (COPENHAGEN ACCORD)

The Copenhagen Climate Change Conference took place from the 7th of December until the 18th of December, raising climate change policy to the highest political level, taking place in Copenhagen and was hosted by the Government of Denmark. In attendance was 115 world leaders making it one of the largest gatherings of world leaders ever outside UN headquarters. The Copenhagen Climate Conference was the 15th session of the Conference of the Parties to the UNFCCC and the 5th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol.  More than 40,000 people applied for accreditation, this included representation from governments, non-governmental organizations, intergovernmental organizations, faith-based organizations, and media and UN agencies.

The Copenhagen Climate Change Conference was crucial in the negotiating process for a variety of reasons. It significantly advanced negotiations on the infrastructure needed for effective climate change cooperation. Progress was also made in narrowing down options and clarifying choices needed to be made on key issues later on in negotiations. Also, the conference produced the Copenhagen Accord, which expressed clear political intent to constrain carbon and respond to climate change in both the short and long term (UFCCC, 2009).

### COPENHAGEN ACCORD

The Copenhagen Accord contained several key elements, helping converge governments' views that included:

- Long-term goal of limiting the maximum global average temperature increase to no more than two degrees Celsius above pre-industrial levels,
- Emission reduction targets by developed countries and 'Nationally Appropriate Mitigation Actions' from developing countries, all to be registered with the UNFCCC.
- Promotion of REDD (reduction of emissions from deforestation and degradation) and the enhancement of existing forests.
- Fast start-mitigation and adaptation finance of US$30 billion for 2010-12 and longer term mitigation funding of US$100 billion by 2020 (APH, 2009).

Within the Copenhagen Accord, Australia sought commitments of comparable effort with other developed countries, with its own targets aiming at:

- Reducing emissions by 25% on 2000 levels by 2020 if the world agrees to an ambitious global deal.
- An unconditional commitment to reduce emissions by 5% below 2000 levels by 2020.
- An emission reduction of 15% by 2020 if there is a less ambitious global agreement (APH, 2009).

## PARIS AGREEMENT

At the 21st United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP21) held in December 2015, the international community unanimously adopted the 'Paris Agreement' to reduce carbon emissions and decarbonise the global economy. In addition to the mitigation of carbon emissions, the Paris Agreement also addresses adaptation issues such as enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, as well as loss and damage associated with the adverse effects of climate change and extreme weather events. The Australian Government ratified the Paris Agreement in November 2016. Under the Paris Agreement, Australia will implement an economy-wide target to reduce GHG emissions by 26 to 28 per cent below 2005 levels by 2030. Shifting global market drivers and preferences for low carbon products have the potential to influence Australia's economy, including changing demand and prices for resources, manufactured items and agricultural products (UNFCCC, 2015)

| Country | Emission Reduction Targets | Renewable Energy Commitment |
|---|---|---|
| Australia | 26-28% emissions reduction from 2005 levels by 2030 | ~20% from renewable energy sources by 2020 (33,000 GWh by 2020) |

## 2.2. National

The Commonwealth Government has played an important role in climate change adaptation and mitigation of climate change.  Primarily through the funding of the National Climate Change Adaptation Research Facility (NCCARF) and other research and development programs. These programs have delivered some of the science needed to understand climate change and implement adaptation across Australia (NCCARF, 2020). Other states and territories are active in developing assertive climate change policies and actions, with a number also having developed adaptation strategies. Each State and territory have adopted emission reduction targets and/or renewable energy targets. Australia's comparatively high emissions per capita are due to our relative abundance of cheap fossil fuels, high dependence on coal-fired power generation and the emissions intensity of our exports (such as aluminium, steel and coal) (Environment NSW, 2015).

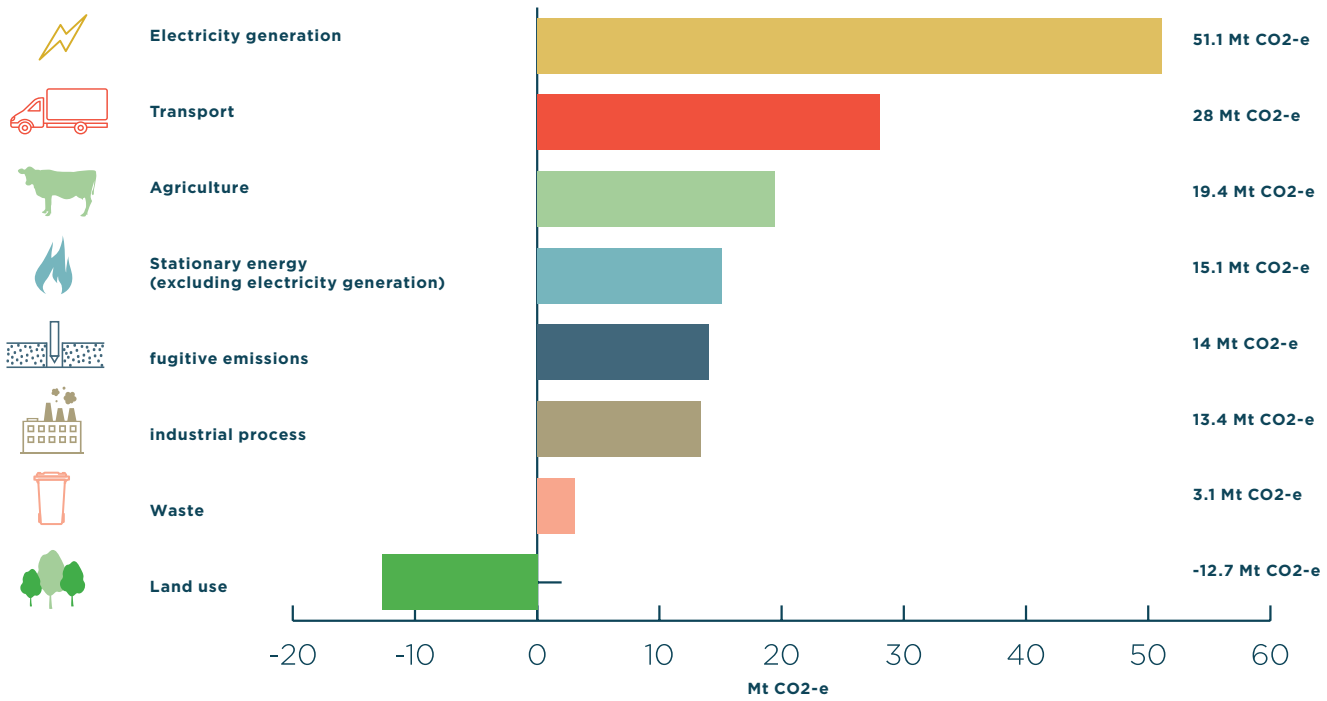
| State or Territory | Emission Reduction Targets | Renewable Energy Targets |
|---|---|---|
| New South Wales | 35% reduction in greenhouse gas emissions on 2005 levels by 2030<br>Zero Net emissions by 2050 | 20% from renewable energy in line with the Renewable Energy Target. |
| Australian Capital Territory | 40% reduction in GHG emissions from 1990 by 2020<br>50-60% reduction in GHG emissions from 1990 by 2025<br>65-75% reduction in GHG emissions from 1990 by 2030<br>90-95% reduction in GHG emissions from 1990 by 2040<br>Zero Net emissions by 2045 | |
| Queensland | Zero net emissions by 2050 | 50% renewable energy by 2030 |
| Victoria | Zero Net emissions by 2050 | 25% renewable energy by 2020<br>40% renewable energy by 2025<br>50% renewable energy by 2030 |
| Western Australia | Zero net emissions by 2050 | No target |
| South Australia | Zero net emissions by 2050 | 50% renewable energy production by 2025 (Target achieved in 2018) |
| Tasmania | Commitment to establish a zero net emissions target by 2050 | 100% renewable energy by 2022<br>200% renewable energy by 2040 |
| Northern Territory | Zero net emissions by 2050 | 50% renewable energy by 2030 |

## 2.3. State

NSW already experiences climate extremes such as floods, droughts, heatwaves and bushfires. Climate change is likely to exacerbate the frequency and/or severity of these events and can be an amplifier of these and other hazards. In this context, it is important to plan and take appropriate action to better manage our climate risks. Well-considered and effective adaptation measures can help manage the adverse impacts of climate change on communities, the economy and natural systems. Many businesses, communities and local governments are already working to incorporate climate change into their planning and risk assessment processes and continue to seek increased action from the State Government. The NSW Government seeks to drive continuous resource efficiency from government operations and limit its impact on the environment. The NSW government adopted the targets of Net Zero emissions by 2050. 36 Councils in NSW have also adopted targets relating to renewable energy and/or emissions reductions.

NSW's annual emissions per capita reduced from 29.9 tonnes CO2-e per capita in 1990 to 16.7 tonnes per capita in 2017. In comparison, annual emissions per capita in the UK, Germany and Japan are in the range of 7-11 tonnes CO2-e per capita. The majority of emissions in New South Wales are derived from electricity generation (51 MtCO2-e), followed by transport (28 MtCO2-e). Land-use is a net sink of emissions, reducing the state's total emissions by 12.7 MtCO2-e (Adapt NSW, 2020)

### NSW EMISSIONS BY SOURCE 2017 (DPIE)



**NSW Local Government Councils with emission reduction and/or renewable energy targets**

| Councils | Emission Reduction Targets | Renewable Energy Targets |
|---|---|---|
| Bathurst Regional Council | | 50% of council's electricity consumption to be from renewable sources by 2025 |
| Dubbo Regional Council | | 50% renewable energy by 2025 |
| Wollongong Council | Aspirational emissions reduction target of zero emissions by 2030. | |
| Broken Hill Council | | 100% renewable energy status by 2030 |
| Uralla Council | Plan to be first net zero energy town. | |
| City of Newcastle | A 50% reduction in operational carbon emissions. | 100% renewable electricity from 2020 |
| Bega Valley Shire Council | Net zero emissions, with interim target<br>of 100% renewable electricity by 2030 | Net zero emissions by 2030 |
| Byron-Bay Council | Net zero by 2025. | 100% renewable energy by 2027 |
| Blue Mountains Council | Carbon Neutral by 2025. | |
| Coffs Harbour City Council | | 100% renewable energy by 2030 |
| Port Macquarie-Hastings Council | | 100% renewable energy by 2027 |
| Kyogle Council | 25% electricity from on-site solar by 2025<br>50% renewable electricity by 2025<br>100% renewable electricity by 2030 | 25% electricity from on-site solar by 2025<br>50% renewable electricity by 2025<br>100% renewable electricity by 2030 |
| Shoal Haven City Council | Aim to Achieve net-zero Green House Gas emissions by 2050.<br>Reduce emissions by 25% by 2025 and 50% by 2030, compared to 2015 levels. | 25% renewables by 2023 and 50% by 2030 |
| Eurobodalla Council | To reduce the total Council energy emissions by 80% from the 2005/06 baseline by 2030 | 100% renewable energy by 2030 |
| Bellingen Shire Council | 45% carbon reduction by 2030 (based on 2010 emissions levels)<br>Zero net emissions by 2040 | |
| Central Coast Council | 60% emissions reduction of Council emissions (below 2017/18 levels) by 2022 and 85% by 2028 | |
| City of Canada Bay | Net zero emissions by 2030 | |
| Lismore City Council | | Self-generate all electricity needs from renewable sources by 2023 |
| Randwick Council | Zero emissions by 2030 | 100% renewable by 2030 for stationary and transport energy |

| Councils | Emission Reduction Targets | Renewable Energy Targets |
|---|---|---|
| Blacktown City Council | Net zero Green House Gas emissions from electricity, fuel and gas by 2030 | |
| Parramatta Council | Carbon Neutral by 2022 | |
| Blue Mountains City Council | Carbon Neutral by 2022 | |
| Willoughby City Council | By 2028 emit 50% less GHG emissions from operations compared with 2008/09. Achieve net zero emissions by 2050 | |
| Ku-Ring-Gai Council | Reduce GHG emissions to achieve net Zero emissions by 2040 or earlier.<br><br>50% reduction, by 2030. 100% reduction in fleet emissions by 2040 | |
| Inner West Council | Carbon neutral by 2025 | 100% renewable electricity by 2025 |
| Nambucca Council | Zero net carbon emissions within the 2030 to 2050 time frame | |
| Coffs Harbour Council | 50% reduction in emissions (on 2010 levels) by 2025 | |
| Kyogle Council | Reduce Councils operational emissions by 50% before 2030 and to be net zero by 2050 | |
| Tweed Shire | Net zero emissions by 2030 | 50% renewable energy by 2025 |
| Hornsby Shire Council | 32% emissions reduction from 2018 by 2025<br><br>53% emissions reduction from 2018 by 2030 | |
| City of Ryde | | 100% renewable energy by 2030 |
| Federation Council | | Electricity neutral (i.e. generating electricity<br><br>equal to, or greater than its consumption) by<br><br>June 2025 |
| Georges River Council | Net zero carbon emissions by 2025 or as soon as practicable | 100% renewable target by 2025 |
| Northern Beaches Council | Net zero emissions by 2045<br><br>60% reduction in carbon emissions by 2040.<br><br>Aspiration to achieve net zero emissions by 2030 | All suitable sites being powered by renewable electricity by 2030 |
| Sutherland Council | Carbon neutral by 2030 | |
| Waverly Council | 70% reduction of Council emissions 2003/04 levels) by 2030.<br><br>Carbon neutral by 2050 | |

## 2.4. Local

Based on long-term (1910–2011) observations, temperatures have been increasing in the Central West and Orana since about 1970, with higher temperatures experienced in recent decades. The region is projected to continue to warm during the near future (2020–2039) and far future (2060–2079). The warming is projected to be on average about 0.7°C in the near future, increasing to about 2.1°C in the far future. The number of hot days is projected to increase and the number of cold nights is projected to decrease. The warming trend projected for the region is large compared to natural variability in temperature and is of a similar order to the rate of warming projected for other regions of NSW.

These climate change projections are from the NSW and ACT Regional Climate Modelling project (NARCliM) project. The NARCLiM project has produced a suite of twelve regional climate projections for south-east Australia spanning the range of likely future changes in climate. NARCLiM is explicitly designed to sample a large range of possible future climates. These projections can be found in Appendix 6 and Appendix 7: (Adapt NSW, 2014).

The climate projections for 2020–2039 are described in the snapshots as NEAR FUTURE, or as 2030, the latter representing the average for the 20- year period. The climate projections for 2060–2079 are described in the snapshots as FAR FUTURE, or as 2070, the latter representing the average of the 20-year period (Adapt NSW, 2014). The following projection maps can be found within Appendix 1Appendix 2Appendix 3Appendix 4 Appendix 5 (Adapt NSW, 2014)

**Climate change projections for central west and orana region.**

| | | | |
|---|---|---|---|
| | **Projected Temperature Changes** | | |
| ↑ | Maximum temperatures are projected to increase in the near future by 0.4 - 1.0 °C | ↑ | Maximum temperatures are projected to increase in the far future by 1.8-2.7 °C |
| ↑ | Minimum temperatures are projected to increase in the near future by 0.5-0.9 °C | ↑ | Minimum temperatures are projected to increase in the far future by 1.5-2.6 °C |
| ↑ | The number of hot days will increase | ↓ | The number of cold nights will decrease |
| | **Projected Rainfall changes** | | |
| ↓ | Rainfall projected to decrease in spring | ↑ | Rainfall is projected to increase in autumn |
| | **Projected Forest Fire Danger Index (FFDI) changes** | | |
| ↑ | Average fire weather is projected to increase in summer, spring and winter | ↑ | Severe fire weather is projected to increase in summer, spring and winter |

## Existing measures

### CITIES POWER PARTNERSHIP ACTION PLEDGES

The Cities Power Partnership is Australia's largest local government climate network, made up of 123 Council's from across the Country, representing almost 11 million Australians. Local Councils who join the partnership make five action pledges in either renewable energy, efficiency, transport or working in partnership to tackle climate change. Orange City Council is a Power Partner and has pledged to take actions found in the table below (Cities Power Partnership, 2018).

| Action Pledges | |
|---|---|
| 1. Renewable Energy  | Power council operations by renewable energy, and set targets to increase the level of renewable power for council operations over time. |
| 2. Energy Efficiency  | Adopt best practice energy efficiency measures across all council buildings, and support community facilities to adopt these measures. |
| 3. Sustainable Transport  | Ensure that new developments are designed to maximize public and active transport use, and support electric vehicle uptake. |
| 4. Energy Efficiency  | Roll out energy efficient lighting across the municipality. |
| 5. Collaboration  | Develop education and behaviour-change programs to support local residents and businesses to tackle climate change through clean energy, energy efficiency and sustainable transport. |

### CITIES POWER PARTNERSHIP PLEDGE EVALUATION

Council progress on the above pledges are reported annually to Cities Power Partnership.

### STATE OF ENVIRONMENT REPORTING

The NSW State of the Environment 2018 is released every three years by the NSW Environmental Protection Authority (NSWEPA). It describes the health of our environment – our land, water, air and ecosystems, and urban environment, at a state-wide level.

The NSW State of the Environment Report provides credible, robust, state-wide environmental information for the NSW Government, decision makers, business and the community, assesses the status and condition of major environmental resources in NSW and examines environmental trends, describes pressures that affect the environment and responses to those pressures.

Orange City Council has opted to report to the EPA annually along with a number of NSW Local Government Councils.

