



City of Cockburn **Climate Change Strategy** **2020–2030**



Acknowledgement of Country

The Mayor, Councillors and staff of the City of Cockburn acknowledge the Whadjuk Nyungar people of Beeliar boodja as the traditional custodians of this land. We pay our respect to the Elders, past, present and emerging.



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Executive summary

Climate change has significant social, economic and legal implications for local government. Cockburn is already experiencing the effects with increased coastal erosion, higher summer temperatures, more severe heatwaves and a longer bushfire season.

The City has a critical role in responding to climate change through its responsibilities for land use planning, emergency management, ownership of public infrastructure and delivery of community services.

The vision of this strategy is for the City of Cockburn to continue to be a leader in climate resilience and sustainability. We aspire to become a carbon neutral City and commit to working with the community to adapt to our changing climate.

The City sought leadership direction from the community on how to create a sustainable and climate resilient future. The community shared their vision, aspirations and insights on actions we can take for a better tomorrow.

The City has used this vision to develop a resilience roadmap with 14 objectives to achieve carbon neutrality and increase our adaptive capacity.



Image 1: City of Cockburn climate resilience roadmap

Introduction

The impacts of climate change are already upon us. More frequent and intensive heatwaves, bushfires and coastal erosion are impacting our natural and built environment. These impacts are predicted to increase in the future and pose risks to our infrastructure and communities.

Local governments are on the frontline in addressing climate change and must ensure that adaptation responses are suitably tailored to the specific risks in their area, and that local communities and stakeholders are consulted and involved in adaptation efforts.

An effective response to climate change requires an integrated approach that considers both mitigation and adaptation.

Climate change mitigation includes actions to reduce and remove anthropogenic (human) causes of greenhouse gas emissions.

Climate change adaptation involves taking practical action to reduce risks from climate impacts and responding to those consequences that cannot be avoided.

Climate resilience is being prepared to readily respond and adapt to future uncertainties, and having the capacity to maintain the essential functions and identity of the City.



Image 2: Solar photovoltaic system (1MW) on the Cockburn ARC

Review of achievements to date

The City of Cockburn has a strong, 20 year history in taking decisive and responsible action on climate change.

In 1999, Cockburn joined the Cities for Climate Protection Program (CPP) and undertook its first greenhouse gas inventory. A corporate emissions reduction plan was developed in 2001 to guide the City through the 5 CPP milestones.

In 2009 the City undertook its first climate change risk assessment and developed a Climate Change Action Plan. The Greenhouse Gas Emission Reduction Strategy was adopted in 2011 and inspired another decade of climate action.

The City has been leading the way in installing renewable energy systems and targeting emissions reductions throughout its policies, strategies and initiatives.

In 2012 Cockburn won the Australian Sustainable Cities award.

The City has the largest inventory of renewable energy systems for any Local Government in Western Australia including

- Solar photovoltaic systems
- Wind turbines
- Geothermal heating
- Methane gas capture
- Solar LED lighting

This document is the City's first Climate Change Strategy. It addresses both mitigation and adaptation and supersedes the Greenhouse Gas Emission Reduction Strategy (2011–2020) and Climate Change Adaptation Plan (2012).



Image 3: Solar photovoltaic system on the Beeliar Community Centre (top left), Methane Extraction at Henderson Waste Recovery Park (top middle), Environmentally Sustainable Design, Success Library (top right), Coastal erosion monitoring at C Y O'Connor Beach (bottom)

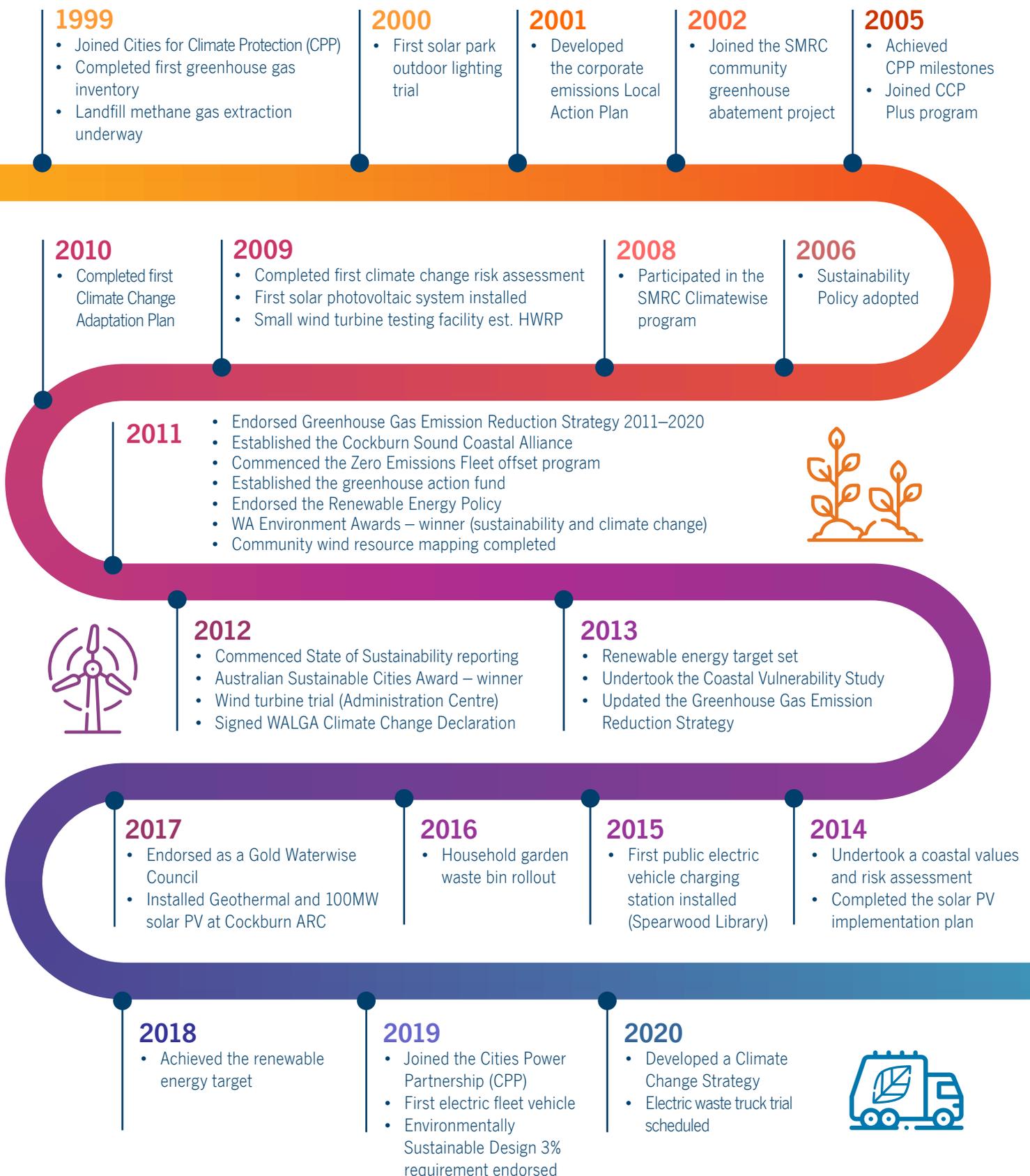


Image 4: The City of Cockburn’s journey of climate change action

Strategic Community Plan 2020–2030

Vision The City of Cockburn will continue to be a leader in climate resilience and sustainability. We aim to be a carbon neutral City and take pride in working together to adapt to our changing climate, now and into the future.

The Climate Change Strategy is aligned with many objectives of the Strategic Community Plan 2020–2030 which aims to sustainably manage the City’s resources, protect the environment, build capacity and seek collaboration.

The primary climate change objective aims to ‘reduce adverse outcomes arising from climate change through planning, adaptation, mitigation, infrastructure and ecological management’.

Sustainability Policy

The Sustainability Policy is the umbrella policy for climate action and includes 11 principles to guide Elected Members and staff in all aspects of decision-making, planning, operations and program delivery.

The ‘Climate Change Action’ principle outlines the City’s commitment to action on climate change, ensuring that mitigation and adaptation actions are equitable and consistent with the

aims of the United Nations (UN) sustainable development goals.

The UN sustainable development goals are a universal call to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. The 17 Goals have been adopted by all UN member states, including Australia as part of the 2030 Agenda for Sustainable Development.



Image 5: Solar powered LED light, Rollinson Road, North Coogee

Climate change impacts in Cockburn

Climate change is happening now, and its occurrence is supported by extensive scientific research undertaken collectively around the world. There is consensus that our climate has changed as a result of additional greenhouse gas emissions in the atmosphere caused from human activities such as land clearing, agriculture and the burning of fossil fuels.

Under a changing climate¹, it is expected that by the end of this century, Cockburn will experience:

- **Higher temperatures:** Double the number of hot days per annum and heatwaves twice as long.
- **Less rainfall:** Dry conditions may be experienced for an additional 2.3 months each year which will significantly reduce groundwater availability.

- **Sea level rise:** 0.9m increase in sea level².
- **More extreme weather:** Increase in the number of high fire weather danger days, and more high-intensity storms.

These changes are likely to pose significant risks to the safety and wellbeing of the community, the natural and built environment and will impact the liveability and amenity of our City. Council will need to plan and adapt to these changes.

Detailed information on the climate models used to predict changes to the City's climate are provided in the *City of Cockburn Climate Change Risk Assessment*, available on the City's website.

The role of local government

The City is responsible for managing the climate risks to its assets (road infrastructure, parks, reserves, public buildings, recreation facilities) and service delivery (waste collection, library and community services, public open space, roads construction, etc).

Local governments are also responsible for setting targets to reduce emissions from their operations, incorporating climate change considerations in policies and contributing appropriate resources to prepare, respond and recover from climate change impacts.

