

QPRC



Queanbeyan-Palerang Regional Council

Climate Change Action Plan: Community

Plan Period: 2020 to 2030

Final Draft

Date: 13 November 2019

Developed by 100% Renewable Pty Ltd



Level 32, 101 Miller Street
North Sydney 2060

www.100percentrenewables.com.au

Overview

Queanbeyan-Palerang Regional Council (QPRC) recognises that climate change is a serious and significant issue and is committed to reducing its carbon footprint and supporting the community in addressing climate change. Council and the community have roles to play in ensuring the Queanbeyan-Palerang region contributes to efforts to mitigate climate change through action to reduce our greenhouse gas emissions. Two documents comprise Council's Climate Change Action Plans:

- QPRC Council Operations Climate Change Action Plan (see Appendix D)
- QPRC Community Climate Change Action Plan (this document)

Both Action Plans cover the period from 2020 to 2030. The plans set out the potential for abatement in Council operations and in the community, as well as actions that Council can undertake to implement the plans. Council is committed to develop annual public reports on its progress implementing the plans. In addition, Council will conduct an evaluation of the plans at the end of its term, to inform updated Climate Change Action Plans.

These plans complement other strategies that Council is developing, which will also impact on climate change in our region. These include:

- QPRC Integrated Transport Strategy (ITS)
- QPRC Waste Strategy

Table of Contents

OVERVIEW	3
MAYOR'S FOREWORD	7
1 CONTEXT FOR ACTION ON CLIMATE	9
1.1 QUEANBEYAN-PALERANG COMMUNITY STRATEGIC PLAN 2018-2028	10
1.2 2016 CENSUS – SNAPSHOT OF QPRC LGA	11
1.3 PAST COMMUNITY CLIMATE CHANGE ACTION PLAN 2013-17	14
2 BROADER CONTEXT FOR ACTION ON CLIMATE	16
2.1 WHAT IS CLIMATE CHANGE?	16
2.2 THE DIFFERENCE BETWEEN CLIMATE CHANGE MITIGATION AND ADAPTATION	17
2.3 GLOBAL RESPONSE TO CLIMATE CHANGE	17
2.4 NATIONAL, STATES AND TERRITORIES RESPONSE TO CLIMATE CHANGE	19
2.5 NSW GOVERNMENT RESPONSE TO CLIMATE CHANGE	19
2.6 NSW LOCAL GOVERNMENTS RESPONSE TO CLIMATE CHANGE	20
3 GREENHOUSE GAS EMISSIONS	23
3.1 AUSTRALIA'S GREENHOUSE GAS EMISSIONS	23
3.2 THE COMMUNITY'S GREENHOUSE GAS EMISSIONS	24
4 HOW CLIMATE CHANGE WILL AFFECT THE REGION	26
5 COMMUNITY CONSULTATION	28
5.1 ANALYSIS OF THE SURVEY RESULTS	28
5.2 COMMUNITY CONSULTATION WORKSHOPS	30
5.2.1 Council targets	30
5.2.2 Community targets	32
5.3 PUBLIC EXHIBITION	33
6 COMMUNITY CLIMATE CHANGE ACTION PLANS	35
6.1 ENERGY ACTION PLAN	36
6.2 TRANSPORT ACTION PLAN	37
6.3 WASTE ACTION PLAN	39
6.4 WATER ACTION PLAN	40
6.5 NATURAL ENVIRONMENT ACTION PLAN	41
6.6 CLIMATE CHANGE ADAPTATION ACTION PLAN	42
6.7 EDUCATION ACTION PLAN	45
APPENDIX A: SURVEY RESULTS	48
APPENDIX B: IMPRESSIONS FROM THE WORKSHOPS	60
APPENDIX C: ENERGY ABATEMENT SUPPORTING INFORMATION	62
GREENHOUSE GAS ABATEMENT OPPORTUNITIES IN QUEANBEYAN-PALERANG LGA	64
OPPORTUNITIES TO UNLOCK THE ABATEMENT POTENTIAL	67
Measurement of whole-of-LGA GHG emissions	68
Increase solar PV uptake in separate houses and business	68
Increase solar PV uptake in strata	70
Battery storage	71
Water heating with renewables	72
Community energy	72

<i>Peer-to-peer energy trading.....</i>	<i>74</i>
<i>Purchasing renewable energy.....</i>	<i>74</i>
<i>Energy efficiency</i>	<i>75</i>
<i>Review Council's Development Control Plan</i>	<i>76</i>
<i>Education and engagement initiatives to place greater emphasis on carbon abatement</i>	<i>77</i>
<i>Electric vehicles</i>	<i>78</i>