# 3. Mitigation

Climate Change mitigation includes actions we take globally, nationally and individually to limit the impact of changes caused in the global climate by human activities. Mitigation activities are designed to reduce Green House Gas (GHG) emissions and/or increase the amounts of GHGs removed from the atmosphere by greenhouse sinks (Adapt NSW, 2014).

## 3.1. Actions Taken to Date

**The following are key examples of mitigation measures achieved by Orange City Council.**

### SOLAR ENERGY

Solar systems are currently installed on 7 sites, totalling approximately 210 kilowatts (kW). This includes a large 99kWh system on the Orange Aquatic centre, which has produced 460 Megawatt hours of energy since installation, reducing Councils' CO2 emissions by 325 tonnes. Council have also agreed to a Power Purchase Agreement (PPA) and the installation of 140 panels of solar on its depot roof. Councils' childcare centres have also installed solar panels on its roofs and recent site assessments have identified the potential for a number of locations for additional solar systems to be installed at Council facilities.

**Approximately 80% of streetlights have been replaced with energy efficient LED lights as of June 2021**

### STREET LIGHTING PROJECT

Council is in the process of replacing 8500 streetlights, switching to energy efficient LEDs expecting to save up to $500,000 annually on energy consumption. As of June 2020 a majority of the Council's streetlights have been replaced with energy efficient LEDs.

The lights began to be replaced at the end of December 2019, since that time Council has already seen significant savings. To compare, in May 2019 street lighting consumed up to 270,000 kWhs of electricity for the month, producing 241 tonnes of CO2 (equivalent) emissions. In May 2020, street lighting consumed 180,000 kWhs of electricity, producing 165 tonnes of CO2 (equivalent) emissions. Council is able to see a reduction of up to 90,000 kWhs of electricity, reducing up to 76 tonnes of CO2 emissions for that month alone.

### LIGHTING UPGRADES

Plans for the replacement of 2117 fluorescent lights to LEDs at 17 Council sites have been prepared, an assessment found lights in Council's buildings used almost $170,000 of electricity a year, as well as about $34,000 in maintenance costs. Under the NSW Government's Energy Savings Scheme, Council would be eligible for more than $130,000 worth of Energy Saving Certificates in return for reducing its energy use. This project could potentially reduce equivalent CO2 emissions by 740 tonnes annually. This project was approved in August 2020 and is currently in progress, the payback period from savings is expected to be 1.2 years.

## CHILLER REPLACEMENT PROJECT

In 2018 it was identified that the Council's cooling system on the civic centre building needed to be replaced. In September 2019, 2 York 500kw chillers (heat pumps) were installed, which provide a highly efficient source of chilled water for cooling and humidity control for both the Civic Centre and the Gallery. Additionally, as they are heat pumps, the Civic Centre now has a source of hot water that can be used to support the building base heating load. The heat pumps produce the hot water very efficiently as they have a high coefficient of performance, this greatly reduces the energy consumption. The original heating in the Civic Centre was generated through electric resistive duct heaters that are highly inefficient and expensive to run. This project has provided savings of $65,000 in electricity costs since the installation and commissioning of the chillers.

## INSPIRING AND INTEGRATING CHANGE PROJECT

The project entails the lessons learnt as three Central West Councils (Orange, Dubbo and Bathurst) tackled sustainability challenges. They have been condensed into a Toolkit Booklet. The booklet was published in November 2012 and is aimed at sharing knowledge and experience gained from the Bathurst, Orange, and Dubbo (BOD) alliances Inspiring and Integrating Change Project and to encourage fellow Councils to establish similar sustainability projects. The toolkit provides an overview of three specific sustainability projects.

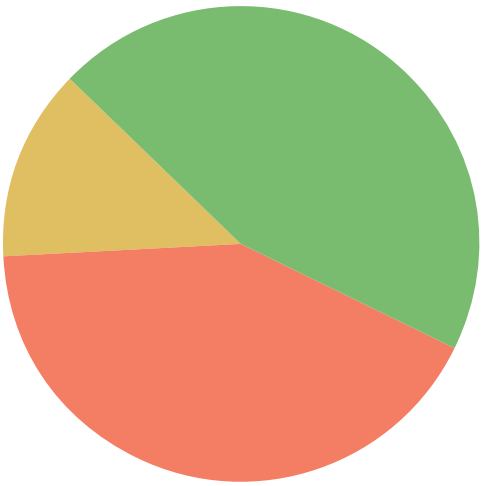
- Dubbo City Council's Victoria Park Precinct Renewable Energy Project,
- Orange City Council's urban constructed wetland for stormwater harvesting and
- Bathurst Regional Council's Biodiversity Management Plan & Urban Drainage Reserve Vegetation Link.

The toolkit provides useful tips on how to gain assistance to begin new projects. Inspiring and Integrating Change aims to motivate and inform other regional Councils, organisations and individuals to create projects and implement policies which support sustainable development into the future.

## ORGANIC WASTE COMPOSTING FACILITY: EUCHAREENA ROAD RESOURCE RECOVERY CENTRE (ERRRC)

The ERRRC is the Euchareena Road Resource Recovery Centre, a state-of-the-art composting facility which uses modern technology and monitoring equipment to recycle organic waste into Australian standard for composts, soil conditioners and mulches (AS 4454). The ability to meet the AS 4454 standard means the product is in great demand, using compost on gardens improves soil quality and water retention, provides nutrients to plants and promotes strong and healthy growth. Its organic certification means organic wineries can use the compost as part of their certification requirements. In 2020 45% of Orange's waste was diverted to organics, to be composted.

This facility is able to provide the community nutrient rich compost and improve soils across Orange. It also reduces overall emissions through reuse, from waste that would have otherwise been placed into landfill. Over the life of the project (2014-2020) 9844.5 tonnes CO2-E have been abated through composting eligible green waste for reuse.



**ORANGE CITY COUNCIL'S WASTE DIVERSION 2019-2020**

- Organics 45%
- General waste 42%
- Recycling 13%

## 3.2 Baseline Data

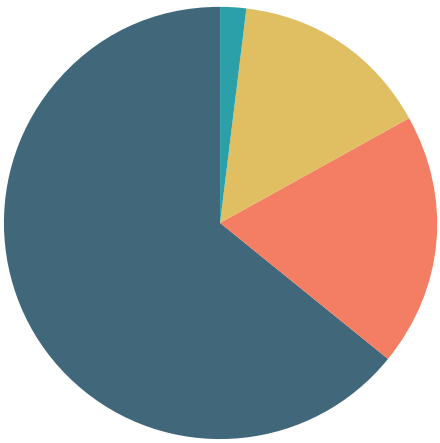
### ENERGY USE - ELECTRICITY

In the 2019/2020 financial year (FY), OCC had a total of 134 sites that were connected to the public electricity grid. These sites were divided into four categories, below details the following categories and their site numbers.

- 'Buildings'- 64 sites
- 'Water & Sewer' -48 sites,
- 'Public Street Lighting'- 9 sites
- 'Other'-13 sites

Council's electricity use can be viewed at a sub-categorical level, as well as within each major category, this is shown in the following table. Water & Sewer' services are Council's highest electricity users however this is due to the nature of delivering those services to a majority of the community.

In addition, the Macquarie pipeline made up 27% of electricity consumed by water/sewer services in 2020. The Macquarie pipeline is used sporadically as required and under specific conditions. The nature of the Macquarie pipeline means usage is difficult to reduce as it relates to the provision of water to Orange in times of drought. As shown in part 4 of this plan, Orange City Council together with the Orange community work hard to achieve great reductions in water use, in turn reducing the electricity required to transport and treat water.



**Electricity use for FY 2019/20**

- Water and Sewer 64%
- Buildings 19%
- Street lighting 15%
- Other 2%

**Electricity consumption at a Sub-category Level from July 2019 to June 2020.**

| Asset Categories | Annual Electricity kWh | Annual Usage |
|---|---|---|
| **WATER & SEWERAGE** | **10,747,158.60** | **64%** |
| Macquarie Pipeline | 2,914,326 | |
| Sewage Treatment works | 1,657,167 | |
| Filtration Plant | 843,632 | |
| Suma Park Pump | 920,556 | |
| Other | 4,411,458 | |
| **STREET LIGHTING** | **2,555,595** | **15%** |
| Public Lighting | 2,555,595 | |
| **BUILDINGS** | **3,183,209** | **19%** |
| Parks & Gardens | 167,707 | |
| Airport | 253,581 | |
| Civic Centre | 798,986 | |
| Community Centre | 6,213 | |
| Aquatic centre | 403,838 | |
| Art Gallery/ Library | 208,527 | |
| Function Centre | 23,899 | |
| Orange Regional Museum | 76,002 | |
| Other Buildings | 1,244,456 | |
| **OTHER** | **363,620** | **2%** |
| **TOTAL** | **16,849,582** | **100%** |

## ENERGY USE - NATURAL GAS

Orange City Council's natural gas use accounts for up to 22 sites. A majority of these sites are considered 'small sites' by usage.

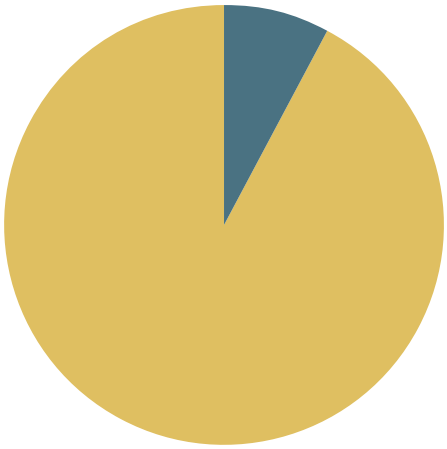
The gas used within the 'Water & Sewer' category came from sewer operations such as the sewer treatment plant.

The Aquatic Centre uses natural gas to provide heated water for the swimming pools for the Orange community.

## ENERGY USE - TRANSPORT AND LIQUID FUEL USE

In FY 19/20, 'Diesel' accounted for the majority of Council's fuel consumption using a total of 421.7KL, while unleaded petrol accounted for 36.6KL. Fuel consumption data includes use from Council's vehicle fleet and plant/equipment use. Fuel use is not distinguished between use for transport and use for plant/equipment (e.g. generators, portable pumps, lawnmowers etc.)

| Fuel Type | Kilolitres |
|---|---|
| Unleaded petrol (excluding E10) | 36.6 |
| Diesel | 421.7 |



**Orange City Council's fuel consumption for FY 2019/20**

Diesel 92%

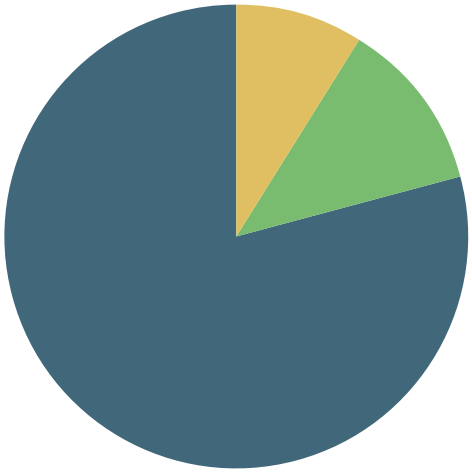
Unleaded Petrol 8%

# Council's Green House Gas Emissions

## COUNCIL'S EMISSIONS SNAPSHOT

Typically emissions are classified into three Scopes explained below.

| | Description | Examples |
|---|---|---|
| **SCOPE 1** | Emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level. | Fuel combustion, manufacturing processes , fugitive emissions, production of electricity |
| **SCOPE 2** | Emissions released to the atmosphere from the indirect consumption of an energy commodity. Scope 2 emissions from one facility are part of the scope 1 emissions from another facility. | Electricity that is transmitted to a certain area examples include energy used to power buildings, lighting, and plant/equipment |
| **SCOPE 3** | Indirect GHG emissions other than scope 2 emissions that are generated in the wider economy. They occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business. | Air travel, car travel, shipping, waste, paper use. |



**Council's GHG Emissions by percentage for each scope, FY 2019/2020.**

- Scope 1 - 12%
- Scope 2 - 79%
- Scope 3 - 9%

Scope 2 was the largest contributor of emissions accounting for 79% of the total emissions in FY 2019/2020. Scope 1 was the second highest emission contributor accounting for 12%, while scope 3 was the lowest contributor of emissions accounting for only 9% of total emissions

In FY 19/20, Council's total GHG emissions footprint was 17,201.69 tonnes, details of the emissions footprint are expressed in the table below. Within FY 19/20, scope 2 was the largest contributor of GHG emissions accounting for 13,595.86 t CO2-e. GHG emissions from all waste activities (excluding electricity use from waste-related buildings) have been omitted. Emissions data from Council's waste services are not currently collected for both Council operations and the broader community's waste services. Emissions from sewer treatment activities have also been omitted as this data is not currently quantified.

Bottled gas is mostly used by plant and equipment and, to provide cooking facilities in Orange's 'Parks and Gardens'

**Emissions footprint for FY 19/20 in Tonnes of CO2-E**

| Emission source | Activity Data | Units | Scope 1 t CO2-E | Scope 2 t CO2-E | Scope 3 t CO2-E | Total t CO2-E | % |
|---|---|---|---|---|---|---|---|
| Diesel for fleet | 421.7 | kL | 1138.59 | | | 1139 | **6.62%** |
| Petrol for fleet | 36.6 | kL | 87.84 | | | 88 | **0.51%** |
| Natural Gas | 14,534 | Gj | 754.39 | | | 754 | **4.39%** |
| Bottled Gas | 3100 | L | 4.96 | | | 5 | **0.03%** |
| Electricity use Street lighting | 2,555,595 | kWh | | 2,069.63 | 229.96 | 2,300 | **13.37%** |
| Paper consumption | 11.9 | Tonnes | | | 107.78 | 108 | **0.63%** |
| Electricity use council assets | 14,293,988 | kWh | 1.62 | 11526.23 | 1280.69 | 12809 | **74.46%** |
| **TOTAL** | | | **1,987.4** | **13,595.86** | **1,618.43** | **17,202** | **100.00%** |

## 3.3 Future Strategies

Emissions Reduction Approach

### BACKGROUND

At the 2019 United Nations Climate Action Summit, experts warned that current global commitments to cut GHG emissions will likely lead to global temperature increases between 2.9°C and 3.4°C by 2100. The NSW Government has committed to reach net zero emissions by 2050 (Environment NSW, 2016). This requires action by governments, communities and businesses. Carbon emission reduction actions include carbon-positive energy efficient buildings, smarter infrastructure, renewable energy technologies, waste solutions, sustainable transport services and increasing canopy cover and green restoration projects (Net Zero Plan, 2020). The following are priority emissions sources based on NSW's emissions profile.

### STATIONARY ENERGY

Stationary energy covers energy used to power buildings, factories and infrastructure. It is the largest sector contributing 60% of NSW's GHG emissions in 2017, primarily from public electricity production. For community inventories, it usually represents the largest source of emissions and includes things like electricity consumption and the combustion of natural gas in heaters and boilers (Environment NSW, 2016).

### TRANSPORT

The transport sector contributes to 21% of NSW's GHG emissions, with road-based transport contributing almost 84% of this figure.

A sustainable transport future can provide many benefits within a community including:

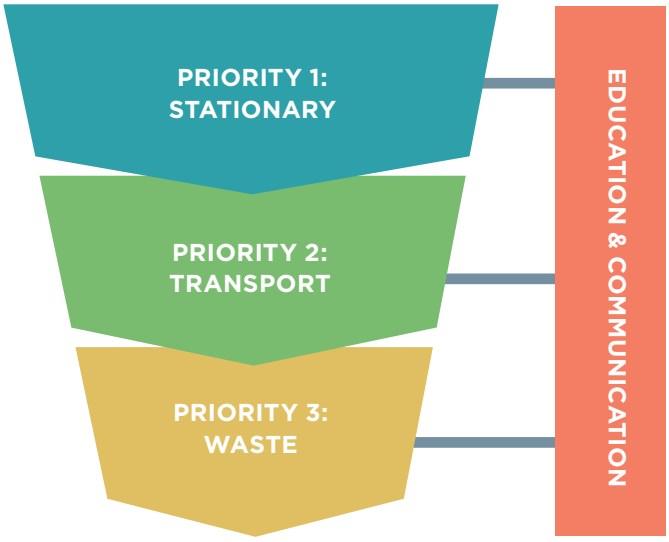
- Increased mobility for all members of the community
- Improved air quality through reduced emissions from cars and trucks
- More active communities
- Improved safety outcomes for pedestrians and cyclists
- Reduced isolation by improving access to facilities and connectedness

### WASTE

Waste accounts for 2.2% of total emissions from NSW in 2017. These emissions are associated with breakdown of organic matter in landfills and waste water treatment facilities, emitting methane (CH4), one tonne of food waste in landfill emits 1.9 tonnes of CO2 – equivalent emissions, as it breaks down over 100 years (DPIE, 2018).

### EMISSIONS REDUCTION PRIORITIES

Council's approach to operational emissions reduction actions will be prioritised according to their NSW emissions profile. 1- Stationary Energy. 2 -Transport. 3- Waste. Education and communication relate to all priority areas equally.



## FUTURE TECHNOLOGIES

Digital advances have led to the popularity of the concept of smart cities, and is seen as a major driver for sustainable transformation. Digital solutions can improve efficiency in a city's service provision and deliver more effective energy use management. Orange is currently planning the future of our city which includes consideration of smart technology and an emphasis on energy efficiency and renewable energy use.