Councils are best placed to provide localised information about relevant climate risks to help the community build resilience and increase adaptive capacity.

1. Based on a high emissions IPCC climate change scenario for 2090

2. 0.9m sea level rise by 2110 based on coastal hazard modelling aligned with State Coastal Planning Policy

Community consultation

We asked the Cockburn community how they would like to see the City demonstrate leadership on climate change action.

Residents, business, stakeholders, and reference groups were invited during May 2020, to share their vision for a better tomorrow. Over 2000 people visited the project webpage and nearly 1000 visited the online survey. In total, 309 survey responses were received, seven submissions were made, and nine digital workshops were facilitated. The City had one of its highest visitation rates on the 'Comment on Cockburn' webpage. The consultation was demographically representative of the diverse Cockburn community.

The Cockburn community were very clear on their position of advocating for a very aspirational approach for the City to demonstrate leadership regarding sustainability and climate resilience. This means:

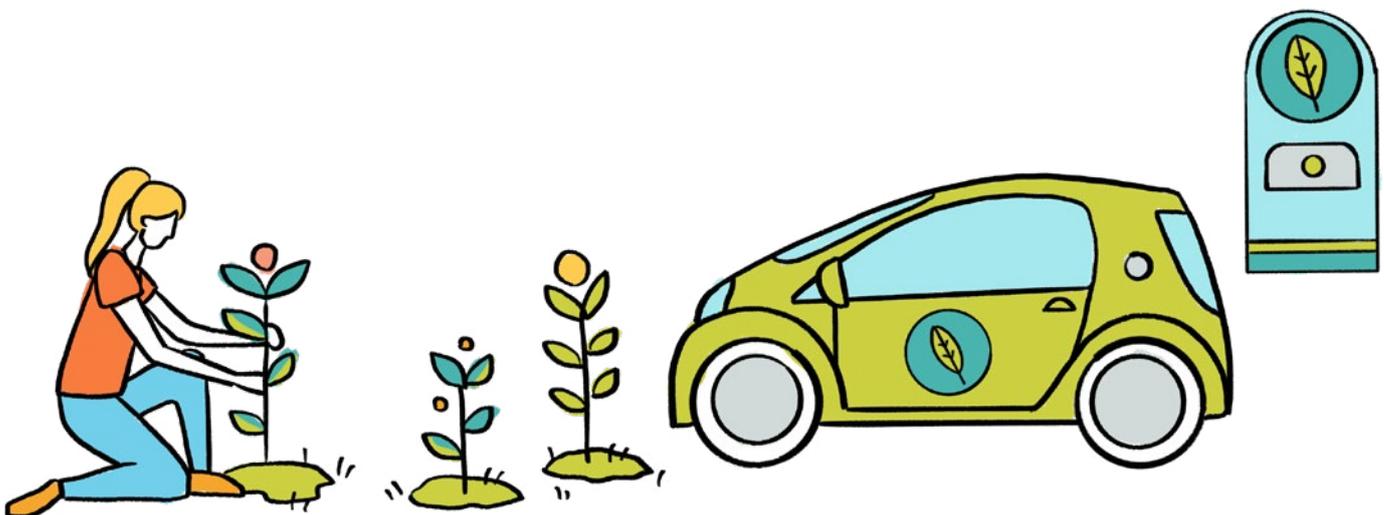
- Aiming towards being a carbon neutral City.
- Support for action towards reducing greenhouse gas emissions by all emitters.
- Investing in education programs to support adaptation initiatives and increase awareness of everyone's environmental impact.

- Reducing energy and consumption costs for City operations.
- Preservation of the urban forest and enhancement of our unique natural landscape.

A shared environmental vision was developed having regard to the insightful conversations and results of the community engagement program, which states:

The City of Cockburn is a leader in climate resilience and sustainability. Our community provides us with the strength and optimism to be aspirational in our approach to creating a better tomorrow for each and every one of us. We are aware of our lasting environmental impact. We are committed to taking pride in working together, celebrating our success and being resilient and adaptive to our changing climate.

The engagement results provide the aspiration and confidence for the City to be a strong leader and facilitator to creating an even more sustainable and climate resilient future. The *Climate Change Consultation Report* is available on the City's website.

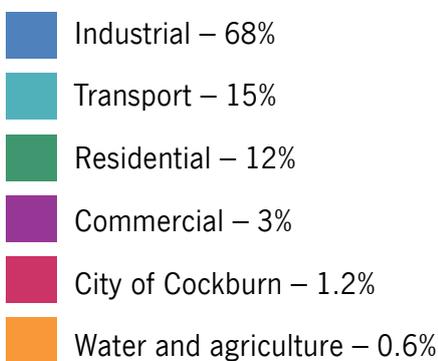
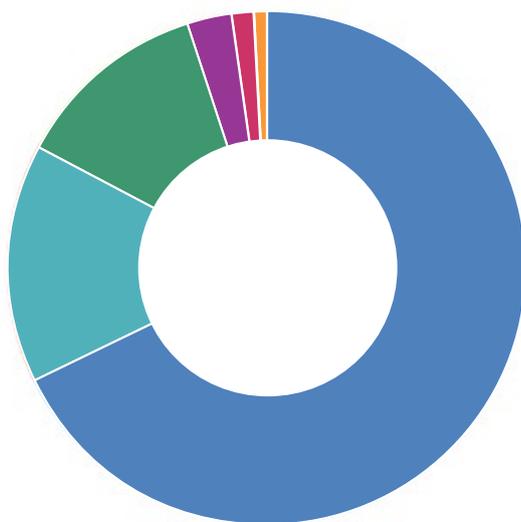


Greenhouse gas emissions in Cockburn

Community emissions profile

The carbon footprint for the entire Cockburn municipality is estimated to be over 2.5 million tonnes of carbon dioxide equivalent (tCO₂-e) per annum,³ Industry is by far the biggest greenhouse gas emitter in Cockburn (68%). The next highest sectors are on-road transport and domestic air travel (15%), residential (12%), followed by commercial (3%).

The City of Cockburn accounts for 1.2% of the total emissions for the municipality, which includes waste emissions from the Henderson Waste Recovery Park.

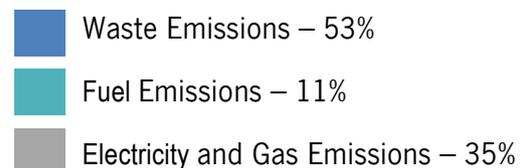


Graph 1: Cockburn community emissions profile

Corporate emissions profile⁴

The City's operational activities generate over 30,000 tCO₂-e per annum. This equates to 1.2% of emissions in the Cockburn municipality.

The majority of emissions (53%) are generated from solid waste to landfill. Purchased electricity and gas are the second largest source of emissions (35%) and include energy used in street lighting, facilities, parks and sporting facilities. Street lighting contributes to almost half of the City's electricity consumption at a cost of \$2.7 million per annum. Additionally, the City manages over 150 facilities and 320 parks which use electricity to maintain core functions. The remaining 11% of emissions are generated by fuel combustion in plant and fleet vehicles.



Graph 2: City of Cockburn corporate emissions profile

3. Cockburn 2017 municipal emissions, Snapshot Community Climate Tool, Ironbark Sustainability

4. City of Cockburn Corporate Greenhouse Gas Emission Inventory 2019/20

Climate change mitigation

Although we are already experiencing the impacts of climate change in Cockburn, we have the solutions to help address this challenge.

‘Climate change mitigation’ is the term used to describe actions to reduce greenhouse gas emissions.

The Cockburn community have told us that they would like the City to be a strong leader and aim towards being a carbon neutral City which means reducing greenhouse gas emissions by all emitters.

This strategy presents net zero emissions targets for the City (to achieve by 2030) and the community (to achieve by 2050). These targets are supported by the community and are in line with leading Councils around Australia.

The emission reduction targets are addressed in the ‘climate resilience roadmap’ (image 8) and supported by the following objectives:



1. Net zero emissions



2. Zero waste to landfill



3. 100% renewable energy



4. Reduce energy consumption



5. Zero Emissions fleet



6. Smart city innovation



Image 6: Cockburn coastline, C Y O'Connor

Net Zero Emissions

The City aims to take responsible action to reduce its carbon footprint and achieve net zero-emissions as soon as practical.

Net zero emissions is akin to ‘carbon neutrality’ and means that the emissions are balanced out to equal zero.

Climate change risk assessment

There are six overarching climate change risks that have the potential to impact the City's service delivery, natural environment, local community and infrastructure (table 1):

1. Reduced water availability from decreased rainfall
2. Biodiversity loss from climate change impacts
3. Coastal impacts from sea level rise
4. Urban forest decline from climate change
5. Community infrastructure damage from climate change impacts
6. Public health decline from climate change

The City undertook a risk assessment and updated its climate change risk register in 2020. The process considered the consequences and likelihood of 18 climate risks using the City's ratings frameworks, which are consistent with *AS ISO 31000:2018 Risk management Guidelines*. The 18 risks have been grouped into their areas of impact and consolidated into the six overarching risks stated above.

The risk assessment considered high and low emissions scenarios, using current, 2050 and 2090 predictions, based on IPCC⁵ research and data from CoastAdapt⁶. Detailed information on the risk assessment methodology and results are provided in the *City of Cockburn 2020 Climate Change Risk Assessment*³ on the City's website.

Climate change adaptation

To reduce the impact of these risks and increase adaptive capacity, the City has integrated the six overarching climate risks into its Risk Management and Safety System (RMSS) and identified key solutions in the climate resilience roadmap.