## ELECTRIC VEHICLES & CHARGING STATIONS

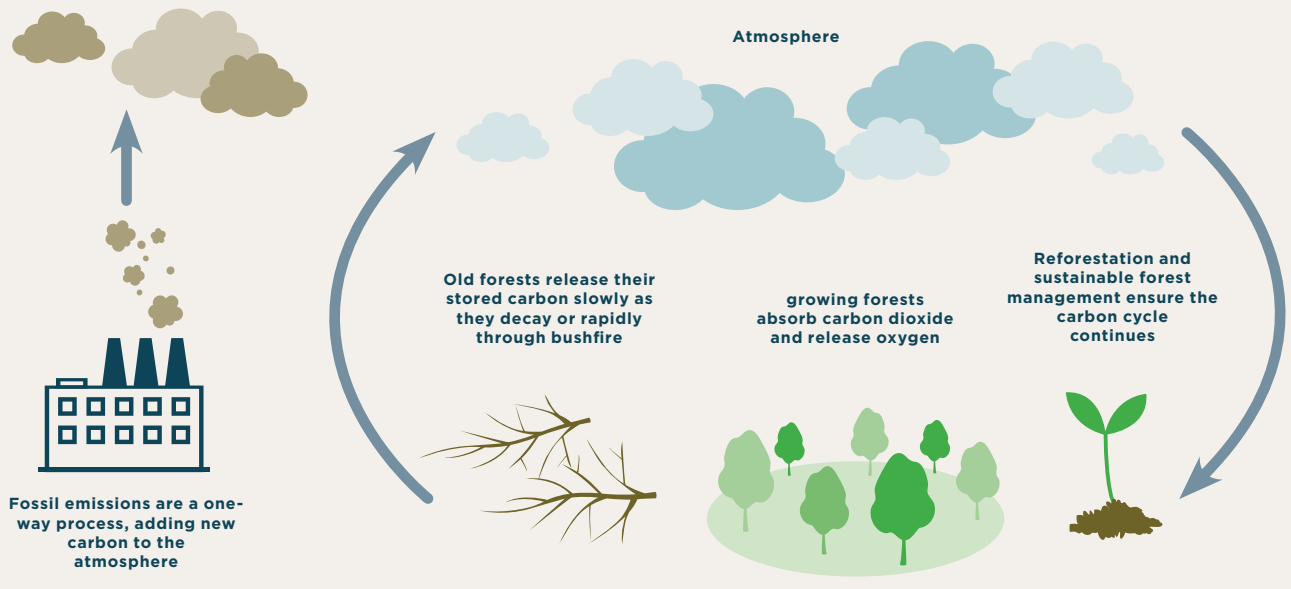
With intervention by the NSW government, falling purchase prices, model availability and increase in the difference between petrol/diesel fuels and electricity as a fuel source; all new vehicle sales of electric and hybrid vehicles are expected to reach 49% by 2030 and 100% by 2040. There are two primary barriers to widespread electric vehicle adoption in New South Wales: the lack of convenient, fast charging infrastructure and the limited range of affordable electric vehicles. In 2019, the NSW Government released its Electric and Hybrid Vehicle Plan to help overcome these barriers in NSW (Electric Vehicle Council, 2019). With the expected increases in electric and hybrid vehicles, community members and tourists wanting to visit our region will require EV infrastructure to be made available. It is important that we use this opportunity, and have the potential, to ensure renewable energy sources are powering this electric vehicle network to gain the full benefits of lower emission transportation for our region (Energeia, 2018).

## BIODIVERSITY

Planting and retaining urban and rural trees and forests is one mechanism to reduce carbon dioxide from the atmosphere. Trees are a carbon sink, storing carbon for as long as the tree has physical form, alleviating impacts from carbon emissions. All plants are known to store carbon as they undergo photosynthesis, however trees and shrubs live longer and therefore store the carbon longer (USEPA, 2015).

The role of trees and forests in combating climate change is recognised as one of the most practical and affordable methods to combat climate change. An important result of the 2015 Paris climate talks emphasised the importance of this preservation. The new climate agreement set goals on reducing emissions from deforestation and degradation of global forests. Planting trees and preserving existing forests can play a role in helping reduce GHG emissions and mitigate effects of climate change (UNCC, 2015). The significance of biodiversity to climate change can be considered in actions 1.1, 1.3, 1.5 & 1.8 of this plan. Orange City Council's Local Strategic Planning Statement also provides the mechanism, actions and additional plans which address the future of biodiversity in Orange.

**The players in the carbon cycle and the role that growing forests play in storage of carbon.**



## CARBON SEQUESTRATION

Carbon sequestration is the process of capturing and storing carbon dioxide found within the atmosphere. It is used as a method of reducing the amount of carbon dioxide in the atmosphere with the goal of reducing climate change. Carbon is stored within sinks such as forests, woody plants, mangroves and soils.

Sustainable land and water management practices are key for carbon sequestration. Some key practices include:

- Revegetation of cleared land areas
- The use of woody crops in farming landscapes (e.g. farm forestry, renewable bioenergy crops, carbon crops and fodder shrubs)
- Managing annual cropping and grazing practices in ways which retain more carbon in soil
- Maintaining or increasing the health of natural vegetation systems and remnant vegetation on farms.

## ENERGY MANAGEMENT STRATEGIES

Energy management is one of the most demanding issues presented within cities, therefore significant attention and effort needs to be dedicated to developing strategies for the management of a city's electricity, gas, water and renewable energy infrastructure. Cities constantly aim to deal with or mitigate, through the highest efficiency and resource optimisation, the problems generated by rapid urbanisation and population growth. Due to this, many countries have an increasing tendency towards the smartening of their cities, and strive to achieve on-going improvement and innovation.

Local governments aiming to reduce their city's energy usage and reduce emissions might begin by implementing a strategic energy management plan for local government operations. Within this plan, an energy usage reduction goal could be established. Cities that practice energy efficiency and environmental stewardship do so across city operations and localise their best practices for certain buildings or building portfolios. Council would benefit by implementing an energy management strategy to reduce energy usage, costs and emissions (Ironbark Sustainability, 2019).

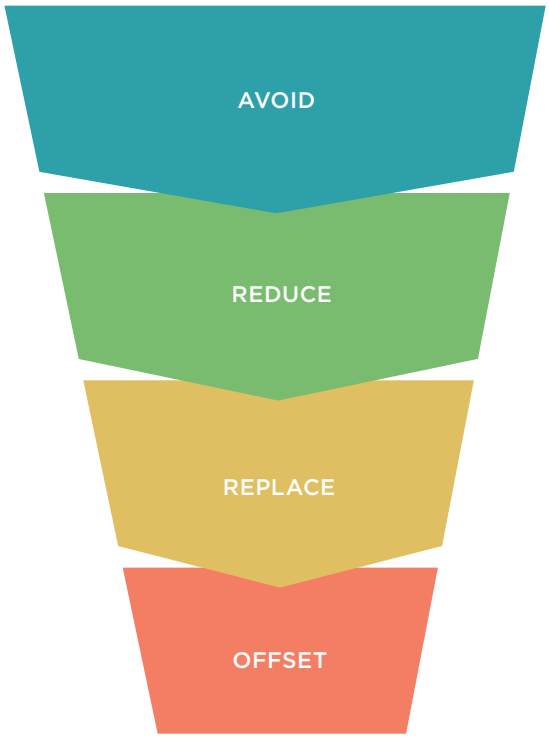
## EVIDENCE-BASED CLIMATE ACTION PLANNING

It is important that the Council is able to fully understand its current impacts on climate change and its role in creating change in order to better plan effective mitigations actions. Developing and analysing Council's corporate emissions profile will provide the critical evidence for decision making and to take adequate actions,

## IDENTIFYING OPPORTUNITIES TO REDUCE EMISSIONS

Council can first investigate ways to reduce corporate emissions, starting with the sources of highest emissions identified in a corporate emissions profile. In this step, Council can identify as many options as possible and later refine through the emissions reduction pathway.

Emissions reduction actions can be considered according to the hierarchy outlined below




(Ironbark Sustainability, 2019).

Ironbark Sustainability are Australian Local Government climate change experts. They are a consultancy that has worked with 260 councils and their communities across Australia since 2004 to reduce greenhouse emissions, tackle climate change and implement sustainability projects and programs. Iron Bark Sustainability were funded by NSW DPIE to provide the NSW local government area CO2 emissions snap shots. Ironbark Sustainability's research and suggested actions have been referenced throughout this plan.

## INTERVENTION PLANNING PROCESS OVERVIEW.

The following outlines the broader process which can be used to establish robust planning and action on climate change.


(Ironbark Sustainability, 2019).

## IRON BARK SUSTAINABILITY'S INTERVENTION PLANNING DETAILED PROCESS.

| | |
|---|---|
| **1. Insight** | |
| Corporate emissions Inventory | Almost 72% of Australian Councils have a corporate GHG inventory, either developed internally or with expert assistance. It is evident that Councils are now taking the extra step to get their inventory accredited as 'Climate Active' for carbon neutral status. It is important for local government to develop corporate emissions inventories to deliver emission reduction requirements best suited. |
| **2. Target** | |
| | Climate change targets establish leadership and demonstrate commitment to action. |
| Science Derived Targets | Science derived targets, are targets that aligns with the Paris Agreement. In the age of the climate emergency, working to a science derived target is the better way that a council can prove that they are taking the required action. |
| **3. Strategy** | |
| Evidence based Action Planning | Climate action planning should always be based on data that demonstrates the available opportunity, future projections and the reductions possible; this is evidence-based action planning. Evidence-based action planning framework can provide a detailed understanding of the most relevant, and effective approaches available to our council, and the relative costs and carbon abatement potential of these interventions. This enables Councils to make informed decisions and drive significant and measurable carbon reductions within our community |
| **4. Action** | |
| Collaborative planning | Collaborative planning processes across all council departments. |
| Project Management | Managed the delivery from feasibility studies, through procurement, and implementation of renewable energy, and energy efficiency projects |
| Policy and regulation development | Support the development or adjustment of policies and regulations that result in emission reductions. This includes through road specifications, planning regulation, climate policies or others. |
| Advocacy coordination | Develop materials to ensure council is able to leverage our influence at the state and national level to achieve our targets. |
| **5. Evaluate** | |
| | It is essential council monitors results and share what we learn so that we can understand the effectiveness of interventions and so that the evidence base in this field can continue to grow |
| KPIs, Trigger Points and Capacity Building | Key Performance Indicators (KPIs), suggested monitoring frequency, and Trigger Points help council evaluate if a project is going to plan.<br><br>Elements of your plan that express what you want to achieve by when. They are the quantifiable, outcome-based statements you'll use to measure if you're on track to meet your goals or objectives.<br><br>Trigger Points - a particular circumstance which causes an event. |

# 4. Adaptation

Adaptation to climate change is defined as an adjustment in natural or human systems in response to actual or expected climatic change or its effects, which moderates harm or exploits beneficial opportunities. It may be risk treatments developed and implemented by an organisation in response to a climate change risk assessment, and can be regarded as a type of climate change adaptation.

## 4.1. Adaptation measures achieved

The rationale for all adaption measures is that a changing climate is more unpredictable and has many consequences, especially with unstructured and non-strategic growth and development. The following are key examples of adaptation measures achieved by Orange City Council.

### CADIA RE-USE SCHEME

Approximately 65% of the final treated effluent from Orange's Waste Water Treatment Plant (WWTP) is exported to a gold/copper mining venture, Cadia Valley Operations, located approximately 25kms south of the city. This equates to an average of 9ML per day. The treated effluent is a prioritised water source for the mine and is used in the ore extraction process. The remaining 35% of treated effluent produced at the Orange WWTP is discharged to Blackmans Swamp Creek.

### STORMWATER HARVESTING

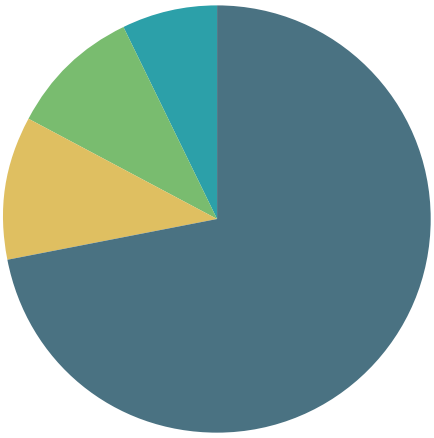
The Blackmans Swamp Creek stormwater harvesting scheme is the first large scale, indirect-to-potable stormwater harvesting project in NSW. Blackmans Swamp Creek and Ploughmans Creek stormwater harvesting scheme began in 2008. The scheme is ultimately capable of providing up to 2000 mega litres (ML) of additional water into Orange's water supply each year. This represents up to 35% of the cities normal annual water usage. The overall concept of the storm water harvesting scheme involves capturing the portion of high flows from Blackmans Swamp Creek and Ploughmans Creek during storm events and after treatment, transferring this water into the nearby Suma Park Dam.

- Combined average harvesting potential of these projects is 1,350ML/year
- Blackmans Swamp Creek = up to 850ML/year
- Ploughman's Creek= 500ML/year

During winter months, snow has also been known to deliver a boost to water catchment. E.g. 12th of August 2019 snow increased flows from 5.6 % to 28.3%, roughly 52ML.

### DUAL WATER SUPPLY

Council has also been investigating the best use of its stormwater through implementing a dual pipe system. Recycled waste water was not an option for Orange City Council as 65% is allocated to Cadia Valley Operations, and a 35% is used as an environmental flow into Blackmans Swamp Creek. Dual pipe systems aim at reducing the consumption of drinking water and make the most of all water sources. A dual pipe system is supplied with non-potable (recycled wastewater) and potable water. Non-potable water is used to supply household uses which do not require drinking standard water e.g. (garden irrigation and toilet flushing). Dual pipe systems have been included in all houses built in the Ploughmans Valley and North Orange since 2005.



**Orange water consumption second quarter 2020**

- Residential 72%
- Non-residential top 50 - 11%
- Non-residential remainder -10%
- Non revenue 7%

The two different kinds of water and their uses used in the dual water supply system are explained below:

**Potable Water:**

The water which flows from your kitchen taps and your baths/showers is sourced from Suma Park dam. From the dam, it is then pumped to the Orange Water Treatment Plant, where it is highly-treated to Australian industry water standards to produce drinking-quality water. It is then pumped to reservoirs and households through pipelines.

**Non-potable water:**

The water which flows from your purple coloured outdoor taps and into your toilets is sourced from Orange's network of wetlands and the Ploughman's Creek & Blackmans Creek stormwater harvesting scheme. From the wetlands and stormwater harvesting schemes, it is pumped to the stormwater storage ponds near the Narrambla Industrial Estate where sediments can settle. It is then sent to nearby treatment facilities which includes ultra-violet (UV) light treatment delivering high-quality water that is fit for use on lawns and for flushing toilets. It is then pumped through a separate system of reservoirs and pipelines to residents in the Ploughmans Valley and North Orange areas.

This reduces potable water consumptions, reducing water in Ploughmans Valley and north Orange by 29%. Alongside additional household savings (e.g. use of water efficient fittings), homes will achieve minimum 40% water saving requirement by BASIX sustainable planning measure. The completed dual water scheme (4,500 households) is estimated to use 330ML of stormwater for non-potable household uses.

## FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Orange City Council is responsible for local planning and land management in Blackmans Swamp Creek floodplain. Council is developing a floodplain risk management plan in accordance with the NSW Floodplain Development manual. The policy provides a floodplain risk management system comprising of stages, including:

- Flood Study- determines the nature and extend of the flood problem
- Floodplain risk management study- evaluates management options for the floodplain, existing and future.
- Floodplain risk management Plan- Involves adoption of the management of floodplain.
- Implementation of the plan- Involves construction of flood mitigation works, ensures control measure are compatible with flood hazards.
- Review of plan- Review is carried out after 10 years.

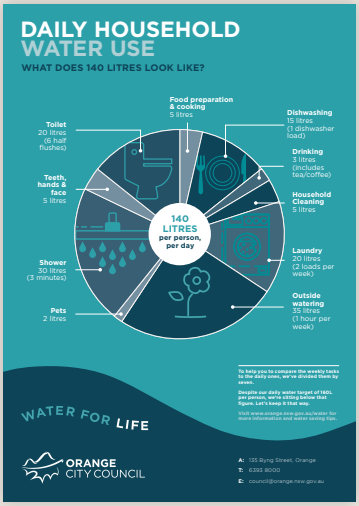
## WATER AUDITS

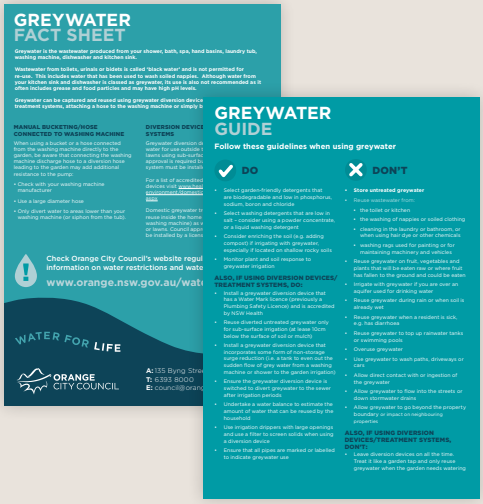
Both residential and business building owners were subject to water audits, finding where there may be issues in their water use, for example leak detection. Recommendation letters were given priority to the top 50 largest water users, implementing water saving action plans that aimed at reducing potable water use, and identified alternate water sources. For example, the use of water tanks for large water users such as pubs, clubs and the golf course.

## COMMUNITY ENGAGEMENT IN WATER CONSERVATION

Community engagement included a shower head exchange program, the promotion and incentives for dual flush toilets, aerators on taps and rainwater tank subsidies. All programs are aimed to facilitate water savings. It is clear that this requires greater input.

**water for life campaign - community engagement examples**





## INTEGRATED WATER CYCLE MANAGEMENT EVALUATION STUDY

The Orange City Council Integrated Water Cycle Management (IWCM) Evaluation Study identifies catchment, water resource and urban water cycle management issues relevant to the management and operation of Council's urban water service business. Integrated Water Cycle Management is a planning process developed by the NSW Department of Water and Energy (DWE), with defined steps to effectively integrate water supply, sewerage and stormwater to achieve sustainable management of these services. IWCM is a way of managing water in which all components of the water system are integrated so that water is used optimally.

For a local water utility such as Orange City Council, this means that the three main urban water services – water supply, sewerage and stormwater – are planned and managed in an integrated way to ensure that the maximum value is obtained from the resources and that benefits to the environment and community are realised.

IWCM deals with the complex linkages between the different elements of the water cycle. It addresses issues facing local water utilities as well as the more general issues facing the environment.

IWCM considers issues such as:

- The future urban water service needs and customer expectations.
- The availability of water including water sources such as surface water, groundwater, rainwater, effluent and stormwater; and
- The impact of water, sewerage and stormwater on other water users including the environment and future generations.

The current OCC IWCM was implemented in 2013 but is now being revised. Clear input from WSC could be significantly beneficial, and ultimately provide further guidance on improving the natural and built environment of Orange.

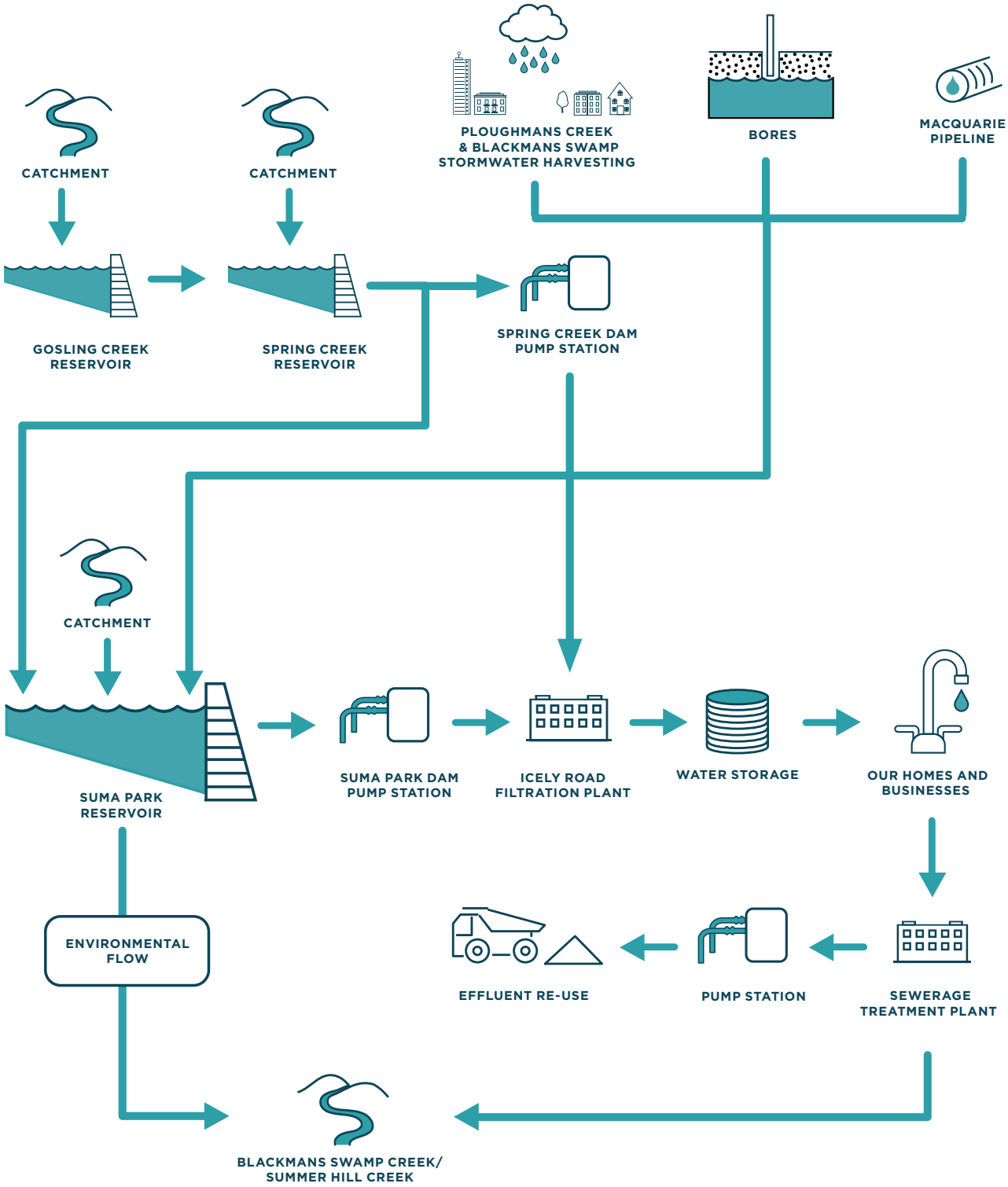
## THE OPERATION ENVIRONMENTAL MANAGEMENT PLAN (OEMP) ORANGE RAW WATER SUPPLY SYSTEM

The OEMP includes:

- Spring Creek and Suma Park Dams;
- The Blackmans Swamp Creek stormwater harvesting scheme (BSCSHS);
- The Ploughman's Creek stormwater harvesting scheme (PCSHS);
- Water supply bores
- The Macquarie River to Orange pipeline (MOP)

The objective of this OEMP is to provide a documented system that will help ensure environmental requirements and commitments made during the approvals process and conditions in other relevant licences and approvals are being implemented, monitored and reviewed when operating the Orange raw water supply system.

# Where does our water come from?




**The Orange raw water supply system**

## COUNCIL'S USE OF WATER SENSITIVE URBAN DESIGN

The role of Water Sensitive Urban Design (WSUD) to minimise impacts of urban development on the water cycle, aims to maximise water reuse in the urban environment and to keep water that is captured by individual house blocks. Key uses of WSUD is to help mitigate impacts from urban development. There is clear evidence of Water Sensitive Urban design throughout Orange, for example:

- Stormwater runoff from the precinct is managed through appropriate detention basins to manage volumes, quality and runoff speeds to pre-development levels.
- Raingardens are incorporated into public open spaces to manage the runoff speeds and water quality.
- Development of individual lots minimises impermeable surfaces to reduce the extent of runoff.
- Development of individual lots includes raingardens to minimise discharge rates and improve water quality.

## SUSTAINABILITY FEATURES AT ORANGES WASTE WATER TREATMENT PLANT (WWTP)

### Biogas

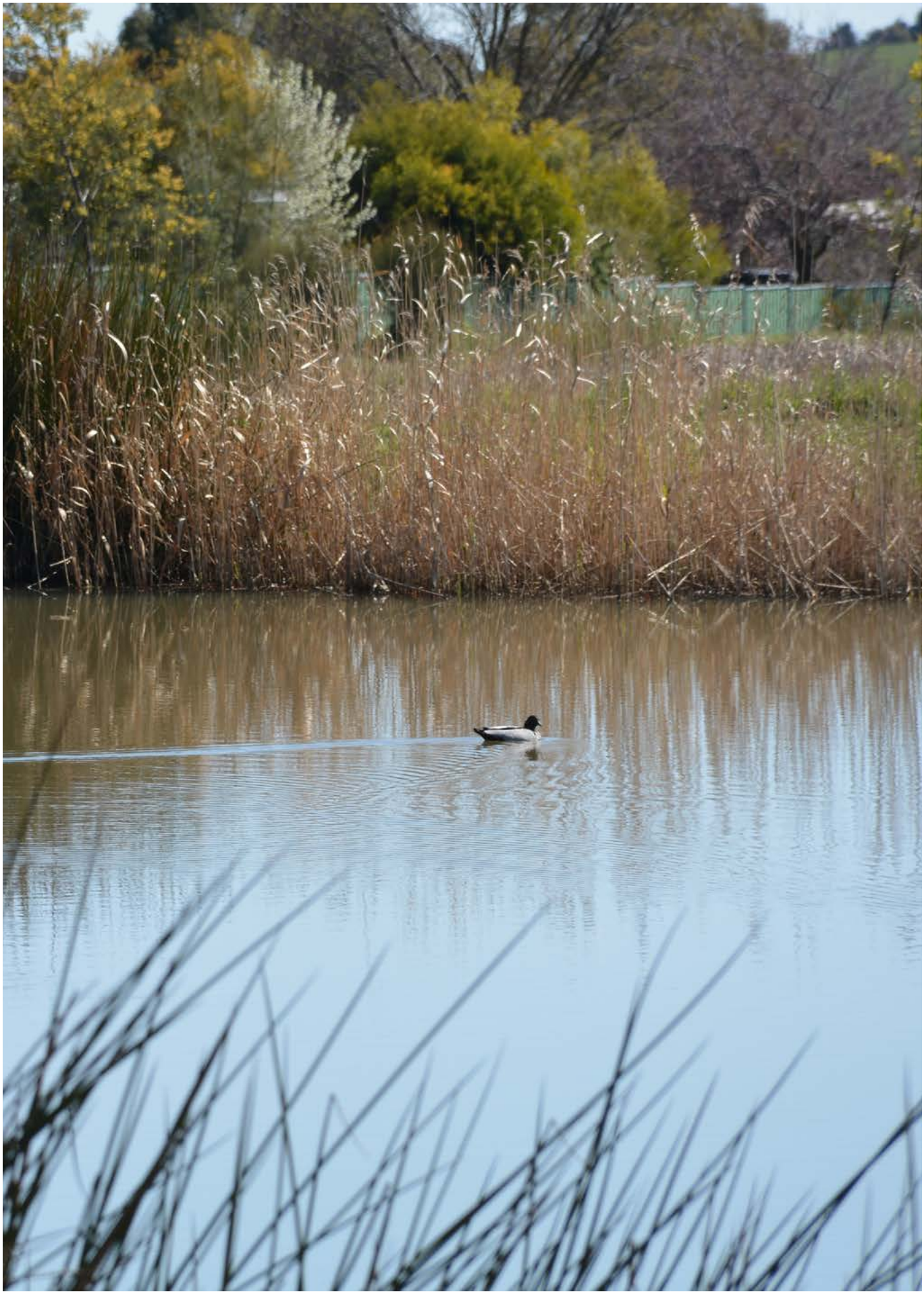
The Orange WWTP uses an anaerobic digester to break down and stabilise the faecal matter (sludge) removed from the wastewater stream. One of the by-products of this digestion process is methane, a gas that can be used as a fuel source. Council uses this methane to fuel boilers that keep the sludge in the digester at a constant temperature of 35 °C. Given the beneficial use of the methane, it is termed biogas

### Bio-solids

Stabilised sludge is removed from the anaerobic digester after an average of 25 days. Excess water is removed via a centrifuge so it can be transported for beneficial re-use. Historically, Council has provided the nutrient rich bio solids to farmers for use as a fertiliser in broad-acare cropping. From 2007, Cadia Valley Operations has used the bio solids for rehabilitation purposes.

### Biological Nitrogen Removal

This is an advanced form of secondary treatment that uses flocculated aerobic bacteria to markedly reduce nitrogen and carbon levels in the wastewater stream. As a result, the treated effluent discharged to Cadia Valley Operations and the Macquarie River catchment is of fit quality.



## 4.2. Adaptation approach

The Enabling Regional Adaptation (ERA) process has been designed to develop a shared understanding among stakeholders of the likely vulnerability to climate change and stimulate action to plan adaptation. The Western Enabling Regional Adaptation Report (which Orange is involved) has been published by the NSW Office of Environment and Heritage (2017). The ERA process provides a credible evidence base to inform government adaptation planning by developing regional understanding of the impacts of projected climate change and vulnerability for key systems. It also builds on the capacity of decision-makers to capture opportunities for regional climate change adaptation projects between sectors across local and state government. Through this process the ERA established several implications from the expected physical responses for the Central West Orana.

## 4.3. Climate Change Risk Assessment

Beyond the ERA and to align with Council's Climate Change Strategic Policy and as part of the recommended review cycle proces, Council is conducting a review of its Climate Change Risk Assessment (CCRA). The aim of the CCRA is to:

- Identify potential risks to Council service areas as a result of climate change.
- Analyse risk statements to determine preliminary level of risk.
- Evaluate risks to develop a list of priority risk statements.
- Identify adaptation actions through literature review and brainstorming.
- Re-analysis of risk statements to determine effectiveness of adaptation actions.

Climate Change projections for the Orange region which have been used to determine risk can be can be found in Appendix 6.

### CLIMATE CHANGE RISK ASSESSMENT METHODOLOGY STEPS

**Identify the risks**

The identification of risks will consist of developing several risk statements through a brainstorming session which investigates the effects of the climate change impacts. Each risk statement should be developed as a cause-effect statement which describes what may happen to specific services and assets as a result of climate change impacts.

**Analyse and evaluate the risks**

Each risk statement will be analysed by determining its likelihood and consequence. The methods used will be consistent with AS/NZS ISO 31000:2009 and are adapted from the Commonwealth Government's Climate Change Impacts and Risk Management – A Guide for Business and Government. Council will use the existing corporate risk management framework.

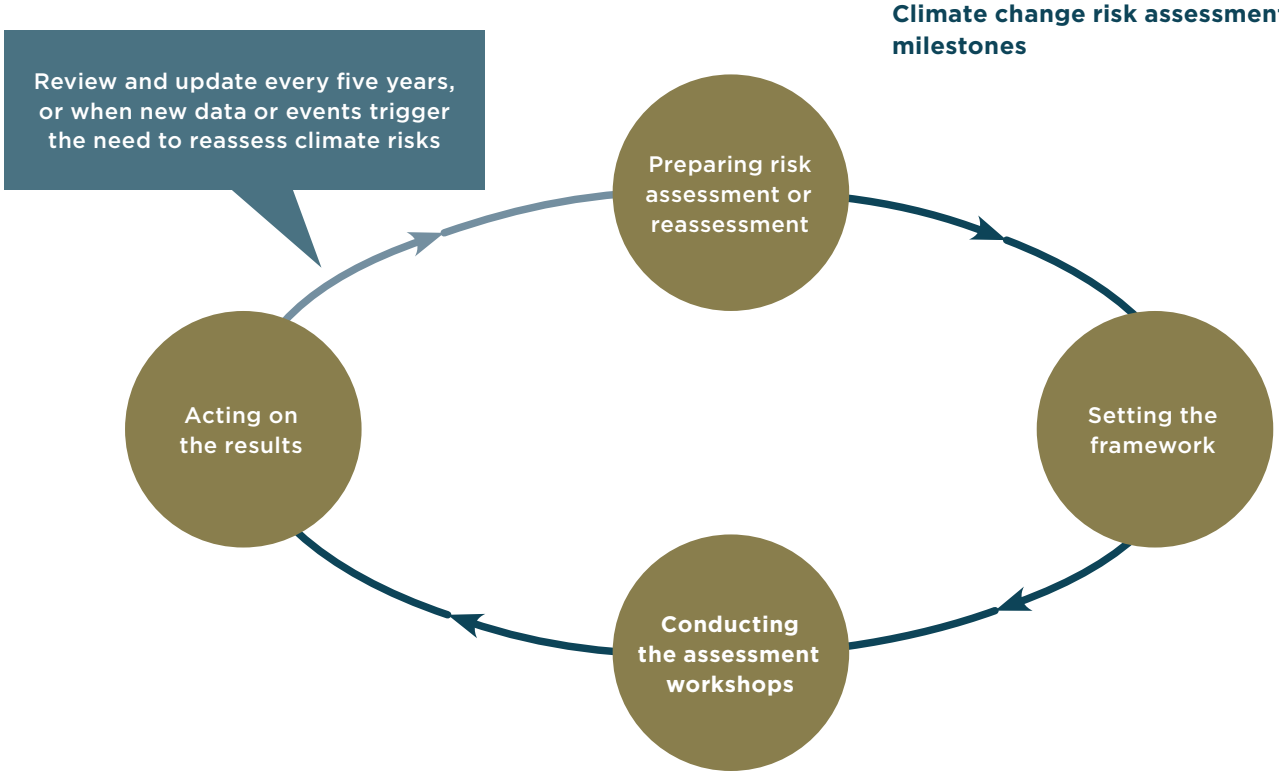
**Establish appropriate adaptation options**

Key risks which are identified will be grouped into similar themes. Adaptation options targeting each risk will be established through internal workshops with council staff. Some adaptation actions are able to be applied across multiple workshops.