There are six adaptation objectives that will help the City reduce the impacts of climate change:

1. Waterwise City
2. Conserve biodiversity
3. Coastal adaptation
4. Increase the urban forest
5. Protect community infrastructure
6. Enhance health and wellbeing



Image 7: Climate change may increase high fire weather days in Cockburn

5. The Intergovernmental Panel on Climate Change (IPCC) assessment reports are the most trusted forum for global climate science. The IPCC fifth assessment report published in 2014, is the most current report

6. CoastAdapt utilises CSIRO datasets and IPCC scenarios to model climate change and impacts. CoastAdapt was developed by NCCARF with funding from the Australian Government. Data sourced June 2020.

Risk Title	Risk Description	Risk Rating	Responsibility	Adaptation objective
Reduced water availability from decreased rainfall	Decreased liveability, reduced water availability, loss of urban vegetation and biodiversity caused by climate change impacts (decreased rainfall)	Substantial	Manager Parks and Environment	Waterwise City 
Biodiversity loss from climate change	Damage to or loss of biodiversity and natural habitat caused by climate change impacts (decreased rainfall and increased bushfires, temperatures and extreme weather events)	High	Manager Parks and Environment	Conserve biodiversity 
Coastal impacts from sea level rise	Legal liability and damage to or loss of natural environment, infrastructure and coastal land, caused by sea level rise	Substantial	Manager Infrastructure Services	Coastal adaptation 
Urban forest decline from climate change	Urban forest decline caused by climate change impacts (increased temperatures and decreased rainfall)	Substantial	Manager Parks and Environment	Increase the urban forest 
Community infrastructure damage from climate change	Damage to or loss of infrastructure and increased demand for electricity and water, as a result of climate change impacts (increased bushfires, extreme weather events and temperatures)	Extreme	Manager Infrastructure Services	Protect community infrastructure 
Public health decline from climate change	Reduced public safety, health and wellbeing caused by climate change impacts (changes to rainfall and increased bushfires, temperatures and extreme weather events)	Extreme	Manager Environmental Health	Enhance health and wellbeing 

Table 1: Climate change risks to the City of Cockburn

Climate Resilience Roadmap

In May 2020 the City sought leadership direction from the community on how we can create a better tomorrow.

The City has used this vision, and information from the risk assessment to develop a 'resilience roadmap' that sets aspirational targets to achieve carbon neutrality and increase our resilience to climate change.

The resilience roadmap presents 14 objectives that demonstrate leadership, encourage collaboration, reduce emissions (mitigation) and increase our adaptive capacity (adaptation).

Each objective is addressed through a comprehensive action plan (page 17) that will deliver innovative solutions for energy supply, showcase world leadership in waste management, and ensure best practice adaptation.



Image 8: Climate resilience roadmap

Climate Resilience Roadmap



1. Strong leadership

Leadership in action is about setting aspirational targets, listening and working together, and increasing our adaptive capacity by strengthening our existing programs and trialing new technology



2. Net zero emissions

The City aims to achieve net zero *corporate* emissions by 2030 and will work with the Cockburn community and the State Government to achieve net zero *community* emissions by 2050.



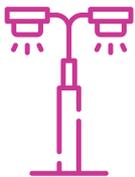
3. Transition to 100% renewable electricity

The City aspires to progressively add more renewable sources to its energy portfolio and transition to 100% renewable energy by 2030.



4. Zero waste to landfill

The City's vision for responsible waste management is for 100% of non-hazardous waste to be diverted from landfill by 2030.



5. Reduce energy consumption

A key step in the resilience roadmap is to decrease the energy demand and cost of the City's street lighting, parks and facilities by improving efficiency and optimising performance.



6. Zero emissions fleet

The City has maintained a Zero Emissions Fleet since 2011 with carbon offsets, and aims to improve its efficiency and reduce the risks of fuel price volatility by exploring advances in electric and hydrogen powered vehicles.



7. Smart City Innovation

The City will invest in innovative technology-based solutions to meet the challenges of climate change and ensure the City is better connected, safer and more resilient.



8. Education and collaboration

The City acknowledges the shared responsibility of climate change and will provide information on local climate change impacts and work with the community, business and stakeholders to take action and build resilience.



9. Waterwise City

The City is experiencing the impact of declining rainfall and aims to improve water security by maintaining its Gold Waterwise Council status and implementing the Water Efficiency Action Plan.



10. Conserve biodiversity

Climate change has the potential to cause damage to, or loss of, biodiversity and natural habitat. The City aims to increase the resilience of natural ecosystems through the Natural Area Management Strategy.



11. Coastal adaptation

Sea level rise is expected to increase shoreline erosion and inundation which may cause loss of natural habitat and infrastructure. The City will reduce these risks and legal liability by implementing planning controls, engineering solutions and monitoring in line with the Coastal Adaptation Plan and foreshore management plans.



12. Increase the urban forest

Increased temperatures, pests, disease and reduced water availability pose a risk to the urban forest. The City aims to increase tree canopy, maintain water security and improve livability by implementing planning controls, the Urban Forest Plan and Water Efficiency Action Plan.



13. Protect community infrastructure

Climate Change may cause damage to, and loss of, infrastructure as a result of bushfires, extreme weather and temperatures. The City will reduce these risks by implementing the Bushfire Risk Management Plan and best practice infrastructure management.



14. Enhance health and wellbeing

Climate change presents a risk to the health, safety and wellness of our community as a result of increased bushfires, heatwaves and extreme weather events. The City will manage these impacts by implementing the Public Health Plan and Bushfire Risk Management Plan.

Climate change action plan

The climate change action plan has been developed with direction from the community on how the City can create a sustainable and climate resilient future.

The plan provides information on the 14 key objectives of the climate resilience roadmap and a comprehensive set of actions to help eliminate greenhouse gas emissions and increase the City's adaptive capacity.





1. Strong leadership

One of the community’s main aspirations for a sustainable and climate resilient future, is to see the City demonstrate strong leadership⁷.

The City will achieve this by:

- Listening and working together – with the community through education, creative engagement and communication towards a healthy and resilient future.
- Setting aspirational targets – to reduce all greenhouse gas emissions throughout the City, supported by our community.
- Increasing our adaptive capacity – by strengthening our existing initiatives, innovating to take advantage of emerging opportunities, trialing new technology and developing programs to support our businesses and residents to better care for our land and adapt to a changing climate.

	Actions for strong leadership	Leader	Related Plan	Timeframe	Resource	Measure of success
1.1	Endorse the 2020 Climate Change Strategy. Commit to net zero emissions	Council	Climate Change Strategy 2020–2030	Now (2020 to 2021)	New	Strategy adopted by Council
1.2	Establish a Climate Change Working group to explore opportunities and technology	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Climate Change Working group established
1.3	Continue investment in the Greenhouse Action Fund using financial savings from energy reduction and renewable energy projects	Executive	Climate Change Strategy 2020–2030	Ongoing	Existing	Greenhouse action fund allocated
1.4	Employ a full-time Climate Change Officer to deliver this Strategy	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Climate Change Officer employed
1.5	Review the Climate Change Strategy in 2025 and update the action plans	Manager Parks and Environment	Climate Change Strategy 2020–2030	Ongoing	New	Climate Change Strategy reviewed
1.6	Continue to implement the Fossil Free Investment preference within the City’s Investment Policy	Manager Finance	City of Cockburn Investment of funds Policy	Medium Term (2024 to 2027)	Existing	Funds are invested in accordance to policy.
1.7	Promoting the City’s initiatives and achievements (ie case studies) to encourage others to follow our lead	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Information shared to other Councils

Table 2: Action plan for strong leadership

7. City of Cockburn, Climate Change Community Engagement Outcomes Report, June 2020, www.cockburn.wa.gov.au



2. Net zero emissions

Reducing greenhouse gas emissions is a major challenge that will require strong action over the next decade to ensure we avoid the worst impacts of climate change.

Pathway to net zero emissions

Net zero emissions can be achieved by first reducing emissions to as-close-to zero as possible by improving energy efficiency, fuel switching, reducing waste to landfill and sourcing energy from renewable sources. Any remaining emissions would be balanced with an equivalent amount of carbon removal, such as the purchase of accredited carbon offsets to remove Greenhouse Gas Emissions from the atmosphere

Corporate emission reduction target

The City of Cockburn aims to achieve net zero emissions by 2030 and will transition to source 100% of electricity for its facilities from renewable sources.

The corporate target relates specifically to Council operations which comprise 1.3 percent of total emissions in the Cockburn municipality. This target is considered to be best practice in Australia and necessary to avoid the worst impacts of climate change.

To achieve net zero corporate emissions by 2030, the City will:

- Establish a 'Climate Active⁸' emissions baseline, annually monitor and report emissions.
- Eliminate waste to landfill.
- Transition to 100% renewable energy.
- Reduce energy consumption and operational costs.
- Transition to energy efficient public lighting.

- Maintain a zero emissions fleet.
- Invest in accredited carbon offsets for residual emissions.

Community emission reduction goal

The City will work with the Cockburn Community and the State Government to achieve net zero emissions by 2050.

This goal recognises the shared responsibility for action on climate change and aligns to the Western Australian Government's proposed emission reduction target. Governments at all levels, businesses, communities and individuals all have important roles to play in reducing emissions.

The City acknowledges that it is well placed to educate, facilitate and support the community, but ultimately the state government, residents and business must take action themselves to achieve net zero emissions.