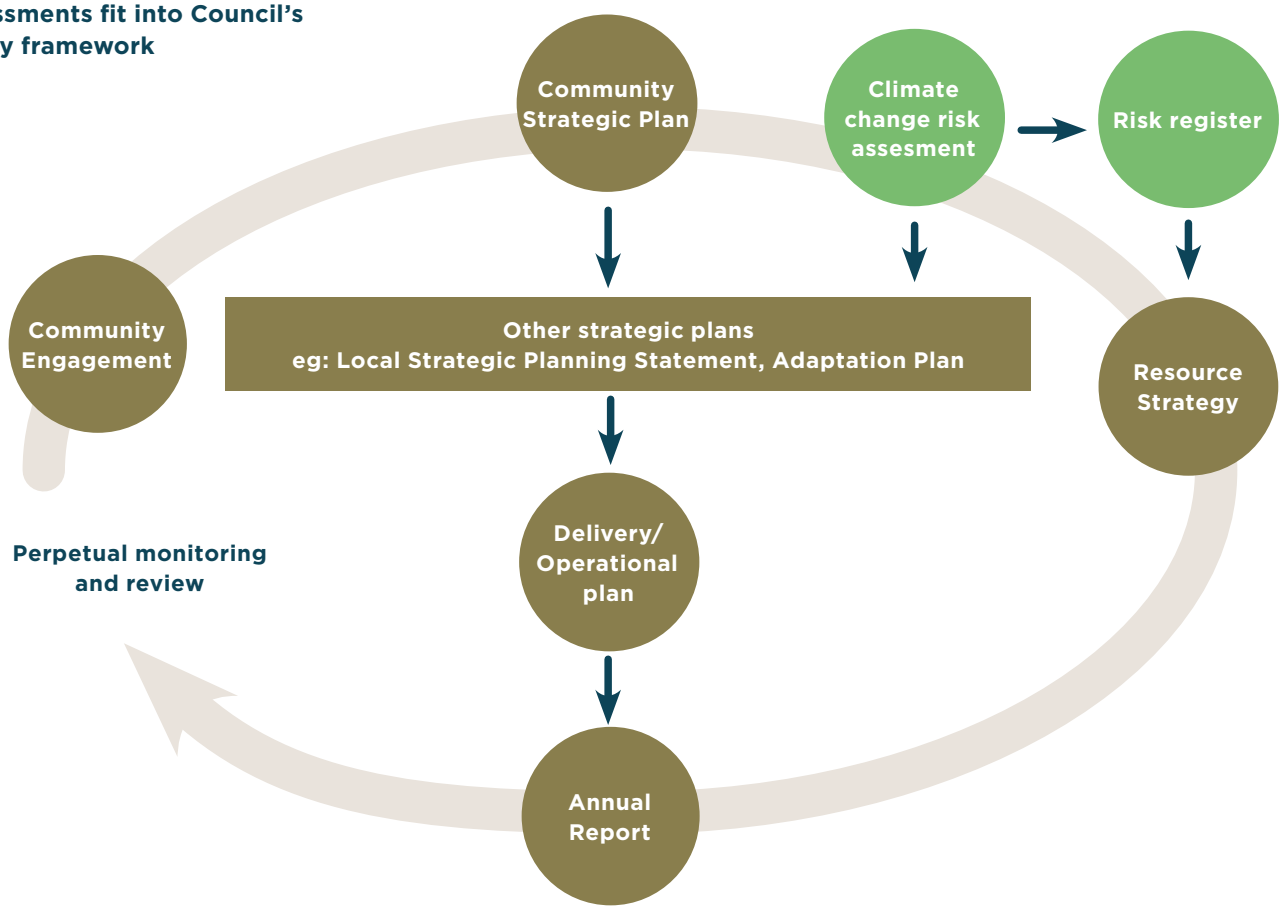
**Review implementation of adaptation options**

Once appropriate adaptation actions are adopted, it is critical that the associated risks and adaptation actions are incorporated into 'Business as Usual' processes. For Council this could be through the existing Integrated Planning and Reporting framework

**Climate change risk assessment milestones**




**How climate change risk assessments fit into Council's policy framework**

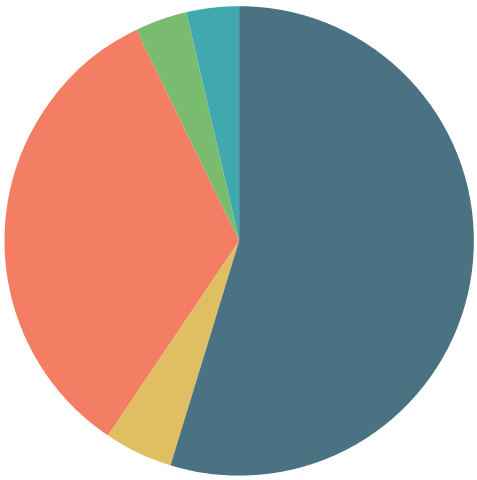


# 5. Community Emissions and Council's Role

## 5.1 Orange Community Emissions

The Orange Local Government Area (LGA) is smaller in area relative to the state average, however it does have a high urban density. The results found in the following pie chart represent the major sources of carbon emissions from the entire LGA. It was developed to be consistent with the Global Protocol of Carbon Emissions reporting (GPC Protocol), the core international standard for cities and local government areas. With input from Australia's leading experts and based on decades of experience working with hundreds of Councils and community groups throughout Australia, the snapshot data, methodology, and calculations have been independently verified and endorsed by the International Council for Local Environmental Initiatives (ICLEI) Oceania, Sustainability Victoria, the NSW Department of Planning, Industry and Environment (DPIE) and Renew (National Sustainability NGO) (Ironbark Sustainability, 2020).

Orange's major emission source is 'electricity consumption', representing 54.74% of total community emissions. This is due to the scale of population and commercial activity. The second largest source of emissions is 'on road transportation', representing 33.44% of total community emissions. Gas, waste and agriculture were the smallest sources of community emissions. 'Gas' emissions accounting for 4.83%, 'Waste' accounting for 3.58% and Agriculture representing only 3.45% of total community emissions The 'industrial sector' is the largest source of emissions within both electricity and gas. 'Residential' is the second largest source and 'Commercial' being the smallest source of emissions. 'On-road travel' was the largest source of emissions for 'transport', while 'landfill' was the largest source of emissions for 'Waste' (Ironbark Sustainability, 2020)



**Orange total municipal emissions**

- Electricity 54.74%
- Transport 33.44%
- Gas 4.83%
- Waste 3.58%
- Agriculture 3.43%

## 5.2. Orange City Council as a Leader for the Community

Although Orange City Council does not itself account for a large portion of Orange's emissions, it has an important role to play in demonstrating how to operate more sustainably, share knowledge, enable action and encourage innovation and new industries. Orange City Council can also work collaboratively with other levels of government, business, industry and advocacy groups to ensure that the Orange community is supported along the way to reduce our collective emissions and provide new and meaningful opportunities to achieve this.

## 5.3 Climate Change Communication

Effectively communicating about climate change is complex, confusing and at times overwhelming, while often being emotionally or politically loaded (Psychology.org.au, 2020). Over the last 10 years the climate change landscape has significantly changed. Observations seen across the world include the heating of oceans and air, changing rainfall patterns, an increase in bushfires and significant biodiversity loss and ecosystem destruction.

Correctly communicating climate change, the impacts and actions that can be taken to reduce both our risks and our impacts is imperative. This should be done in a manner which supports the Strategic Climate Change Policy, to lead and encourage our community to take action. Council's role is to communicate available future pathways and assist our community to realise opportunities which arise, to implement climate change action.

# 6. The Plan

## 6.1 Mitigation Actions

The following climate change action plan aims to reduce emissions from Council's' operations, build community and Council's capacity to deliver key objectives of the climate change strategic policy over the next 5 financial years. Each action references Council's current Cities Power Partnership commitments where applicable.

**DELIVERY MECHANISMS.**

- Business as usual -influencing existing programs, projects and works to incorporate delivery
- Planning for the future - separate approval, determined through future annual planning

## UNDERSTANDING COUNCIL'S OPERATIONAL EMISSIONS

This table describes actions that address the current issues in relation to understanding Councils emissions. Understanding our emissions can help us set a benchmark for reduction efforts. The deliverance of correct climate change mechanisms and timeframes are essential for mitigating climate change.

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | CPP | Policy Objectives Reference |
|---|---|---|---|---|---|---|
| 1.1 | Develop and analyse Council's full operational emissions profile. | Development Services | Planning for the Future | 2021-2022 | 1,2 | 1 |
| 1.2 | Establish robust emissions data collection systems and methodology. | Development Services | Planning for the Future | 2021-2022 | 1, 2 | 1 |
| 1.3 | Identify emission reduction pathways. | Development Services | Planning for the Future | 2021-2022 | 1, 2 | 1 |
| 1.4 | Understand business as usual emission trajectory. | Development Services | Planning for the Future | 2021 - 2022 | 1,2 | 1 |
| 1.5 | Identify opportunities to reduce emissions. | Development Services | Planning for the Future | 2021 - 2022 | 2 | 1 |
| 1.6 | Establish emission reduction targets. | Development Services | Planning for the Future | 2022-2026 | 2 | 1 |
| 1.7 | Define commitments and publish emission reduction targets. | Development & Corporate Services | Planning for the Future | 2022-2026 | 2 | 1 |
| 1.8 | Monitor, evaluate and review actions. | Development Services | Planning for the Future | Annually | 1,2 | 1 |
| 1.9 | Develop a communication strategy for this plan. | Development & Corporate Services | Planning for the Future | 2021-2022 | | 1 |
| 1.10 | Continually review Council's existing policies and recommend changes to ensure Council's climate change policy is adequately reflected. | Development Services | Planning for the Future | 2021-2026 | | 1 |

## DEVELOP A LOW CARBON CULTURE

As caretakers of Orange's public assets, we need to consider the needs of present and future generations, and at the same time respect the diversity and cultural heritage of our community. It is important to ensure that we integrate reconciliation and social inclusion into our actions, as well as sensitivity to heritage and the needs of the community when approaching climate change action

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | CPP | Policy Objectives Reference |
|---|---|---|---|---|---|---|
| 2.1 | Continue to engage with Orange's local Aboriginal community and provide opportunities to integrate Aboriginal knowledge, cultural diversity and social inclusion in Council's approach to climate change. | Development & Corporate Services | Business as Usual, Planning for the Future | 2021 - 2026 | 5 | 1,6,7,9 |
| 2.2 | Promote Council's emission reduction aims/achievements and options for patrons at our facilities to contribute to emissions reduction through sustainable choices of purchases and avoiding waste. | Development & Corporate Services | Planning for the Future | 2022 - 2026 | 5 | 1, 7,8,9 |
| 2.3 | Promote Council's emissions reduction aims/achievements to the broader community, modelling and encouraging emissions reduction actions by the community. | Development & Corporate Services | Planning for the Future | 2023-2026 | 5 | 1, 7,8,9 |
| 2.4 | Conduct Council staff training and behaviour change programs to ensure facilities and equipment are operated efficiently. | Development & Corporate Services | Planning for the Future | 2021 - 2026 | 5 | 2,7 |
| 2.5 | Establish an internal staff committee for the management and implementation of this climate change management plan. | Development Services | Future Planning | 2021 | 5 | 2,7 |
| 2.6 | Establish internal monitoring and reporting for the implementation of this climate change management plan. | Development Services | Planning for the future | 2021 - 2022 | 2,5 | 2,3, 7 |
| 2.7 | Report the progress on implementing the plan to the public and to Councillors annually. | Development Services | Planning for the future | Annually | 2,5 | 2,3, 7 |
| 2.8 | Engage with the community in making a low carbon culture a source of community pride. | Development & Corporate Services | Planning for the future | 2021 - 2026 | 5 | 2, 3,7,9 |

## COUNCIL EVENTS

Orange's liveability, thriving culture and environmental sustainability are a source of community pride. Working on reducing emissions from events and celebrations is important. Working with partners and suppliers calculating emissions is essential for the management of climate change.

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | CPP | Policy Objectives Reference |
|---|---|---|---|---|---|---|
| 3.1 | Develop communication materials and online communication campaigns to promote climate mitigation actions of our organisation at community facilities, information centres and events. | Development & Corporate Services | Business as Usual | 2021 - 2026 | 5 | 3,7,8,9 |
| 3.2 | Promote walking, cycling and public transport to event patrons. | Development & Corporate Services | Business as Usual | 2021 - 2026 | 3, 5 | 4,7 |
| 3.3 | Work with suppliers and event partners to reduce packaging and food waste and increase the number of carbon neutral products and services. | Development Services | Business as Usual and Future Planning | 2021 - 2026 | | 3,3,5 |
| 3.4 | Support events that promote climate change action through sponsorship, information stalls, expert speakers and communications material that promotes actions patrons can take to reduce their emissions. | Corporate Services | Business as Usual | 2022 - 2026 | 3, 5 | 2,7, |
| 3.5 | When the events guide is next reviewed, include information on how venues and event planners can reduce or offset emissions. | Development & Corporate Services | Future planning | 2021 - 2022 | 5 | 2,3,9 |
| 3.6 | Develop website content and/ or fact sheets tailored to small, medium and large events on how to reduce or offset emissions from venues, catering, transport and waste process and the process of carbon neutral certification (for large events). | Corporate Services | Future Planning | 2021 - 2022 | 5 | 2,3,5 |

## CARBON REDUCTION FOR COUNCIL BUILDINGS

Council's most recognised buildings are also some of the largest users of energy. The increased technology in relation to efficient buildings and renewable energy provide opportunities to reduce emissions and reduce ongoing costs. Orange City Council is committed to making the right decisions about community assets to monitor and eliminate GHG emissions.

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | CPP | Policy Objectives Reference |
|---|---|---|---|---|---|---|
| 4.1 | Establish an energy management strategy. Deliver emissions reductions from Council buildings by making the right decisions, with the right information and the right data and processes related to their energy performance. | Development & Technical Services | Business as Usual and Future Planning | 2021 -2022 | 1, 2 | 2,3,6 |
| 4.2 | Incorporate appropriate technology into the energy management strategy to guide actions to reduce emissions through the optimisation of current technology, procurement of new technology and future planning for a data centre. | Development & Technical Services | Business as Usual and Future Planning | 2021 -2022 | 1, 2 | 2,3,8 |
| 4.3 | Introduce staff to the energy saving features of their work place at induction sessions for new staff, and promote actions to save energy through internal staff engagement. | Development & Corporate Services | Future planning | 2023 -2026 | 1,2 | 2,4 |
| 4.4 | Integrate energy efficiency objectives into the plans, design, specifications, and tender documents for new Council buildings and capital upgrades. | Development Services | Future planning | 2021 -2026 | 1, 2 | 2 |
| 4.5 | Establish an energy management case study of a Council building which demonstrates a transferrable template for energy management across Council's buildings. | Development & Technical Services | Future Planning | 2021 -2026 | 1,2 | 2,4 |
| 4.6 | Include renewable energy technology into the energy management strategy. Continually assess the need and practicalities of renewable energy technology and implement where practical to do so. | Development & Technical Services | Future Planning | 2021 -2026 | 1,2 | 2,4 |
| 4.7 | Install appropriate renewable energy technology on Council buildings to offset energy usage and cost and reduce operational emissions. | Development & Technical Services | Business as Usual and Future Planning | 2021-2026 | 1 | 2,3,6 |

## CARBON NEUTRAL GOODS AND SERVICES

To increase the number of major contracts with carbon neutral services, Orange needs to consider the impact of emissions across the decision-making life cycle of purchasing and procurement. This includes the development, category management plans, tender documentation, key performance indicators and contract management and reporting.

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | CPP | Policy Objectives Reference |
|---|---|---|---|---|---|---|
| 5.1 | Measure and report emissions from major categories of supply and require contractors to report any large sources of emissions from sub-contractors. | Development Services | Future Planning | 2021 - 2026 | 5 | 2,3 |
| 5.2 | Train contract managers in key concepts relating to carbon neutrality to enable them to evaluate, negotiate and manage carbon neutral services. | Development & Corporate Services | Future Planning | 2020 -2021 | 5 | 2,3 |
| 5.3 | Work with Council's Joint Organisation (JO) and similar organisations to amplify market demand for carbon neutral goods and services. | Development Services | Business as Usual<br>Future Planning | 2021 - 2026 | 5 | 2,3,7 |
| 5.4 | Communicate organisational expectations for carbon neutral goods and services in the procurement policy, tenders and related documents. | Development & Corporate Services | Business as Usual | 2021 - 2026 | 2 | 3 |

## REDUCE CARBON EMISSIONS FROM WASTE

The waste generated by Orange City Council's operations includes waste from our offices and public facilities including community buildings, parks and gardens

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | CPP | Policy Objectives Reference |
|---|---|---|---|---|---|---|
| 5.5 | Promote operational waste avoidance, diversion from landfill and recycling through council staff engagement programs. | Development Services | Future planning | 2022 -2026 | 5 | 2,3 |
| 5.6 | Ensure Council's waste collection, office cleaning and parks and gardens maintenance support emission reductions from waste. | Development and Technical Services | Future planning | 2023 - 2026 | 5 | 2,3 |
| 5.7 | Collect and report data on waste from Council operations and facilities. | Development and Technical Services | Future Planning | 2022 - 2026 | | 2,3 |
| 5.8 | Promote waste avoidance and recycling to patrons at community facilities through clear signage, and investigate other options to improve waste avoidance and reduction. | Development Services | Business as usual | 2022 | 5 | 2,7,9 |
| 5.9 | Promote waste avoidance, diversion from landfill and recycling through community engagement programs. | Technical Services | Business as usual | 2020 - 20205 | 5 | 2,3,7,9 |

## REDUCED CARBON TRANSPORT

New vehicle technologies and alternatives transport that does not use fossil fuels can prevent emissions

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | CPP | Policy Objectives Reference |
|---|---|---|---|---|---|---|
| 6.1 | Promote walking, cycling and public transport options to Council staff for commuting and business travel. | Development & Corporate Services | Future Planning | 2022 - 2026 | 5 | 3,6 |
| 6.2 | Promote walking, cycling and public transport options to Orange's community for commuting and business travel. | Development & Corporate Services | Business as Usual and Future Planning | 2023 - 2024 | 5 | 6,7,9 |
| 6.3 | Investigate opportunities to increase the use of emission passive forms of transport and address existing barriers. | Development Services | Future Planning | 2026 | 5 | 2,6 |
| 6.4 | Ensure vehicle leasing and Council vehicles support efforts to increase vehicles that use zero carbon technology. | Technical Services | Future Planning | 2022 - 2026 | | 2,3 |
| 6.5 | Design car park charging facilities for the projected increase in electric vehicles. | Development and Technical Services | Future Planning | 2023 - 2026 | 3 | 2,8 |
| 6.6 | Survey, monitor and report Council's use of transport fuel and associated emissions. | Development and Technical Services | Business as Usual | 2021 - 2026 | | 2,3 |
| 6.7 | Apply fuel efficiency criteria to the purchase and lease of new vehicles. | Technical Services | Business as usual | 2021 - 2026 | | 2,3 |
| 6.8 | Increase the number of vehicles with zero carbon technology such as electric and hydrogen powered vehicles. | Development and Technical Services | Future Planning | 2021 - 2026 | | 3,6 |


RECYCLED
WATER
DO NOT
DRINK

## 6.2. Adaptation Actions

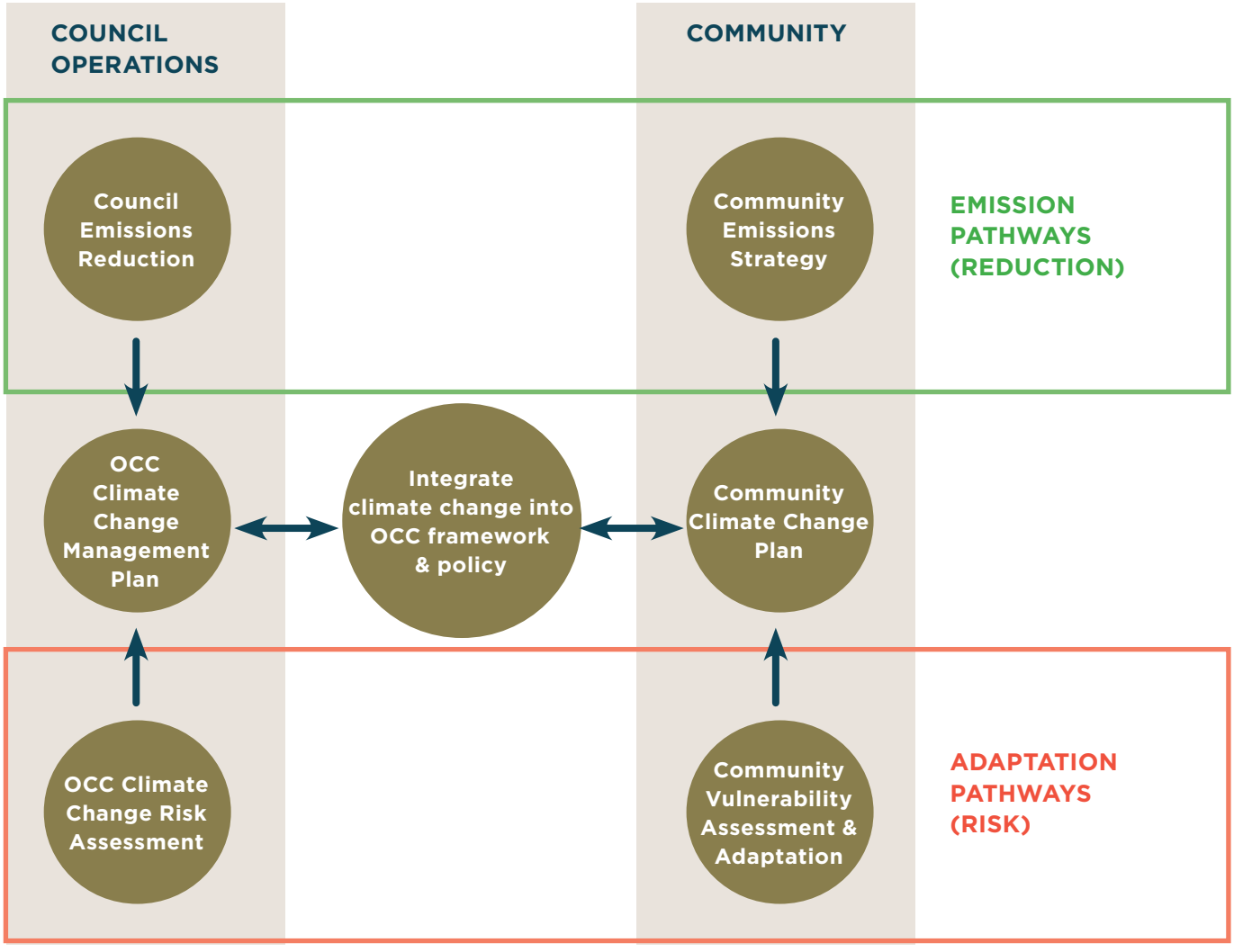
The actions found below were developed for Orange City Council to adapt to the current risks and issues that climate change is presenting and will present in the future.

| Reference number | Action | Work Area | Delivery Mechanism | Timeframe for Delivery | Policy Objectives Reference |
|---|---|---|---|---|---|
| 7.1 | Conduct Council's Climate Change Risk Assessment in line with Council's existing Corporate Risk Management policy. | Development and Corporate Services | Business as usual | 2021 | 2,3 |
| 7.2 | Consider climate change mitigation action planning, climate risk assessment and adaptation planning in the next review of the community strategic plan. | Development and Corporate Services | Future Planning | 2021-2026 | 2,3 |
| 7.3 | Incorporate identified climate change risks and adaptation options into existing corporate risk IP&R framework and appropriate 'business as usual' operations. | Development and Corporate Services | Future Planning | 2021-2026 | 2,3 |
| 7.4 | Develop communication materials and online communication campaigns to promote climate adaptation actions of our organisation at community facilities, information centres and events. | Development and Corporate Services | Future Planning | 2022 - 2026 | 2,3,7,9 |
| 7.5 | Review Council's Climate Change Risk Assessment. | Development Services | Future Planning | 2026 | 2 |

# 7. Implementation

## 7.1 Implementation Pathway

This pathway represents Council's proposed climate change action pathway. Initially, climate change risks and mitigation action planning will be considered and implemented operationally within Council to align with Council's Climate Change Policy and address Council's operational response to climate change. The emissions pathway refers to emissions mitigation actions (reducing the impact of climate change) and the adaptation pathway refers to taking action in relation to climate change risks (reducing the impact to council), this plan addresses both pathways. There is flexibility in our approach to climate change to assist the community further with climate change action planning and action implementation.



## 7.2 Implementation Mechanisms

The current mechanisms to support the implementation of this plan are as follows:

### COMMUNITY STRATEGIC PLAN

The Community Strategic Plan is Orange City Council's chief planning document and financial blueprint. It aims to outline the aspirations and needs of the Orange community together with expected levels of service alongside financial modelling, asset management strategies and projected resources.

The Community Strategic Plan is a 10-year plan to guide Council and community activity. It is a State legislative requirement to develop this plan which will provide the community with a blueprint for its long-term growth, community development and infrastructure renewal.

The community strategic plan is separated into themes, the following themes relate to the implementation of this plan.

**Preserve - Balancing the natural and built environment.**

This theme ensures that the unique natural, cultural, social and historical aspects of our community are preserved while recognising the need for growth and development. The community is strong in its desire to be more sustainable by promoting renewable energy, reducing waste and protecting our natural resources. There is also an expectation for infrastructure to support a growing city, with roads, footpaths, parking and a vibrant CBD seen as priorities.

**Objectives**

7.2. Ensure best practice use of renewable energy options for Council and community projects.

8.2. Develop and promote initiatives to reduce water, energy and waste in consultation with the community.

8.3. Promote the range of recycling services.

9.3. Ensure that an appropriate level of pedestrian amenity is provided throughout the community.

**Council's role**

- Initiate and implement environmental programs and projects.
- Encourage builders to offer energy efficient homes and renewable energy options in their designs.

**Community Participation**

- Reduce, reuse, and recycle.
- Compost kitchen and garden waste.
- Use the green bin.
- Use recyclable bags and say no to plastic.
- Install energy and water-saving options in your home.
- Retain and plant native vegetation and trees on your property.

**Measuring Our Achievements**

- An increase in the number of people participating in community engagement.
- Reduction in waste to landfill.
- Increase in the use of alternative energy sources.
- Increase in the number of residents caring for their natural environment.

### DELIVERY/OPERATIONAL PLAN 2018/19 – 2021/2022

The four-year Delivery/Operational Plan details how the strategies outlined in the 10-year Orange Community Strategic Plan will be implemented generally over the next four years, and specifically identifies annual tasks to be undertaken. The following actions from the Delivery/Operational plan relate to this plan.

## 7.2.1 Increase solar power

- Seek funding opportunities for solar expansion of Council facilities.
- Roll out of solar panels on Council assets where funding permits.

## 7.2.2 Maintain Cities Power Partnership membership

- Use membership to investigate sustainability options

**Budget**

Renewable Projects – Works to be allocated, $500,000 for the next 3 years. 2021-2024

### ORANGE LOCAL STRATEGIC PLANNING STATEMENT (LSPS) 2020

In March 2018, amendments to the Environmental Planning and Assessment Act 1979 (EP&A Act) introduced new requirements for Council's to prepare and make local strategic planning statements (LSPS). The LSPS acts as a link between the strategic priorities identified at a regional or district level, and the finer-grained planning at a local level expressed in Council's Local Environmental Plan and development control plans, to ensure consistency in strategic planning approaches. While mainly related to land use planning from the State to the local level, the LSPS is also intended to connect and align with the Council's broader role via the Community Strategic Plan.

The legal framework for the LSPS requires that planning priorities are established, consistent with existing strategic plans (including the Community Strategic Plan). The following Planning Priorities which relate to the actions in this plan are:

**Planning Priority 5**

Ensure that building design and construction is of high quality, and maintain resident amenity.

**Planning Priority 13**

Protect, conserve and enhance Orange's urban tree canopy, landform, waterways and bushland.

**Planning Priority 15**

Manage energy, water and waste efficiently to ensure a sustainable urban environment.

**Planning Priority 16**

Adapt to the impacts of hazards and climate change.

These planning priorities are found in Appendix 8

## 7.3 Orange Active Travel Plan

Orange's Active Travel Plan was implemented in 2016 as an importance step in helping residents get active and reduce GHG emissions. The objectives of the plan is to increase the number of people walking and riding short distances for travel within Orange, by improving the safety and convenience of walking and riding systems in the Orange City Council area.

Aims of the plan include:

- Building appropriate infrastructure for walking and riding
- Encouraging and facilitating participation in walking or riding for short trips
- Partnering with agencies, communities and maintaining facilities

## 7.4 Climate Change Action Opportunities

### NSW STATE POLICY

The NSW Climate Change Policy Framework outlines the long-term objectives to achieve net-zero emissions by 2050 and to make New South Wales more resilient to a changing climate.

The policy framework builds on expanding clean energy, helping households and businesses reduce their bills by saving energy and preparing for the impacts of climate changes and guides the NSW Government's policy and programs. As a result of the state policy, Orange City Council has the potential to engage in this process and lobby to attract the state government assistance to our Council and community.

### NSW ELECTRIC AND HYBRID VEHICLE PLAN

The NSW Government's Electric and Hybrid Vehicle (EV) Plan reflects a growing focus on future mobility and technology innovations which will modernise transport for the community and businesses across New South Wales. The EV plan will maximise the benefits of a transition to more electric and hybrid vehicles for NSW. NSW supports the transformation of transport through technology and recognises the need for a clear direction forward to guide government and industry actions on EVs. The EV Plan is intended to be a catalyst for positive change that will benefit communities and businesses. The actions in the EV Plan will help support the EV transition over the next five years, by moving ahead with partners in communities, Council, site owners, vehicle suppliers, charging providers, energy suppliers and others. The Government is ensuring that NSW is well placed and prepared for EVs and to capitalise on their many benefits. Orange City Council stands to engage in this process and to participate in opportunities which arise from the plan to support our climate change objectives.

## CLIMATE SOLUTIONS FUND

The Emissions Intensity Reduction Program will be complemented by the Commonwealth's $450 million commitment to New South Wales from the Climate Solutions Fund (CSF) in addition to the other commitments under the Bilateral. The Climate Solutions Fund supports Australian businesses, farms and land managers to take practical, low-cost actions to reduce emissions. This commitment from the Commonwealth will allow New South Wales to take full advantage of the CSF fund over the next decade and will provide important environmental, economic and social benefits to local businesses and communities.

In addition to the Emissions Intensity Reduction Program and the NSW allocation of the Climate Solutions Fund, the NSW and Commonwealth Governments will commit a further $1.07 billion over 10 years under the Bilateral to the Energy Efficiency, Electric Vehicle Infrastructure and Model Availability, Primary Industries Productivity and Abatement, Coal Innovation, Clean Technology and Hydrogen programs (OEH, 2018).

## NSW ELECTRICITY INFRASTRUCTURE ROADMAP

The NSW Electricity Infrastructure Roadmap is a plan to transition the electricity sector and deliver electricity infrastructure for the future including pumped hydro, Renewable Energy Zone (REZ) generation, firming and transmission.

The plan is built on 5 on five foundational pillars:

1. Driving investment in regional NSW: Supporting the regions as the State's economic and energy powerhouse.
2. Delivering energy storage infrastructure: Supporting stable, long-term energy storage in NSW.
3. Delivering Renewable Energy Zones: Coordinating regional transmission and renewable generation in the right places for local communities.
4. Keeping the grid secure and reliable: Backing the system with gas, batteries or other reliable sources as needed.
5. Harnessing opportunities for industry: Empowering new and revitalised industries with cheap, reliable and low emissions electricity.

In relation to Climate Change, there are potential opportunities for Council as a result of this plan, particularly in the procurement of cost efficient renewable 'clean' energy which can further reduce our emissions (Energy NSW, 2020).

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# Appendix:

**APPENDIX 1**

Climate change projection maps for the Orana region- 1990-2009 to 2020-39. Changes in annual daily maximum temperature (°C). Source Central West and Orana Climate Change Snapshot Report.

**APPENDIX 2**

Climate change projection maps for the Orana region 1990-2009 to 2060-2079. Changes in annual daily maximum temperature (°C). Source Central West and Orana Climate Change Snapshot Report.

**APPENDIX 3**

Climate change projection maps for the Orana region- 1990-2009 to 2020-39. Change in annual mean number of days with temperatures less than 2 °C. Source Central West and Orana Climate Change Snapshot Report.

**APPENDIX 4**

Climate change projection maps for the Orana region- 1990-2009 to 2020-39. Change in the annual mean number of days with temperatures greater than 35°C. Source Central West and Orana Climate Change Snapshot Report.

**APPENDIX 5**

Climate change projection maps for the Orana region- 1990-2009 to 2060-2079. Change in the annual mean number of days with temperatures greater than 35°C. Source Central West and Orana Climate Change Snapshot Report.

Appendix items 1-5 are on the following pages

## APPENDIX 1

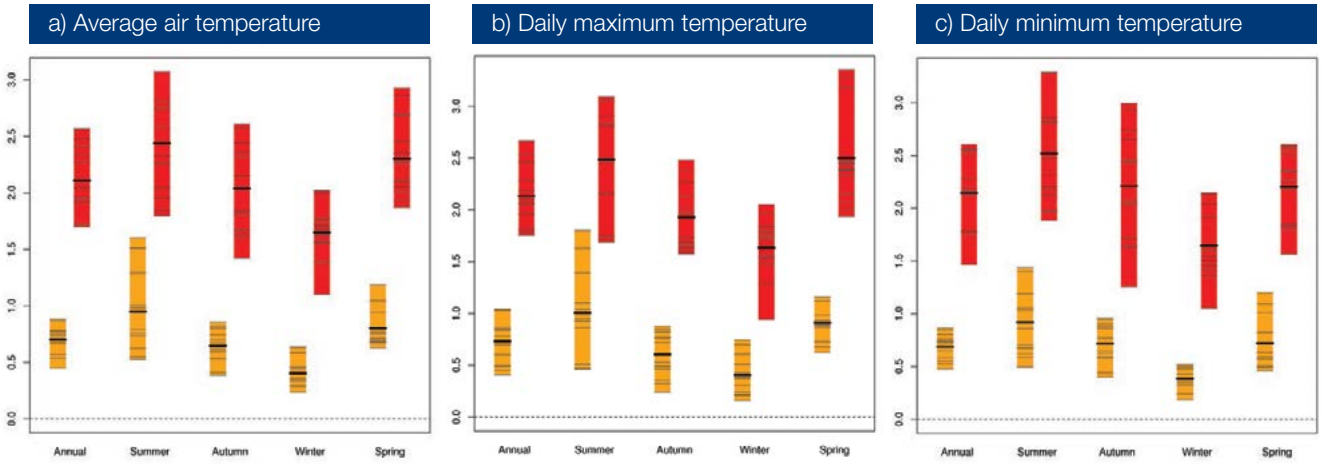



Figure 2: Projected air temperature changes for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red): a) average, b) daily maximum, and c) daily minimum. (Appendix 1 provides help with how to read and interpret these graphs).