To assist the community in achieving net zero emissions by 2050, the City will:

- Provide households with the information they need to reduce energy, water and waste
- Develop an Economic Development Framework and action plan to assist local business reduce their energy consumption and prosper in a low emissions economy
- Issue an open letter to the state government, to acknowledge the shared responsibility in working towards net zero emissions
- Advocate for improvements to public transport
- Provide infrastructure such as electric vehicle charging stations and shared paths to facilitate sustainable and active transport

⁸ Climate Active certification is awarded to businesses and organisations that have reached carbon neutrality

	Actions to achieve net zero emissions	Leader	Related Plan	Timeframe	Resource	Measure of Success
2.1	Undertake an annual 'Climate Aligned' greenhouse gas emission corporate inventory and report on performance against targets	Manager Parks and Environment	Climate Change Strategy 2020–2030	Ongoing	Existing	Annual inventory and report completed
2.2	Implement the climate resilience roadmap to reduce corporate emissions as much as practical by eliminating waste to landfill, transition to 100% renewable energy, and reduce energy consumption.	Manager Parks and Environment	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	New	Implementation of resilience roadmap
2.3	Invest in ethical, accredited carbon offsets for residual emissions that can't be reduced by 2030.	Manager Parks and Environment	Climate Change Strategy 2020–2030	Long Term (2027 to 2030)	Existing	Investment on accredited carbon offsets
2.4	Issue an open letter to the state government, to acknowledge the shared responsibility in working towards net zero emissions	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short term (2021 to 2023)	New	Letter issued
2.5	Assist the community in achieving net zero emissions by 2050 through education and collaboration	Manager Parks and Environment	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	New	Implementation of resilience roadmap
2.6	Establish partnerships to assist industry achieve net zero emissions by 2050	Manager Parks and Environment	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	New	Implementation of resilience roadmap

Table 3: Action plan for net zero emissions



3. Transition to 100% renewable electricity

For decades, scientific communities around the world have been warning about the climate impacts that will be felt if we don't move away from the consumption of coal, oil and gas for energy⁹.

As the world's sunniest and windiest inhabited continent, Australia has everything it could ever need to reduce emissions to zero and benefit from the transition¹⁰.

The City currently receives the majority of its energy supply from the South West Interconnected System (SWIS). The City generates around 23% of its own renewable energy from decentralized solar installations on the City's buildings.

Currently energy regulation barriers in WA restrict local governments from establishing power purchase agreements (PPAs) for non-contestable sites and restrict access to the grid for large-scale renewable energy projects. A fundamental regulatory change is required to enable the City to decarbonise its electricity supply.

Greenhouse gas emissions from energy use contribute 40% of the City's emissions. This energy is used to power essential services including street lighting, irrigation bores in parks, and facilities including libraries, community buildings and the Cockburn ARC.

The City aspires to progressively add more renewable sources to its energy portfolio and by 2030 transition to 100% renewable energy by sourcing electricity from:

- small to medium scale rooftop solar on occupied council facilities.
- large scale solar on the Cockburn ARC, Operations Centre and Administration Building.
- a renewable energy park at the Cockburn Resource Recovery Park.
- energy storage devices including hydrogen cells and electric vehicles.
- organic 'waste from energy'.

In addition, the City will advocate for the contestability of electricity supply in WA to enable the procurement of renewable energy.



Image 9: Solar photovoltaic system (130kW), Cockburn Health and Community Facility

⁹ Primed for action: A resilient recovery for Australia, Climate Council of Australia, 2020

¹⁰ Super-Power: Australia's Low-Carbon Opportunity, Ross Garnaut 2019

	Actions to achieve 100% renewable electricity	Leader	Related Plan	Timeframe	Resource	Measure of Success
3.1	Install solar photovoltaic systems on all major council facilities. Continue to investigate the feasibility of battery storage.	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Ongoing	Existing	PV systems installed
3.2	In collaboration with WALGA, advocate for: a) contestability of street lighting and all Council accounts b) improved grid access for large scale renewable projects as well as community driven projects.	Executive	Climate Change Strategy 2020–2030	Ongoing	New	Electricity market reform
3.3	Seek funding for the development of a ‘Renewable Energy Park’ including wind turbines, solar photovoltaics and hydrogen at the Cockburn Resource Recovery Precinct	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	Existing	Funding obtained
3.4	Investigate off-grid energy options e.g. transfer electricity and hydrogen from the Renewable Energy Park to facilities i.e Cockburn ARC.	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	Existing	Feasibility study completed
3.5	Continue to replace petrol driven tools, such as chainsaws, blowers and hedge trimmers, with rechargeable battery options and power them with renewable energy	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Ongoing	Existing	Replacement program completed
3.6	Phase out gas appliances and changeover to electric powered appliances which can be powered by renewable energy	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Ongoing	Existing	Replacement program completed
3.7	Secure an agreement with a retailer to procure renewable electricity	Manager Financial Services	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	Existing	Agreement established
3.8	Support community groups in leased facilities to install renewable energy infrastructure through the sustainability grants program.	Manager Parks and Environment	Climate Change Strategy	Ongoing	New	Sustainability grant criteria amended

Table 4: Action plan for 100% renewable electricity



4. Zero waste to landfill

Methane emissions from landfill at Henderson Waste Recovery Park (HWRP) contribute to 60 percent of the City's total greenhouse gas emissions. In October 2019, the City temporarily diverted household general waste to HWRP landfill following withdrawal from the Southern Metropolitan Regional Council. From June 2022, general waste will be sent to the energy from waste plant in East Rockingham. Landfill emissions may increase during this transition period as a result of increased tonnage being sent to HWRP.

The City's vision for responsible waste management is for 100% of non-hazardous waste to be diverted from landfill by 2030.

This will be achieved by applying the WA State Government's waste hierarchy (see image 6 below), with avoidance of waste being the most preferred option. The City will invest in research-based behaviour change programs to encourage community and industry to generate less waste.

An integral component of City's waste management strategy is a strong community engagement program which will be supported by a best practice community drop off facility, recycle shop and education center.

The disposal of waste to landfill is the least preferred option in the hierarchy, as it recovers the least value from materials that are disposed. The City recognises that there will be a small percentage of hazardous and toxic material (eg asbestos) that can only be safely disposed of within a specialised landfill site. The Zero Waste to landfill objective excludes hazardous waste.

Henderson Waste Recovery Park will be transformed in the coming years to become the Cockburn Resource Recovery Park (CRRP) and will include a renewable energy park with methane gas capture, wind, solar and hydrogen technology. Partnerships are being explored to enable complimentary waste processors to take up leased land on site which will contribute to a circular economy. By 2030, the City plans to cap all landfill cells at the CRRP and transition to a waste transfer facility with zero waste to landfill.

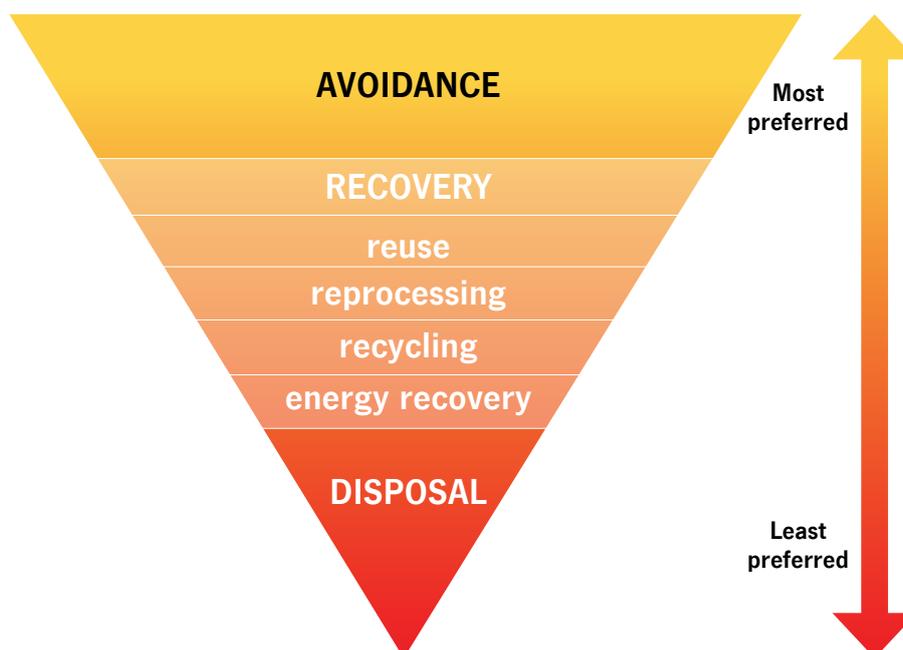


Image 10: Waste Hierarchy, Waste Avoidance and Resource Recovery Strategy 2030

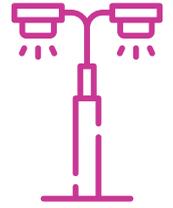


Image 11: Waste transfer station aerial (top), Waste separation at Henderson Waste Recovery Park (bottom)

	Actions to achieve zero waste to landfill	Leader	Related Plan	Timeframe	Resource	Measure of Success
4.1	Eliminate organic waste to landfill by complete product separation at CRRP and by diverting waste to the energy from waste facility.	Waste Manager	Waste Strategy	Long Term (2027 to 2030)	Existing	CRRP completed. Energy from Waste commenced
4.2	Improve resource recovery and education through construction of a best practice community drop off facility, reuse shop and education centre at CRRP.	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	Existing	Community education facility constructed
4.3	Deliver research-based behaviour change programs to encourage the community to generate less waste and adopt leading waste separation practices.	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	Existing	Behaviour change programs developed
4.4	Establish partnerships and offer land for lease at CRRP to complimentary waste businesses to further recover and process valuable waste streams onsite.	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	Existing	Lease arrangements established
4.5	Increase recovery from verge side collections through improved processes.	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	Existing	Recovery rates increased
4.6	Continue partnership landfill gas and power generator. Address legacy and fugitive emissions through landfill capping and by installing extensive methane capture pipework.	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	Existing	Cells capped. Landfill gas and power partnership continued.
4.7	Investigate opportunities to facilitate a circular economy within Cockburn	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	Existing	Feasibility study completed
4.8	Continue to report landfill emissions under the National greenhouse Emissions reporting Scheme (NGERs) and monitor federal government policy in respect to a price on carbon.	Waste Manager	Waste Strategy	Ongoing	Existing	NGERs report submitted annually.
4.9	Provide container deposit scheme collection points and reduce single use plastics at City events	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	Existing	Wastewise event policy adopted.
4.10	Increase the use of recycled and sustainable materials within road construction.	Manager Engineering	Waste Strategy	Ongoing	Existing	Recycled material use increased.

Table 5: Action plan for zero waste to landfill

5. Reduce energy consumption



Community facilities

The design and operation of our facilities has long-term implications on City's energy use and associated greenhouse gas emissions. A key step in the transition to net zero carbon emissions is to decrease the energy demand of our facilities by improving efficiency and optimising performance.

The City manages over 150 facilities and 320 parks which use electricity and gas to power appliances, lighting, pumps, heating, cooling and more.

The City is committed to implementing best practice in facility management. This includes implementing policy for sustainable buildings, data management, monitoring, reporting and active management of buildings to optimize energy efficiency.

The installation of solar power systems and application of environmentally sustainable design for all new Council facilities will significantly reduce future emissions, while lowering utility costs and enhancing comfort for building occupants.

Street lighting

Street lighting is a significant source of greenhouse gas emissions, contributing to almost half of the City's electricity consumption at a cost of \$2.7 million per annum.

Currently it is difficult for Local Governments in WA to influence the electricity consumption from street lighting, as the majority of lights are under the operational control of Western Power, who determine which luminaire is fitted to each light and their operational hours.

In other Australian states the Distribution Network Service Providers (DNSPs) and councils have come to an agreement whereby streetlights have been converted to LED on a large scale. Councils are gaining significant financial and emissions savings with leading councils now seeking extra savings by installing smart lighting.

The City will continue to advocate for technology replacement, contestability of street lighting and will work with Western Power to facilitate a roll out of more energy efficient street lighting.



Image 12: LED street lights in North Lake

	Actions to reduce energy consumption	Leader	Related Plan	Timeframe	Resource	Measure of Success
5.1	Design all new Council buildings to best practice Environmentally Sustainable Design (ESD) by allocating 3% of the project budget towards innovative ESD	Executive	Sustainability Policy	Ongoing	Existing	ESD incorporated into new builds (over \$1m)
5.2	Investigate opportunities for carbon positive buildings	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Report complete
5.3	Implement environmentally and financially sustainable methodology for government facilities management.	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Ongoing	New	Best practice implemented
5.4	Support community groups in leased facilities to undertake energy efficient upgrades through sustainability grants	Manager Recreation and Community Safety	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Sustainability grant criteria amended
5.5	Undertake energy audits of all major community facilities, identify a schedule of works and develop building optimization plans to reduce operating costs, better manage energy demand and reduce consumption	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	Ongoing	Energy audit program delivered
5.6	Investigate opportunities to offset the carbon emissions from City of Cockburn organised events	Manager Corporate Communications	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	Existing	Feasibility report completed
5.7	Switch to energy efficient street lighting by working with WALGA and Wester Power (WP) to upgrade WP streetlights and upgrade Council owned streetlighting to LED in parks, marina, public access ways, etc.	Executive	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Smart street light rollout complete
5.8	Update the Public Open Space Strategy to make it a requirement for all parks and streetscape lighting to be LED	Manager Parks and Environment	Public Open Space Strategy 2014–2024	Medium Term (2024 to 2027)	Existing	Public Open Space Strategy updated
5.9	Continue to monitor the City's energy use via the online integrated monitoring platform and integrate real-time data	Manager Parks and Environment	Climate Change Strategy 2020–2030	Ongoing	Existing	Regular monitoring and inventory report completed.

Table 6: Action plan to reduce energy consumption

6. Zero emissions fleet



The City has operational requirements for a range of vehicles, plant and equipment which deliver essential services such as waste collection, recycling and maintenance of the City's parks and reserves.

Fleet emissions from consumption of petrol and diesel fuel contribute 11 percent of the City's total emissions. Almost 80 percent of these emissions are from heavy fleet including waste trucks.

The City has maintained a Zero emissions fleet since 2011, by purchasing accredited carbon offsets that support local WA projects including biodiverse tree planting in the wheatbelt. Going forward the City aims to improve the efficiency of its fleet and transition to electric and hydrogen powered vehicles.

Innovations in the vehicle industry and declining battery costs will soon put Electric Vehicles (EVs) on par with conventional fuel powered vehicles.

EVs will be the most significant technology change in passenger vehicles. Over the next five years, it is expected that most of the barriers to adoption will be addressed, with the price of EVs expecting to drop below their conventional counterparts by as early as 2022.

Electric vehicles will play an important role in the City's transition to 100% renewable energy. EVs can also form part of the City's power system as they use, generate and store electricity.

Technological advances in hydrogen fuel cell vehicles may also present opportunities, particularly with waste vehicles.

Replacing the fleet's energy source from fuel, to electricity and hydrogen, can help reduce the risks of fuel price volatility. Integrating battery storage and renewables into the energy mix will help to enhance energy security as the City can generate and store its own fuel source onsite.



Image 13: electric vehicle charging station at Cockburn Central

	Actions for a Zero Emissions Fleet	Leader	Related Plan	Timeframe	Resource	Measure of Success
6.1	Develop a best practice Council fleet policy and ensure fleet purchases meet strict Greenhouse Gas emissions requirements. Incentivise the selection of low or “zero” emission vehicles. Set a requirement for the proportion of fleet vehicles to be EV.	Manager Infrastructure Service	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Policy updated
6.2	Continue to offset residual emissions from the City’s Fleet by purchasing accredited carbon offsets	Manager Infrastructure Service	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	Existing	Offsets procured
6.3	Develop a plan to adopt new technology to transition Council’s fleet to electric vehicles or hydrogen and power these by 100% renewable energy	Manager Infrastructure Service	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Plan endorsed and implemented
6.4	Undertake a ‘Green Hydrogen for City of Cockburn’ feasibility study for solar hydrogen production for waste collection and light vehicle fleets.	Manager Infrastructure Service	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	Existing	Feasibility study completed
6.5	Continue to provide fast-charging infrastructure throughout the City at key locations for electric vehicles	Manager Infrastructure Service	Climate Change Strategy 2020–2030	Ongoing	Existing	EV charging infrastructure installed
6.6	Quantify the amount of carbon sequestration through the City’s annual planting program to offset residual fleet emissions	Manager Parks and Environment	Urban Forest Plan 2018–2028	Short Term (2021 to 2023)	New	Calculations completed
6.7	Upgrade the staff vehicle booking system, including the ability to facilitate carpooling to meetings and for commute to work.	Manager Human Resources	Climate Change Strategy 2020–2030	Now (2020 to 2021)	Existing	Vehicle booking system commissioned
6.8	Investigate incentives to encourage staff to switch to more sustainable transport to commute to work.	Manager Engineering	Integrated Transport Strategy	Short Term (2021 to 2023)	Existing	Incentives approved and implemented

Table 7: Action plan for a zero emissions fleet



Image 14: The City offsets fuel emissions for fleet and plant (top), An electric waste truck trial is schedule for 2020 (bottom)



7. Smart city innovation

The City of Cockburn aspires to be recognised as a digital transformation leader and has made a commitment to embrace leading edge practices, enhance digital literacy, and apply smart technology¹¹.

A smart City is one that uses information and technology to increase operational efficiency, improve communication and enhance liveability.

There are new approaches, innovative technologies and smart infrastructure that can help meet the challenges of climate change and ensure a more sustainable and resilient future.

Sensors and integrated technology providing real time data can be used in decision making to improve livability of the City i.e. by monitoring urban heat, water use and waste levels. Smart lighting can also help to reduce energy demand and costs.

	Actions for smart city innovation	Leader	Related Plan	Timeframe	Resource	Measure of Success
7.1	Review and implement the Digital Strategy 2019–2023	Executive	Digital Strategy 2019–2023	Short Term (2021 to 2023)	Existing	Strategy reviewed and implemented
7.2	Develop an Innovation Framework	Executive	Corporate Business Plan	Short Term (2021 to 2023)	Existing	Framework endorsed by Council
7.3	Pilot smart street lighting e.g technology with environmental sensors, dimming technology, metering, traffic measurement. Seek funding to accelerate a City wide replacement program	Executive	Digital Strategy 2019–2023	Short Term (2021 to 2023)	Existing	Pilot completed City wide rollout complete
7.4	Advocate for a fast-tracked roll-out of residential Advanced Meter Infrastructure to help establish a smart grid and facilitate a virtual power plant in the community	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Advanced Meter Infrastructure installed
7.5	Support western Power in the installation of Community Storage (large scale batteries) to meet network needs and facilitate a smart grid.	Manager Parks and Environment	Climate Change Strategy 2020–2030	Ongoing	New	Community Storage Batteries installed

¹¹ City of Cockburn Digital Strategy 2019 –2023, www.cockburn.wa.gov.au

	Actions for smart city innovation	Leader	Related Plan	Timeframe	Resource	Measure of Success
7.6	Continue to provide electric vehicle charging infrastructure to facilitate sustainable transport	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Ongoing	New	EV charging infrastructure installed
7.7	Investigate usage-pricing technology and pay-as-you-throw programs for municipal waste	Waste Manager	Waste Strategy	Long Term (2027 to 2030)	New	Feasibility study completed
7.8	Investigate smart technology to reduce litter (e.g. microplastics) on the Cockburn coastline.	Waste Manager	Waste Strategy	Medium Term (2024 to 2027)	New	Feasibility study completed
7.9	Investigate reverse vending machines for household waste to engage the community and provide incentives to reduce waste	Waste Manager	Waste Strategy	Short Term (2021 to 2023)	New	Investigation completed. Incentives provide.
7.10	Implement smart building controls to monitor and manage City’s facilities remotely (e.g. to enable switch off of lights and appliances)	Manager Infrastructure Services	Digital Strategy 2019–2023	Now (2020 to 2021)	Existing	Intelligent building controls installed
7.11	Explore innovative ways to utilise renewable energy technology to establish a local network of energy generators, peer-to-peer trading and micro grids.	Manager Parks and Environment	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	New	Feasibility study completed
7.12	Undertake a ‘Green Hydrogen for City of Cockburn’ feasibility study to examine cogeneration opportunities for electricity and heat production.	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Ongoing	Existing	Study completed
7.13	Investigate design requirements for road signage and line markings to accommodate future advances in transport including driverless and autonomous electric vehicles	Manager Engineering	Integrated Transport Strategy	Long Term (2027 to 2030)	Existing	Investigations completed
7.14	Encourage smart city infrastructure in land developments (e.g. Hamilton Hill High School redevelopment)	Manager Parks and Environment	Climate Change Strategy 2020–2030	Ongoing	Existing	Advice provided to land developers

Table 8: Action plan for smart city innovation



8. Education and collaboration

Education and collaboration are essential elements in the City's response to climate change. Through education, the City can help the community and business understand the specific climate risks to our region, which can empower them to take action to reduce emissions and build resilience by being prepared to adapt to the impacts.