## APPENDIX 2

Near future change in maximum temperature

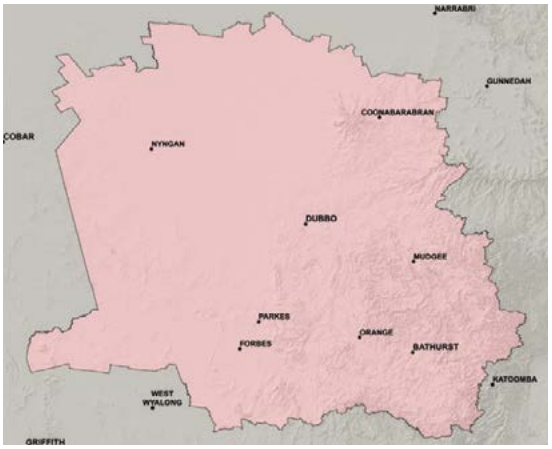



Figure 3: Near future (2020–2039) change in annual average maximum temperature, compared to the baseline period (1990–2009).

Far future change in maximum temperature

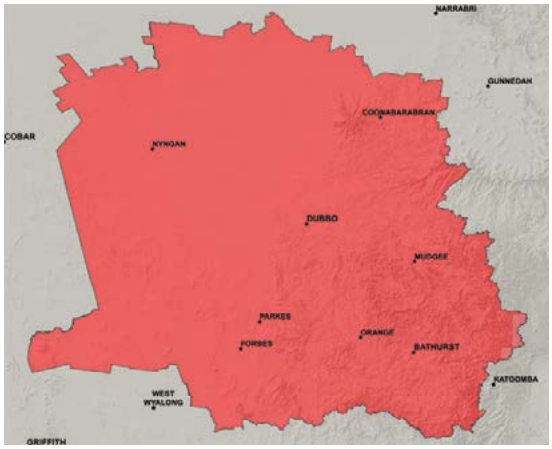



Figure 4: Far future (2060–2079) change in annual average maximum temperature, compared to the baseline period (1990–2009).

Near future change in minimum temperature

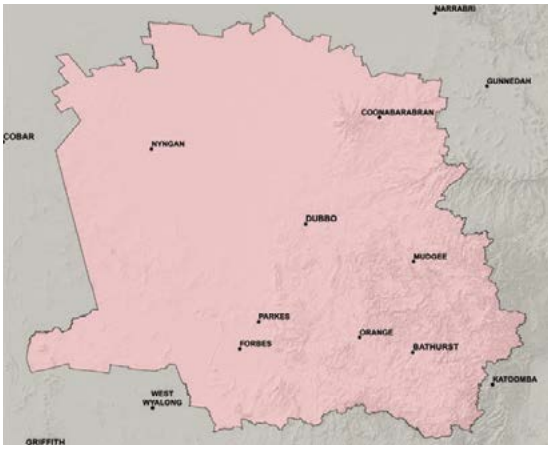



Figure 5: Near future (2020–2039) change in annual average minimum temperature, compared to the baseline period (1990–2009).

Far future change in minimum temperature

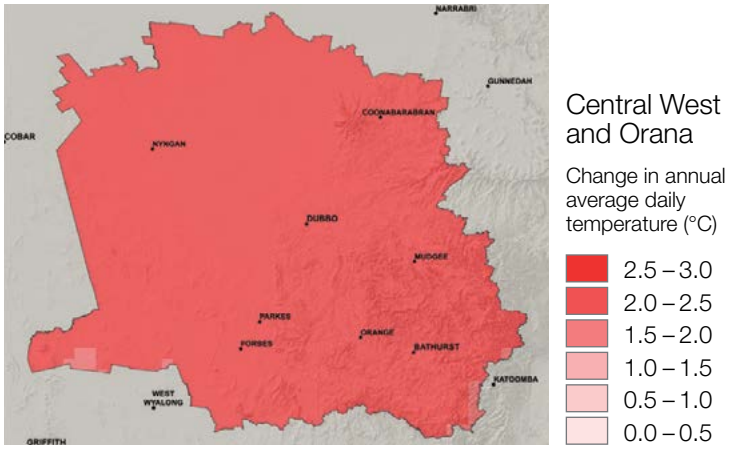



Figure 6: Far future (2060–2079) change in annual average minimum temperature, compared to the baseline period (1990–2009).

APPENDIX 3

# Cold nights

## DAYS PER YEAR BELOW 2°C

Most of the emphasis on changes in temperatures from climate change has been on hot days and maximum temperatures, but changes in cold nights are equally important in the maintenance of our natural ecosystems and agricultural/horticultural industries; for example, some common temperate fruit species require sufficiently cold winters to produce flower buds.

## Projected regional climate changes

**The Central West and Orana is expected to experience fewer cold nights in the near future and the far future (Figure 10).**

**The greatest decreases are projected to occur near the Blue Mountains and on the Central Tablelands. These areas are projected to experience a decrease of 10-20 fewer cold nights in the near future and 20–30 fewer cold nights by 2070 (Figures 11 and 12).**

**All models agree with a decrease in the number of cold nights in the near future by an average of approximately eight per year (ranging from 4 –10 nights across the individual models). The decrease in the average number of cold nights is projected to be even greater in the far future, with an average decrease of 23 fewer cold nights per year, (ranging from 17–28 nights across the individual models) (Figures 11 and 12).**

**The largest decrease in cold nights is projected for winter , but fewer cold nights are also projected for autumn and spring (Figure 10).**

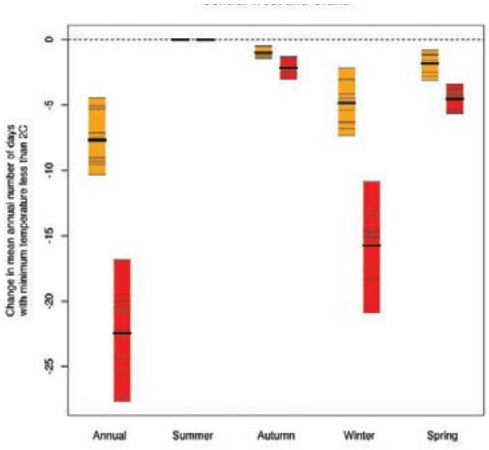



Figure 10: Projected changes in the number of low temperature nights for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red). (Appendix 1 provides help with how to read and interpret these graphs).

Near future change in number of cold nights (below 2°C) per year

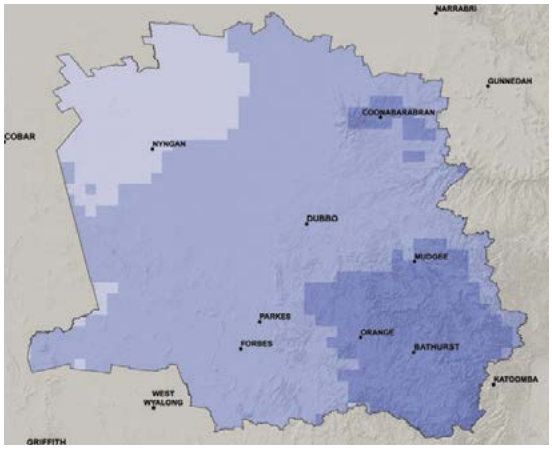



Figure 11: Near future (2020–2039) change in the number of days per year with minimum temperatures below 2°C, compared to the baseline period (1990–2009).

Far future change in number of cold nights (below 2°C) per year

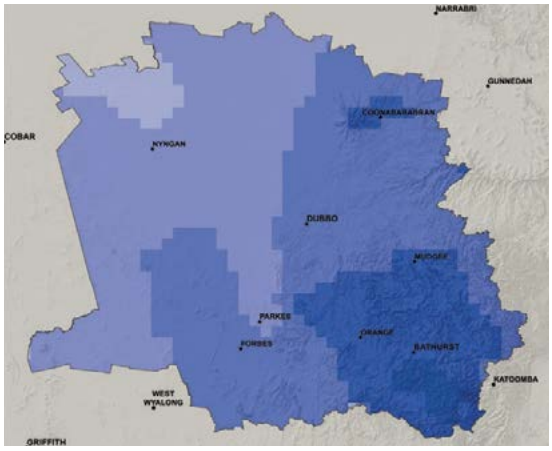



Figure 12: Far future (2060–2079) change in the number of days per year with minimum temperatures below 2°C, compared to the baseline period (1990–2009).

Central West and Orana

Change in annual average number of days with temperatures less than 2°C

- -1 – 0
- -5 – -1
- -10 – -5
- -20 – -10
- -30 – -20
- -40 – -30
- < -40

APPENDIX 4 & 5

# Hot days

## DAYS PER YEAR ABOVE 35°C

Currently the Central West and Orana Region experiences fewer than 10 hot days per year in the Central Tablelands. Parkes and Forbes experience an average of 20–30 hot days each year and the western plains have over 50 hot days each year. International and Australian experiences show that prolonged hot days increase the incidence of illness and death – particularly among vulnerable population groups such as people who are older, have a pre-existing medical condition or who have a disability. Seasonal changes are likely to have considerable impacts on bushfire danger, infrastructure development and native species diversity.

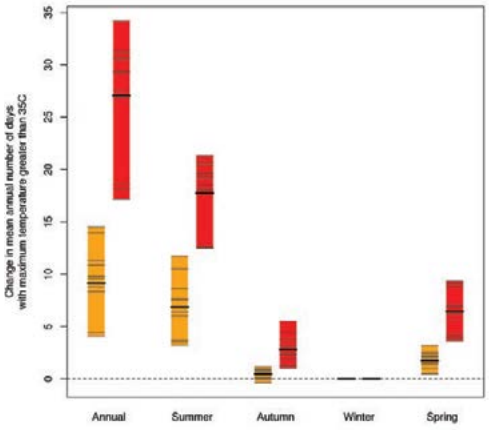



Figure 7: Projected changes in the number of hot days (with daily maximum temperature of above 35°C) for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red). (Appendix 1 provides help with how to read these graphs).

## Projected regional climate changes

**All models agree that the Central West and Orana are expected to experience more hot days in the near future and the far future (Figure 7).**

**The greatest increase is projected for the western plains with an additional 10–20 hot days in the near future (Figure 8), and 30–40 additional hot days by 2070 (Figure 9). Between 20 and 30 more days are also projected for much of the Central West including Parkes and Forbes.**

**The region, on average, is projected to experience an additional nine hot days in the near future (ranging from 4–15 days across the 12 models) and 27 more hot days by 2070 (17–34 days across the 12 models) (Figure 7).**

**These increases are projected mainly in spring and summer although in the far future hot days are also extending into autumn (Figure 7).**

Near future change in days per year above 35°C

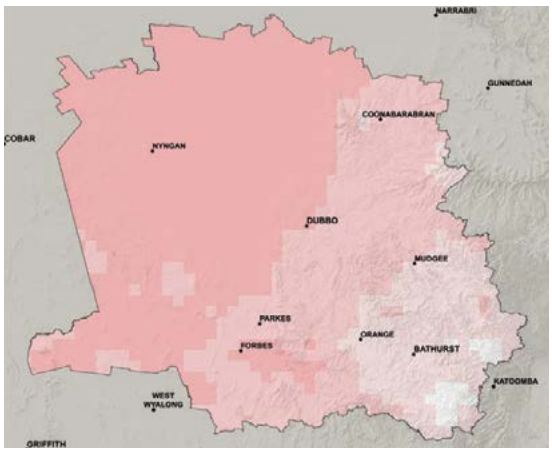



Figure 8: Near future (2020–2039) projected changes in the number of days per year with maximum temperatures above 35°C.

Far future change in days per year above 35°C

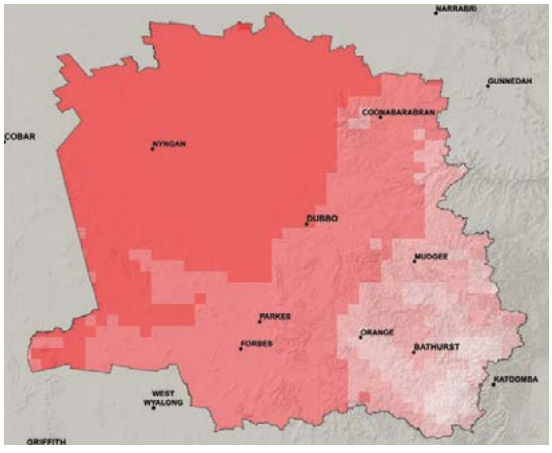



Figure 9: Far future (2060–2079) projected changes in the number of days per year with maximum temperatures above 35°C.

Central West and Orana

Change in annual average number of days with temperatures greater than 35°C

- >40
- 30 – 40
- 20 – 30
- 10 – 20
- 5 – 10
- 1 – 5
- 0 – 1

## APPENDIX 6

Climate change projections for the Central West region. Source Western Enabling Regional Adaptation Central West and Orana Report.

| Climate variable (average across the region) | Trend | Projections | |
|---|---|---|---|
| | | Near future (2030) | Far future (2070) |
| Atmospheric CO2 | Increase | A2 IPCC emissions scenario | |
| Max temperature | Increase | <0.5 – 1.5°C | 1.5 – 3°C |
| Min temperature | Increase | <0.5 – 1.0°C | 1.5 – 3°C |
| Hot days | Increase | 1 – 20 | 1 – 30 |
| Cold nights | Decrease | 10 – 20 | 20 – 40 |
| Heatwaves | Increase (frequency) | 1 – 1.5 events | 2.5 – 4.5 events |
| | Increase (intensity) | 1.5 -4.5°C | 4.5°C |
| | Increase (duration) | 1.4 – 3.5 days | 7 – 9 days |
| Annual rainfall* | Drying & wetting | –12% to +11% | –10 to +22% |
| Changes in average rainfall by season* | Drying & wetting | Summer –10% to +10% | Summer –5% to +20% |
| | | Autumn 0% to +20% | Autumn +10% to +20% |
| | | Winter 0% to +10% | Winter –10% to +20% |
| | | Spring 0% to +20% | Spring 0% to +20% |
| Sector | Direct climate impacts | Indirect climate impacts | Adaptive capacity |
| Economy and industry | Decreased agricultural productivity | Enhanced economic adjustment | Infrastructure design and integration |
| | | Increased value of water | Regional knowledge base |
| | | | Resource availability and sharing |
| Human services | Increased hospital presentations | Declining health and wellbeing | Community health |
| | | | Social equity |
| | | Increasing inequality and disadvantage | |
| Settlements and infrastructure | Decreased agricultural productivity | Declining community wealth | Resource availability and sharing |

| | | | |
|---|---|---|---|
| Natural resources and ecosystems | Damage to ecosystems<br>Changed surface water flows<br>Increased potable water usage<br>Increased energy demand | Loss of vulnerable ecosystems and services<br>Increased value of water | Landscape resilience<br>Resource availability and sharing |
| Emergency management | Increased demand for emergency services | Declining health and wellbeing<br>Increasing inequality/ disadvantage | Resource availability and sharing<br>Community health |

## APPENDIX 7

Expected physical Reponses for the Central West and Orana. Source: Western Enabling Regional Adaptation – Central West and Orana Report.

| Physical response | Trend | Projection | Implications |
|---|---|---|---|
| Heat | Increase | Heatwaves are projected to occur more often, be more intense and last longer. Across most of NSW there will be more days over 40°C. For further information refer to *Minimising the impacts of extreme heat: A guide for local government*: climatechange.environment.nsw.gov.au/Adapting-to-climate-change/Local-government | • Human health<br>• Urbanisation<br>• Biodiversity<br>• Fire weather<br>• Agricultural productivity |
| Hillslope erosion | Increase | Areas which already experience high erosion rates are projected to see increases in erosion. For this region, the erosivity is projected to increase by 4.6% in the near future and 20% in the far future. For further information refer to *Soil Erosion Climate Change Impact Snapshot*: climatechange.environment.nsw.gov.au/Impacts-of-climate-change/Soil/Soil-Erosion | • Water quality<br>• Agricultural productivity<br>• Biodiversity |
| Soil properties (SOC, pH and sum of bases) | Increase – decrease | The projections of SOC across this region are complex, with both increases and decreases in different areas and depths. The greatest decrease in SOC is around Bathurst and Lithgow in the upper depths in the far future. In the region, pH is projected to experience only marginal change, but a moderate trend to acidification is projected for the lower depth in the far future. Sum of bases are projected to increase in both upper and lower soil depths for both the near and far futures. For further information refer to *Soil Properties Climate Change Impact Snapshot*: climatechange.environment.nsw.gov.au/Impacts-of-climate-change/Soil/Soil-Properties | • Agricultural productivity (+ and –)<br>• Natural ecosystems |
| Rainfall erosivity | Increase | In the region rainfall erosivity will decrease in summer and winter in the near future; however increases are projected for all seasons by the far future. For further information refer to *Rainfall erosivity* in the *Soil Erosion Climate Change Impact Snapshot*: climatechange.environment.nsw.gov.au/Impacts-of-climate-change/Soil/Soil-Erosion | • Water quality<br>• Agricultural productivity<br>• Biodiversity |
| Rainfall extremes | Increase | Rainfall extremes are projected to increase in the near future and far future. For further information visit the Adapt NSW website: climatechange.environment.nsw.gov.au/Impacts-of-climate-change/Floods-and-storms | • Flooding<br>• Agricultural productivity<br>• Emergency services<br>• Local government |
| Flood | Not known | For further information visit the Adapt NSW website: climatechange.environment.nsw.gov.au/Impacts-of-climate-change/Floods-and-storms | • Urban and rural properties<br>• Agricultural productivity<br>• Emergency services<br>• Local government |

**APPENDIX 8**

OCC Planning Priority 5, 11, 13, 15, 16. Source: Orange Local Strategic Planning Statement (LSPS) 2020



## Planning Priority 5

# Ensure that building design and construction is of high quality, and maintains resident amenity.

### Rationale

The built form environment has a substantial influence over the day to day lives of residents. Issues around scale, density, access to sunlight, aesthetic presentation as well as acoustic and visual privacy all have an influence over the quality of life and psychological health of people.