The City acknowledges the shared responsibility of climate change. Collaboration with stakeholders, the community and business, enables the City to pool resources to tackle an issue that isn't defined by borders.

Early childhood and school programs

The City provides grants and scholarships to support environmental education and subsidised access to a wide range of excursions, festivals and programs e.g.

- environmental education and sustainability grants.
- school holiday programs.
- early learning programs.
- professional development sponsorships.
- climate change excursions.



Image 15: Guided indigenous walk

Community engagement programs

The City offers a wide range of grants, rebates and engagement programs to residents on sustainability, environmental protection and climate change, including:

- sustainability workshops and events.
- community litter prevention programs.
- citizen science programs.
- sustainability and landowner biodiversity grants.
- free mulch and street trees.
- rebates and subsidies, free home energy and water audits.

Helping local business prosper

The City is developing an Economic Development Framework and action plan that will outline how the City can help business thrive. The City supports local business and industry through:

- grant funding, support for start-ups and innovation in business.
- business capacity building.
- support for business-to-business growth and competitive supply chains.
- business advisory support, events and online resources.
- promoting a 'shop local' message.
- advocating for a full range of education and training opportunities.
- facilitating a thriving tourism and ecotourism industry.

Collaboration and partnerships

The City maintains strong partnerships with the Melville Cockburn Chamber of Commerce (MCCC), Jandakot Airport Chamber of Commerce, Small Business Development Corporation (SBDC), South West Group, and Business Foundations to help build a strong and sustainable economy

In 2012 the City signed the WALGA Climate Change declaration and continues to work with this peak body to advocate for changes in regulation and policy to enable local government to deliver its core services in a sustainable manner. The City is also active in the WALGA CHRMAP (Coastal Hazard Risk Management and Adaptation Planning) Forum, which brings the state's coastal local governments together to collaborate and advocate for better responses to sea level rise and coastal hazards.

The City is actively working with the Department of Fire and Emergency Services (DFES) to mitigate the risk and impact that fire may have on our community.



Image 16: residents can save energy and reduce their bills with the Climate Clever app

Cities power partnership

Cockburn joined the Climate Council's Cities Power Partnership (CPP) in 2019. CPP is Australia's largest climate change program and provide councils with the opportunity to contribute to the national knowledge hub and collaborate with other councils.

Participating councils are required to identify five power partnership pledges. The City has selected the following five pledges which are addressed within this strategy:

1. Set city-level renewable energy or emissions reduction targets.
2. Roll out energy efficient lighting across the municipality.
3. Identify opportunities to turn organic waste into electricity.
4. Install renewable energy (solar PV and battery storage) on council buildings.
5. Power council operations by renewable energy, and set targets to increase the level of renewable power for council operations.

Climate clever

The City joined ClimateClever in 2020 through the Local Government (LGA) Partnership Program. ClimateClever helps empower school, students and households to reduce their carbon footprint and save money. Residents and Schools in Cockburn are encouraged to participate and can receive a 50% discount on Climate clever apps.

Cockburn sound coastal alliance

The City is a founding member of the Cockburn Sound Coastal Alliance (CSCA). The CSCA aims to take a regional approach to understanding and adapting to coastal hazards, so that methodologies to address climate change risks are consistent within the geographical area of Cockburn Sound and Owen Anchorage.

	Actions for education and collaboration	Leader	Related Plan	Timeframe	Resource	Measure of Success
8.1	Continue environmental education programs to build awareness and understanding of climate risks and resilience.	Manager Parks and Environment	Climate Change Strategy 2020–2030	Ongoing	Existing	Education programs delivered
8.2	Continue collaboration with the Cockburn Sound Coastal Alliance	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Ongoing	Existing	Partnership continued
8.3	Continue the Cities Power Partnership Champion membership	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	Existing	Membership maintained
8.4	Work with WALGA to advocate for changes to policy and legislation	Executive	Climate Change Strategy 2020–2030	Ongoing	Existing	Partnership continued
8.5	Support the implementation of State Government climate policy	Executive	Climate Change Strategy 2020–2030	Ongoing	Existing	Support continued
8.6	Continue to implement the buy local purchasing policy	Manager Financial Services	Purchasing Policy	Ongoing	Existing	Buy local policy implemented
8.7	Implement sustainable behaviour change programs and provide households with the information and tools they need to reduce energy, water and waste consumption.	Manager Parks and Environment	Sustainability Strategy 2017 –2022	Ongoing	Existing	Sustainable living events program delivered.
8.8	Continue to fund the Home Eco Audits program to facilitate personalised actions for households to reduce carbon emissions	Manager Parks and Environment	Climate Change Strategy 2020–2030	Ongoing	Existing	Home eco audits program delivered

	Actions for education and collaboration	Leader	Related Plan	Timeframe	Resource	Measure of Success
8.9	Prepare an Economic Development Framework that outlines how the City can build resilience, help business proposer in a low emissions economy and create new jobs, particularly via: organics waste management, renewable energy infrastructure, ecosystem restoration, active transport, energy efficiency and electric vehicle infrastructure.	Manager Strategic Planning	Corporate Business Plan	Short Term (2021 to 2023)	New	Economic Development Framework adopted
8.10	Continue to encourage sustainable transport use such as public transport, walking and cycling through the 'Your Move' program, transport planning and design	Manager Engineering	Integrated Transport Plan	Ongoing	Existing	Integrated transport plan implemented
8.11	Investigate how the City can support the community and local business develop, own, or benefit from renewable energy projects. E.g. bulk buys.	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Report complete
8.12	Explore community ownership models for large-scale renewable energy infrastructure.	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Report complete

Table 9: Action plan for education and collaboration



Image 17: Get wild about wetlands school holiday program



9. Waterwise city

Cockburn’s water security has already been influenced by climate change and associated local decline in rainfall. This has resulted in reduced ground water availability, which may decrease liveability with loss of urban vegetation and a decline in biodiversity.

The City is actively managing the impacts of reduce water availability for its operations. Many of the City’s groundwater resource areas are exhausted and with further reductions in groundwater allocations anticipated.

In order to maintain local amenity through neighborhood parklands, high quality sporting grounds and verges, the City is reducing water use by rationalising irrigation. This is achieved through hydrozoning, planting drought tolerant

native species and using central controlled irrigation systems. This is a primary example of climate change adaptation in action.

Waterwise Council Program

The City has been endorsed by the Water Corporation as a Gold Waterwise Council since 2015. This program supports councils to improve water efficiency and gives recognition to the City’s initiatives to reduce water use at all facilities, buildings and public open spaces. The Water Efficiency Action Plan (WEAP) guides the City to monitor water use, deliver on identified goals, targets and sets actions that improve efficiency in groundwater use and reduce scheme water consumption.

	Actions for a waterwise City	Leader	Related Plan	Timeframe	Resource	Measure of Success
9.1	Maintain Gold waterwise Council Status. Aim for platinum endorsement.	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Ongoing	Existing	Gold waterwise Council Status maintained
9.2	Review, update and implement the Water Efficiency Action Plan to address climate change	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Now (2020 to 2021)	New	Plan updated
9.3	Establish a waterwise working group to advance the WEAP and water sensitive urban design	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Now (2020 to 2021)	New	Working group establish
9.4	Reduce community and corporate water consumption	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Short Term (2021 to 2023)	Existing	Water consumption reduced
9.5	Increase water literacy and continue to offer incentives to encourage water efficiency in households	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Ongoing	Existing	Education program and incentives delivered

	Actions for a waterwise City	Leader	Related Plan	Timeframe	Resource	Measure of Success
9.6	Continue to reduce Council groundwater abstraction and explore use of alternative water sources	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Now (2020 to 2021)	Existing	Groundwater usage reduced. Alternatives identified
9.7	Maintain dialogue with the Water Corporation to enhance the outcomes of major stormwater drainage systems on Wetlands	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Now (2020 to 2021)	Existing	Partnership maintained
9.8	Implement Water Sensitive Urban Design initiatives e.g. groundwater replenishment, Policy or guidelines, aquifer recharge trials and groundwater interception drain at Port Coogee	Manager Parks and Environment	Drainage Management Strategy 2018–2028	Now (2020 to 2021)	New	WSUD Initiatives implemented
9.9	Continue to monitor water use and sources for public open space and adjust regimes	Manager Parks and Environment	Water Operating Strategy	Ongoing	Existing	Water Operating Strategy implemented
9.10	Continue to investigate and implement opportunities to reduce irrigated surface area and improve irrigation design e.g. hydrozoning.	Manager Parks and Environment	Water Operating Strategy	Ongoing	Existing	Irrigation reduced
9.11	Continue to implement water saving measures at the ARC and water audits to identify savings.	Manager Recreation and Community Safety	Water Efficiency Action Plan 2016 –2020	Ongoing	Existing	Water consumption reduced
9.12	Conduct water audits at the top 5 water using facilities/ locations.	Manager Parks and Environment	Water Efficiency Action Plan 2016 –2020	Short Term (2021 to 2023)	Existing	Audits completed
9.13	Require best practice strategies for new urban development and existing storm water drainage management systems, to be capable of handling greater flows considering latest climate science.	Manager Engineering	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	New	Review undertaken

Table 10: Action plan for a waterwise city



10. Conserve biodiversity

The City of Cockburn manages 92 bushland reserves, spanning 1,189 hectares, which includes coastal, wetland and upland areas. Many of the City's reserves are located within three regional parks – Beelihar, Jandakot and Woodman Point.

As well as bushland reserves, the City manages a number of ecological linkages in developed areas which provide important movement passages for fauna and habitat for flora. There are two chains of wetlands that run through the heart of the City, including an internationally listed Ramsar wetland, Thompson Lake.

Cockburn's biodiversity is part of the South West Botanical Province of Western Australia, which is recognised as one of the world's top 25 biodiversity hotspots.

Climate change projections suggest that Cockburn will experience an increase in the occurrence of extreme weather and fire-prone conditions which can threaten biodiversity. Increase in temperatures, decreased rainfall and drier conditions can also result in changes to the distribution and occurrence of fauna and flora, due to shifting climate envelopes and changes to the natural cycles of flora and fauna, and in turn biodiversity loss.

Additionally, coastal erosion and salt water intrusion may also cause loss of habitat and reduced ecosystem function in coastal dunes and wetlands such as Manning Lake.

The City has a number of measures in place to increase the resilience of these ecosystems, including flora and fauna monitoring, weed and pest management as outlined in the Natural Area Management Strategy.

Detailed information on climate change risks to biodiversity, current controls, and actions are provided in the City of Cockburn Climate Change Risk Assessment.



Image 18: revegetation for habitat creation (top), grass trees after bushfire in yangebup (left), Southwestern snake-necked turtle
Photo credit: Sharon Meredith (right)

	Actions to conserve biodiversity	Leader	Related Plan	Timeframe	Resource	Measure of Success
10.1	Implement the Natural Area Management Strategy.	Manager Parks and Environment	Natural Area Management Strategy 2018–2022	Now (2020 to 2021)	Existing	Strategy implemented
10.2	Update the City’s Bushfire Risk Management Plan and Conservation specific Fire Response Plans to reduce adverse impacts upon biodiversity.	Manager Recreation and Community Safety	Bushfire Risk Management Plan 2015–2020	Now (2020 to 2021)	Existing	Bushfire Risk Management Plan updated
10.3	Continue to help to protect at risk species by increasing protected bushland areas, and relocating species that are under threat to suitable areas	Manager Parks and Environment	Natural Area Management Strategy 2018–2022	Now (2020 to 2021)	Existing	Relation programs implemented
10.4	Continue to investigate and implement alternative species of plants, and trees for new parks/ovals and old parks/ovals requiring upgrading/replacing	Manager Parks and Environment	Natural Area Management Strategy 2018–2022	Now (2020 to 2021)	Existing	Plant selection lists updated
10.5	Continue to monitor wetlands and conservation areas and adapt management regimes to build resilience and maintain ecosystem function	Manager Parks and Environment	Natural Area Management Strategy 2018–2022	Now (2020 to 2021)	Existing	Monitoring and adaptation regimes implemented
10.6	Provide education programs/campaigns to assist the public in understanding biodiversity loss and implementing biodiversity preservation strategies in their own gardens	Manager Parks and Environment	Natural Area Management Strategy 2018–2022	Short Term (2021 to 2023)	Existing	Education campaigns delivered

Table 11: Action plan to conserve biodiversity

11. Coastal adaptation



Sea level rise is expected to result in increased shoreline erosion and more frequent inundation of low-lying land. Salinity and salt water intrusion to aquifers may also cause damage to, or loss of natural environment and habitat, low-lying buildings and infrastructure.

Increased erosion due to sea level rise is expected to be the first and most significant impact of sea level rise, likely to be acutely observable by the middle of the century. All of the City's sandy shoreline is expected to progressively recede to varying degrees, resulting in permanent loss of coastal land and adjoining assets if no action is taken.

Occasional inundation (coastal flooding) of some low lying coastal areas is likely to occur later in the 21st century, impacting locations such as parts of North Coogee and much of the Woodman Point reserves. The City should be considerate of legal liability and reputational risk in relation to development approval and planning schemes for low-lying areas at high risk of inundation.

Damage to coastal structures as a result of increased storm intensity as well as salt water intrusion and elevated groundwater levels in coastal areas are also likely to have material negative impacts however the magnitude of these hazards are difficult to predict and have not been assessed in detail at this time.

These risks may result in a reduction of public amenity, loss of natural environment and damage to infrastructure. The City has a number of measures in place to reduce these risks including the Coastal Adaptation Plan, and a Coastal Monitoring Program.

Coastal Adaptation Plan

The Coastal Adaptation Plan (CAP) was developed in 2016 as part of the Cockburn Sound Coastal Vulnerability & Flexible Adaptation Pathways Project, using information from the Coastal Vulnerability Study and Values and Risk Assessment. The CAP guides the City in managing risks and adapting to coastal changes in a sustainable and flexible manner.

The Coastal Adaptation Plan adopts a flexible adaptation pathway approach, which aims to implement management actions using risk-based triggers whilst prioritising measures that address the coastal risk without limiting future adaptation strategy options. Specific recommended actions for the City to take in the immediate (15-year) planning horizon are provided to manage risks of coastal erosion and inundation. Recommendations for actions further afield are also provided, on the understanding that these may evolve with periodic review of the CAP to reflect future changes in community values, scientific understanding and future events.

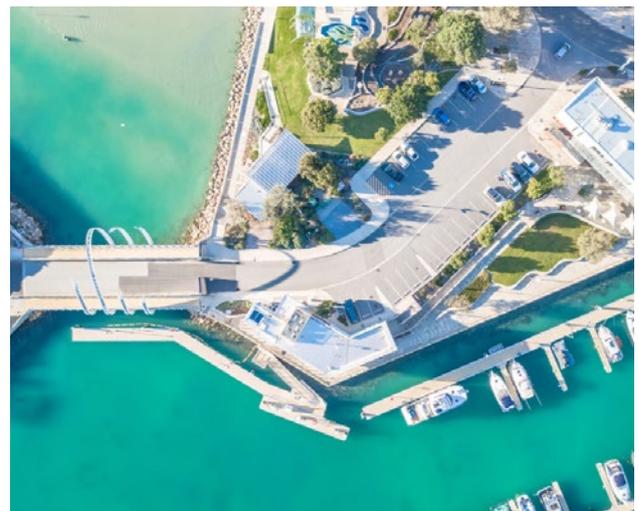
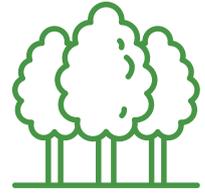


Image 19: Ngarkal Beach, Port Coogee

	Actions for coastal adaptation	Leader	Related Plan	Timeframe	Resource	Measure of Success
11.1	Review and implement the Coastal Adaptation Plan with latest climate science, scenario mapping and WALGA recommendations.	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Ongoing	Existing	Coastal Adaptation Plan reviewed
11.2	Review and maintain ongoing coastal monitoring program to identify early changes to shoreline conditions and risks	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Ongoing	Existing	Coastal monitoring program delivered
11.3	Receive legal advice to clarify the liability of the City in the event of coastal climate change risk scenarios	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Short Term (2021 to 2023)	Existing	Legal advice received
11.4	Engage with the community and stakeholders to raise awareness of coastal risks and increase collaboration	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Short Term (2021 to 2023)	Existing	Community engagement program delivered
11.5	Prepare site specific foreshore management plans to provide an implementation framework for coastal adaptation measures, including managed retreat or defence as appropriate to the site	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Short Term (2021 to 2023)	Existing	foreshore management plans implemented
11.6	Design and implement coastal adaptation measures as required and in alignment with the Coastal Adaptation Plan and foreshore management plans	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Ongoing	Existing	Coastal adaptation measure implemented
11.7	Review and update planning schemes and controls according to latest coastal hazard information and legal advice and best-practice coastal engineering.	Manager Strategic planning	Coastal Adaptation Plan 2016	Medium Term (2024 to 2027)	New	Planning schemes and controls updated
11.8	Design for climate resilience and with consideration to the most appropriate sea level rise predictions for any expansion of Marina infrastructure or the development of other coastal structures.	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Ongoing	Existing	Coastal and marina infrastructure designed appropriately
11.9	Advocate for State and Commonwealth funding towards coastal adaptation measures	Manager Infrastructure Services	Coastal Adaptation Plan 2016	Ongoing	New	Funding obtained

Table 12: Action plan for coastal adaptation



12. Increase the urban forest

Trees, bushland, parks and gardens are central to the character and liveability of the City. The current value of the City's street trees is over \$137 million. These valuable assets help to cool our suburbs, improve the health and wellbeing of our residents, provide habitat, increase amenity and improve property values.

The climate change risk assessment identified a substantial risk to the City's urban forest as a result of increased temperatures and decreased rainfall which will cause heat, pest and water stress on vegetation and the urban forest.

Urban Forest Plan 2018–2028

The *Urban Forest Plan 2018–2028* recognises the impacts of climate change and guides the management of streetscapes and public open space to improve the liveability of our City. The plan aims to expand canopy cover through the City's tree planting program, promote resilience by increasing diversity and protect green infrastructure by strengthening development controls.