Building construction quality or standards effect the durability, maintenance costs and energy efficiency of the structure and the safety, comfort and ease of access for occupants. Externally, construction standards may impact upon neighbours in terms of acoustic amenity, protection from stormwater runoff and potential for erosion or landslip.

Quality buildings are also more energy efficient, passive solar design reduces the need for artificial heating and cooling, resulting in smaller and potentially quieter air conditioning compressors.

Durable buildings require less maintenance and have longer structural lifetime and so consume fewer materials. Designs that are adaptable enable buildings to have multiple uses over their structural lifetime reducing the need for demolition and rebuilding, again saving materials and reducing waste being sent to landfill.

Therefore buildings need to be well designed and constructed:

- to provide safe, efficient and fit for purpose environments for occupants,
- to preserve amenity for neighbours,
- to reduce energy consumption and waste generation,
- to contribute to the broader community by enhancing the public realm.

Meeting such design standards can bring additional costs to construction projects and this could limit the provision of some housing forms that may in turn limit housing availability for some sectors. In response to this Council will seek to enable innovative forms that meet the above concerns while also catering for under served sectors of the community.

Through the land use planning system Council will ensure that new developments respond positively to resident, and neighbour, amenity. This will entail a review of planning controls and requiring all new greenfield rezonings and large subdivisions to be supported by a masterplan or dedicated DCP chapter that considers the needs of our diverse households.

### Actions

1. Review and update the Orange Development Control Plan to deliver a well rounded synthesis of:
2. Enhancing residential amenity
3. Water Sensitive Urban Design principles
4. Ecologically Sustainable Development principles
5. Universal Design Principles
6. Crime Prevention Through Environmental Design principles
7. Planning for Bushfire Protection 2018 recommendations

## Monitoring and Reporting

- Track and publish non-identifying statistics in relation to development objections
- Publish non-identifying numbers and types of amenity complaints and concerns - distinct from new development objections (eg. noise, privacy concerns, solar access, barking dogs and the like) to gain a better understanding of the matters affecting the community so that reviews of planning controls can proactively seek to prevent these matters in future.

## Key Stakeholders

- Residents
- Architects and building designers
- Construction companies

## Relationship to Other Plans

- Orange Development Control Plan
- Disability Inclusion Action Plan
- State Legislation, Programs and Policies
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
- State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004
- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

**Planning Priority 11**

# Provide for opportunities for local employment.

## Rationale

Employment opportunities provide multiple benefits to society and individuals. For the individual it provides an income source, a sense of purpose, an ability to contribute and a chance to connect and interact.

Income from employment reduces homelessness and housing stress. A gainfully employed community builds wealth and cohesion, while reducing incidents of crime.

A diversified economy provides a wider range of occupations, which in turn builds up the local skill base, and generates career pathways. More opportunities and diversification also increases the range of services and goods available locally. A stronger local skill base enables new businesses to start and expand.

Council has a significant role to play in helping to boost employment. From ensuring enough land is appropriately zoned for commercial, industrial and tourism purposes through to advocacy and tangible assistance where the return to the community is likely to be significant.

Council will review internal plans, policies and controls to assist the generation of local employment. This includes ensuring that land use regulation caters for future growth and expansion of industry, commerce, retail, tourism, health and education sectors.

This involves ensuring that relevant strategies are reviewed and updated on a timely basis and also ensuring Council maintains a flexible and responsive posture so that unforeseen opportunities can also be harnessed as they arise between strategy reviews.

## Actions

1. Monitor the take up rate of industrial land and seek to maintain a 10 – 20 year supply.
2. Review and update the Blayney Cabonne Orange rural and industrial lands strategy in conjunction with partner councils.
3. Advocate for local employment opportunities with State and Federal government agencies.
4. Pursue grant funding opportunities to assist new and growing local businesses.

## Monitoring and Reporting

- Track and publish statistics in relation to the take up rate of industrial and employment land.
- Track and publish non-identifying data on the number and type of economic enquiries received by Council.

## Key Stakeholders

- Residents
- Employers
- Job Network operators
- Orange Chamber of Commerce

## Relationship to Other Plans

- Regional Economic Development Strategy (REDS)
- Blayney Cabonne Orange Rural and Industrial Lands Strategy (BCO)
- Disability Inclusion Action Plan
- State Legislation, Programs and Policies

**Planning Priority 13**

# Protect, conserve and enhance Orange's urban tree canopy, landform, waterways and bushland.

## Rationale

Urban trees, bushland, waterways and land form combine to provide a variety of ecological services that are often underappreciated due to being "free" to those who benefit. These services include:

Reducing the urban heat island effect, in turn reducing energy demand for air conditioning.

Increased shade also reduces exposure to ultraviolet radiation and may contribute to reducing incidence of melanoma.

Vegetation of all forms also removes carbon from the atmosphere and may sequester carbon into the soil in the form of roots and organic matter.

Plants also assist in cleaning the air of particulate pollution that may otherwise impact on respiratory health.

Filtering stormwater runoff improving water quality creating a healthier environment and pre-treating a resource that can then be harvested to supplement the urban water supply.

Providing habitat to urban and urban-peripheral wildlife, including birds, lizards, insects and other biota. The foraging activities of such wildlife clean up or dispose of unpicked fruit and other organic matter. Processing the nutrients back into the environment before such build up could become problematic.

Council will seek to maximise the benefits of these services to our community through a combination of direct management of the public realm and appropriate planning requirements for new developments.

## Relationship to Other Plans

- Biodiversity / Ecological Strategy
- Orange Street Tree Master Plan
- Botanic Gardens Master Plan
- Gosling Creek Reserve Plan of Management
- State Legislation, Programs and Policies
- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

## Actions

1. Review and update the Orange Street Tree Master Plan by 2023.
2. Review and update the Orange Development Control Plan to:
3. Require greenfield subdivisions to protect and enhance waterways and riparian corridors.
4. Require multi dwelling housing to include a minimum area of deep-root landscaping for trees, proportional to the scale of the development
5. Council seek to preserve and enhance the urban tree canopy throughout Orange and establish a target canopy coverage rate for the urban areas accompanied by a replacement planting ratio within the DCP
6. Council prepare a Strategic Urban Biodiversity Framework (SUBF) in line with Greener Places Design Framework provided by the Government Architect NSW

## Monitoring and Reporting

- Track and publish statistics in relation to street tree planting and replacement.
- Publish statistics in relation to tree preservation orders.
- Publish statistics in relation to landscaping related conditions of consent on new developments.
- State of the environment reporting

## Key Stakeholders

- Residents
- Tourists
- NSW Office of Water
- Local Land Services

## Relationship to Other Plans

- Biodiversity / Ecological Strategy
- Orange Street Tree Master Plan
- Botanic Gardens Master Plan
- Gosling Creek Reserve Plan of Management
- State Legislation, Programs and Policies
- State Environmental Planning Policy (Vegetation in
- Non-Rural Areas) 2017

**Planning Priority 15**

# Manage energy, water and waste efficiently to ensure a sustainable urban environment.

## Rationale

Orange is a large, growing inland regional city that uniquely is not located on a major river. Together with Australia's variable climate this means that water security is an important ongoing challenge. Council will continuously seek to enhance and improve water management for the benefit of our community.

Through our renowned storm water harvesting approach new development and greenfield release areas can be designed to be water neutral in normal weather conditions. Infill development can be encouraged to incorporate rainwater harvesting and grey water reuse. Water tank rebates are already in place for households and will be continued.

Landscaping of development and existing homes can be encouraged to adopt water efficient species to build drought resilience. Other water sensitive urban design principles can be incorporated into both the public and private realm.

Energy efficiency is important on both environmental and economic grounds. As a significant land and building owner Council needs to set an example and stretch ratepayers funds further. Street light upgrades to more energy efficient forms as well as targeted retrofits of buildings will reduce carbon emissions and Councils power bills.

Waste streams can be minimised through reduction, recycling and reuse efforts. Opportunities should always be sought to view the material as a potential resource. Green waste can be composted to provide nutrients to gardens.

All council assets will be managed consistent with this priority and Council will seek to assist residents and other groups within the community through a mix of direct assistance where appropriate and creation of informative and educational resources specific to Orange.

## Actions

1. Provide assistance to households to improve water efficiency.
2. Produce and publish a list of water efficient plants suitable to the local climate.
3. Seek opportunities to install solar panels at all Council owned buildings.
4. Continue to upgrade streetlights to more energy efficient forms.

## Monitoring and Reporting

- Track and publish statistics in relation to energy, water and waste.
- Report on energy consumption and generation as part of the annual budget process.

## Key Stakeholders

- Residents
- Local businesses
- Farmers
- Relationship to Other Plans
- Urban Efficiency Strategy
- Asset Management Strategy
- State Legislation, Programs and Policies
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

**Planning priority 16**

# Adapt to the impacts of hazards and climate change.

## Rationale

Orange's terrain, of rolling hills with farms and orchards interspersed with bushland provides a rural setting around the city.

Some areas of the municipality are more prone to natural hazards including bushfire and flooding. Land in the vicinity of Mount Canobolas, for example, is bushfire prone due to the presence of State Forests and other large bushland areas.

The diverse mix of farming enterprises from orchards and vineyards through to grazing and cropping have adapted to the variable climate of the central west. This adaptability is facing new challenges from climate change.

Climate change is resulting in increasing temperatures and dryer weather patterns, more extreme storms could also be anticipated which will exacerbate these natural hazards. This poses a challenge for Orange in meeting the needs of current and future population. Placing development in hazardous areas or increasing the density of development in areas already subject to hazardous conditions increases the risk to people and property.

However Orange, and the broader central west region, remain popular destinations for both visitors and tree-changers seeking to relocate from congested metropolitan areas. Our economy remains strong and robust further enhancing the attraction for new residents. Therefore as Orange continues to grow, incremental loss of vegetation and expansion of urban areas will alter continue.

At the micro-climate level New roads, driveways and buildings absorb, hold and re-radiate heat, raising the air temperature, adding to an urban heat island effect. Orange's location in the central west and elevation above sea level means that it does not experience extreme high temperatures to the same extent as other regions to our west, however high temperatures can occur, adding to energy demand for cooling. Maintaining an urban tree canopy cover and ensuring good building design is thus important to help mitigate the heat island effect.

Additional population will also continue to add, incrementally, to the demand for water. Orange is not located directly on a major river and the water supply is principally derived from a modest catchment area feeding into Suma Park dam. This has been supplemented in recent years with various initiatives such as storm water harvesting, raised dam walls and pipeline connections to the Macquarie River and other regional storages. These measures have improved the supply of water by increasing and diversifying the effective catchment area, improving storage capacity and enabling the resource to be reused.

On the demand side of water there are more options to be explored. From encouraging water efficient appliances, rainwater tanks and grey water reuse through to including stormwater capture as a priority in subdivision design.

## Actions

1. Consider initiatives that respond to the impacts of climate change, mitigate the urban heat island effect and reduce vulnerability to extreme heat.
2. Ensure development, including rezonings, is consistent with the Blackmans Swamp Creek and Ploughmans Creek Flood Study.
3. Maintain, and review as necessary, existing planning controls and objectives within Orange's Local Environmental Plan and Development Control Plans relating to natural hazards and climate change.
4. Prepare planning controls for the Orange LEP and DCP to require that new greenfield subdivisions are designed to facilitate stormwater harvesting on an estate wide basis.

5. Undertake an Urban Efficiency Strategy to enhance local resilience and to guide the security of water and energy supplies while minimising waste generation.
6. Council prepare planning controls for the LEP and DCP to address the hazard of Ultra-Violet (UV) radiation and the need for shade within the public and private realms.
7. Council work with the Rural Fire Service to review bushfire mapping and appropriate planning controls" – note that RFS has oversight of bushfire mapping
8. A disaster recovery strategy be developed and maintained to address recovery after natural hazard events and ensure that local and regional hazard risk assessments inform land use planning decisions
9. Planning for population growth be located and designed to minimise exposure to natural and technological hazards
10. Hazard planning and disaster resilience principles be developed for inclusion in the Development Control Plan.
11. Development controls in the LEP and DCP be reviewed to encourage adaptable and resilient building designs.
12. Council support 'urban farming' particularly on flood prone or otherwise constrained land to showcase production systems to the visitor economy, mitigate the urban heat island effect and contribute local produce with reduced food miles.
13. Council allow for the planting of appropriate trees along roadsides and other public lands in rural areas, particularly in combination with farm windbreaks, to improve shelter from strong winds and storms while enhancing local ecological outcomes.
14. Council support initiatives that seek to improve access to renewable energy, telecommunications (including internet services) for remote and isolated properties.
15. Council develop and adopt planning controls within the LEP and DCP that enable innovative and/or unconventional forms of primary production where they can be shown to sustain or improve productive output

## Monitoring and Reporting

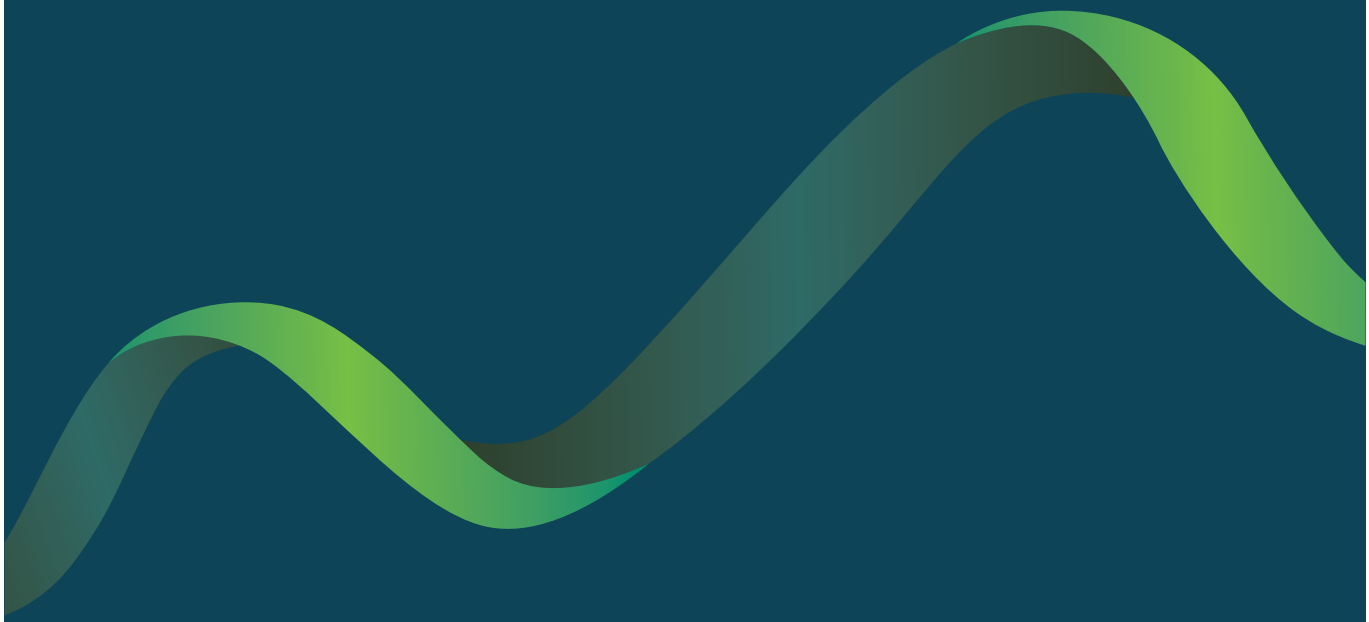
- Track and publish statistics in relation to water supply and consumption levels, including figures on stormwater harvesting and pipeline transfers between catchments.
- Publish statistics in relation to the urban tree canopy including number of street trees, numbers lost (to development or natural causes), replaced and added.
- Through aerial images map the canopy coverage across urban parts of Orange to identify which streets and neighbourhoods have opportunity to improve coverage.
- Annual State of the Environment Reporting
- Blackmans Swamp Creek and Ploughmans Creek Flood Study – April 2019, to be reviewed by 2030.

## Key Stakeholders

- Residents
- Farmers

## Relationship to Other Plans

- Urban Efficiency Strategy
- Orange Active Travel Plan
- Blackmans Swamp Creek and Ploughmans Creek Flood Study
- State Legislation, Programs and Policies
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004



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