Planning mechanisms

During the past decade Cockburn has experienced rapid clearing of vegetation due to urban development. The City is currently looking at ways to improve retention of mature trees across the City as part of the draft *Local Planning Strategy*, by acknowledging their environmental value, increase the local amenity and in combating the heat island effect. As part of this, the City is considering how it can identify, protect and enhance ecological corridors across the City. The approach and opportunity to do this depends on the zoning and the development/subdivision potential and the planning of the area.

In 2020 the City amended *Local Planning Policy 1.2 Residential Design Guidelines* as part of the *Better Neighbourhoods, Better Homes* project. The policy mandates garden areas for new grouped dwellings to accommodate a 3x3m minimum deep soil zone for a tree. It is hoped that this will increase neighborhood tree canopy cover.

The City also maintains a significant tree register within the Local Government Inventory (local heritage survey). The register is intended to protect trees of cultural heritage significance with a requirement for planning approval prior to removal or significant pruning, as per the town planning scheme provision.



Image 20: Waverly Road, Coolbellup (left), Community tree planting (right)

	Actions to increase urban forest	Leader	Related Plan	Timeframe	Resource	Measure of Success
12.1	Implement the Urban Forest Plan 2018–2028 to increase canopy cover and enhance resilience of the City urban forest.	Manager Parks and Environment	Urban Forest Plan 2018–2028	Short Term (2021 to 2023)	Existing	Urban Forest Plan implemented
12.2	Update the Local Planning Strategy to improve retention of mature trees in Cockburn	Manager Strategic Planning	Local Planning Strategy	Now (2020 to 2021)	Existing	Local Planning Strategy updated
12.3	Adopt the Local Planning Policy 1.2 Residential Design Guidelines to mandate deep soil zone for trees in new grouped dwellings.	Manager Strategic Planning	Local Planning Policy 1.2	Now (2020 to 2021)	Existing	Local Planning Policy amended
12.4	Create a plan for climate resilient green spaces to reduce irrigated grass and increase hydro zoning and tree canopy in identified streetscapes and public open space	Manager Parks and Environment	Urban Forest Plan 2018–2028	Medium Term (2024 to 2027)	New	Plan for climate resilient green spaces developed
12.5	Continue to maintain the significant tree register	Manager Strategic Planning	Local Planning Policy 4.4 Heritage Conservation Design Guidelines	Ongoing	Existing	Significant tree register maintained

Table 13: Action plan to increase the urban forest



Image 21: Eucalyptus tree



13. Protect community infrastructure

Climate change has the potential to cause damage to community infrastructure as a result of increased bushfires, higher temperatures and extreme weather events.

Collectively these impacts may result in:

- Financial loss to the City through increased insurance premiums, maintenance and repair costs.
- Reduced public safety, health and wellness.
- Legal, financial and reputational damage to the City.
- Power outage impacts on transport infrastructure such as traffic lights causing traffic congestion and delays.
- Increased operational costs and peak energy demand for utilities.

Bush fires currently pose the greatest climate risk to properties, buildings and other infrastructure located within the City.

The City has a number of measures in place to reduce the impact of bushfires, including vegetation and fuel load management in bushland reserves, facility-centric evacuation plans, fire management plans for building design approval, and community education programs to improve public emergency preparedness.



Image 22: Approaching storm at Port Coogee Marina

	Actions to protect community infrastructure	Leader	Related Plan	Timeframe	Resource	Measure of Success
13.1	Review capacity of existing Council buildings to withstand more severe storms and retrofit as appropriate and if required to meet updated building codes	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Now (2021 to 2022)	New	Review completed
13.2	Review the frequency of reactive and preventative maintenance performed on the City’s infrastructure assets to identify potential gaps in service and develop an environmentally and financially sustainable methodology for maintenance, renewal and repair	Manager Infrastructure Services	Climate Change Strategy 2020–2030	Medium Term (2024 to 2027)	New	Review completed
13.3	Consistent with Planning Policy provisions continue to ensure all proposed Structure Plans are accompanied and informed by a Bushfire Management Plan where required.	Manager Strategic Planning	Bushfire Risk Management Plan 2015 –2020	Ongoing	Existing	Bushfire Management Plans developed
13.4	Ensure all City owned buildings (within Bushfire Prone Areas) have Bushfire Risk Assessment completed.	Manager Recreation and Community Safety	Bushfire Risk Management Plan 2015 –2020	Ongoing	Existing	Risk Assessment completed
13.5	Consistent with Planning Policy provisions continue to ensure that the new building design approval process (within Bushfire Prone Areas) incorporates bush fire management.	Manager Recreation and Community Safety	Bushfire Risk Management Plan 2015 –2020	Ongoing	Existing	Bush fire management undertaken
13.6	Design building for climate resilience and improve energy management, through implementation of ESD guidelines	Manager Infrastructure Services	Sustainability Policy	Now (2020 to 2021)	Existing	Sustainability Policy implemented
13.7	Continue to implement Drainage Management Strategy 2018–2028.	Manager Engineering	Drainage Management Strategy 2018–2028	Now (2020 to 2021)	Existing	Reviewed to manage climate risks

Table 14: Action plan to protect community infrastructure



14. Enhance health and wellbeing

The City of Cockburn has a new vision to make Cockburn the best place to be. Our world-class livability, healthy communities and abundance of natural assets make our City the ideal place to live, work and play.

Climate change has the potential to impact public safety, health and wellness as a result of increased bushfires, heatwaves, higher temperatures, less rainfall, extreme weather events

The impacts of changes to these climate variables can result in:

- increased pressure on emergency and social services.
- reduced air quality from smoke following bushfire events.
- increase in mosquito borne disease, food poisoning cases or nuisance species.
- heat stress and reduced wellbeing.
- reduced liveability of the City.
- greater demand for resources to accommodate displaced persons.
- cancellation or postponement of public events organised by the City.

- legal, financial and reputational damage to the City.
- increased downtime during hot weather or extreme weather.

Public Health Plan

The City is currently reviewing and updating its Public Health Plan, which will address climate change impacts and include measures to enhance the health and wellbeing of the Cockburn community.

Local Emergency Risk Management Plan

The City's Local Emergency Risk Management Plan describes emergencies that are likely to occur, defines roles and responsibilities within the community, list resources, and coordinate operations and activities. The Plan also identifies agreements between local governments and emergency management agencies.

Bushfire Risk Management Plan 2015–2020

This Bushfire Risk Management Plan provides a basis for reducing the risk of fire, reducing the fuel load and increasing community awareness on bushfire risks. The plan acknowledges the impacts of climate change and details a program of coordinated multi-agency treatments to address this risk.



Image 23: Manning Park stairs, Hamilton Hill

	Actions to enhance health and wellbeing	Leader	Related Plan	Timeframe	Resource	Measure of Success
14.1	Undertake a climate change health vulnerability assessment and map vulnerable residents and areas.	Manager Environmental Health	Public Health Plan	Short Term (2021 to 2023)	New	Vulnerability assessment completed
14.2	Review, update and implement the Public Health Plan including actions that reduce climate change risk to public health including heat stress, increases in mosquito and vector borne disease, food poisoning, nuisance species, bushfires, pandemics extreme weather events, etc	Manager Environmental Health	Public Health Plan	Short Term (2021 to 2023)	New	Public Health plan reviewed, updated and implemented
14.3	Continue to update and implement shade strategy for community facilities, playgrounds, parks and beaches.	Manager Parks and Environment	Playground Shade Sail Strategy 2013–2023	Ongoing	Existing	Shade Strategy implemented
14.4	Review, update and implement the Bushfire Risk Management Plan and Local Emergency Risk Management Plan.	Manager Recreation and Community Safety	Bushfire Risk Management Plan 2015–2020 Local Emergency Risk Management Plan	Short Term (2020 to 2021)	New	Plans updated
14.5	Provide education programs to assist the public prepare for emergency situations.	Manager Recreation and Community Safety	Local Emergency Risk Management Plan	Ongoing	Existing	Education Programs implemented
14.6	Review existing warning systems and identify potential gaps and opportunities for improvement.	Manager Recreation and Community Safety	Local Emergency Risk Management Plan	Short Term (2021 to 2023)	Existing	Review completed
14.7	Provide updated information to assist the public understand the impacts of climate changes and empower them to take action to build resilience	Manager Parks and Environment	Climate Change Strategy 2020–2030	Short Term (2021 to 2023)	New	Education resource developed

Table 15: Action plan to enhance health and wellbeing

Resourcing

The action plan is supported by the City's Greenhouse Action Fund which includes an allocation of \$200,000 each year. The Greenhouse Action Fund was established in 2011 using ongoing savings from previous emission reduction initiatives. To date the fund has financed over \$2 million in projects including a 1MV PV systems and geothermal for the Cockburn Aquatic and Recreation Centre.

The City will also explore grant opportunities from the state and federal government to further advance the action plan.

Many actions in this strategy align to existing strategies or plans which provide guidance on resources and funding. The remaining actions will be subject to annual budget submissions, approved business cases by responsible leaders and budget capacity.

Coordination of the actions, delivery of education programs and the continued investment in researching new initiatives will require the appointment of a full-time Climate Change Officer (currently part-time contract).

It is recommended a full-time Climate Change Officer be included in the Work Force Plan for appointment in the 2021–2022 financial year to oversee the implementation of this strategy and the climate resilience roadmap.

Monitoring and review

This strategy will be reviewed in 2025 to stay up to date with changes in policy, technology and climate change science. Annual greenhouse gas emission inventory reports will continue to be produced to measure the City's carbon footprint.

The City recognises that risk management is an ongoing process, and will monitor and review climate change risks and actions as new data becomes available.



Image 24: The Climate Change Strategy will be reviewed in 2025



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