Table of figures

<i>Figure 1: Queanbeyan-Palerang Community Strategic Plan – 5 Strategic Pillars.....</i>	<i>9</i>
<i>Figure 2: Key Goals associated with Strategic Pillar 3 – Character</i>	<i>10</i>
<i>Figure 3: Key Goals associated with Strategic Pillar 4 – Connection</i>	<i>11</i>
<i>Figure 4: Forecast population growth for the QPRC area.....</i>	<i>12</i>
<i>Figure 5: Solar PV uptake by QPRC (APVI 2019)</i>	<i>13</i>
<i>Figure 6: Uptake of solar PV in the QPRC LGA compared with other NSW LGAs.....</i>	<i>13</i>
<i>Figure 7: “Heat Map” showing areas of high business concentration in QPRC LGA.....</i>	<i>14</i>
<i>Figure 8: Overview of the Greenhouse Effect</i>	<i>16</i>
<i>Figure 9: Global context for action on climate</i>	<i>18</i>
<i>Figure 10: Global risks report – likelihood & impact of climate, other risks to global economy</i>	<i>18</i>
<i>Figure 11: Australia’s renewable energy and carbon goals – National level.....</i>	<i>19</i>
<i>Figure 12: Australia’s renewable energy and carbon goals – State & Territory level.....</i>	<i>19</i>
<i>Figure 13: renewable energy & carbon targets by NSW Councils and Communities</i>	<i>21</i>
<i>Figure 14: Net greenhouse gas emissions under the UNFCCC, by sector, Australia, 1990-2018.....</i>	<i>23</i>
<i>Figure 15: Percentage contribution of emission sources to the community carbon footprint</i>	<i>24</i>
<i>Figure 16: Community & other inputs to the development of the community climate change plan.....</i>	<i>28</i>
<i>Figure 17: Examples of posters used at the workshops.....</i>	<i>30</i>
<i>Figure 18: Community workshops – recommendations for Council operations targets.....</i>	<i>31</i>
<i>Figure 19: Community workshops – recommendations for LGA targets</i>	<i>32</i>
<i>Figure 20: Examples of how council can support the community</i>	<i>35</i>
<i>Figure 21: Projected population increase to 2036 in Queanbeyan-Palerang</i>	<i>62</i>
<i>Figure 22: Percentage contribution of emission sources to the community carbon footprint</i>	<i>64</i>
<i>Figure 23: Four broad categories of abatement for Queanbeyan-Palerang community</i>	<i>65</i>
<i>Figure 24: Comparison of Emissions per kilometre from Motor Vehicles in Australia.....</i>	<i>67</i>

Table Summary

<i>Table 1: Dwellings trend in QPRC LGA from 2011 to 2016</i>	<i>11</i>
<i>Table 2: Projected climate changes for the QPRC region</i>	<i>26</i>
<i>Table 3: Action Plan – energy</i>	<i>36</i>
<i>Table 4: Action Plan – transport</i>	<i>37</i>
<i>Table 5: Action Plan – waste</i>	<i>39</i>
<i>Table 6: Action Plan – water</i>	<i>40</i>
<i>Table 7: Action Plan – natural environment</i>	<i>41</i>
<i>Table 8: Action Plan – climate change adaptation</i>	<i>42</i>
<i>Table 9: Action Plan – education</i>	<i>45</i>
<i>Table 10: Survey results #1</i>	<i>48</i>
<i>Table 11: Survey results #2</i>	<i>53</i>
<i>Table 12: Projected population increase to 2036 in Queanbeyan-Palerang</i>	<i>62</i>
<i>Table 13: dwelling types in Queanbeyan-Palerang in 2016</i>	<i>63</i>
<i>Table 14: Car ownership in Queanbeyan-Palerang in 2016</i>	<i>63</i>
<i>Table 15: Registered businesses in Queanbeyan-Palerang in 2018.....</i>	<i>63</i>

Mayor's Foreword

Queanbeyan-Palerang Regional Council (QPRC) continues to recognise that climate change is a serious and significant issue and is committed to supporting the community in addressing it through a local response. The reasons to act now on climate change are many, and calls to action have been increasing both locally and globally.

Focusing on the community, this action plan accompanies Council's operations Climate Change Action Plan. The community action plan includes measures to both mitigate and to adapt to climate change impacts. Taken together these action plans will form the framework for Council and the community to work together to address climate change issues in our region.

The action plans were developed via an assessment of the opportunities available in the community to mitigate and adapt to climate change, and via engagement of Council and community stakeholders to ensure a broad range of views and ideas were input to the process. Engagement of stakeholders has helped to ensure a common understanding of the climate change issues requiring a local response and will help in fostering a Council/community partnership in implementing the action plans in coming years.

Part 1

Introduction

1 Context for action on climate

1.1 Queanbeyan-Palerang Community Strategic Plan 2018-2028

The Queanbeyan-Palerang Community Strategic Plan (CSP) sets out the long-term aspirations of the community in terms of where we see our region over the next 10 years and the things, we most value about living here. The Strategic Plan 2018-2028 highlights five strategic pillars that the CSP is built around, including two that are particularly relevant to this Plan:

- Strategic Pillar 3: Character
 - A sustainable Queanbeyan-Palerang
 - A clean, green community that cherishes its natural and physical character
- Strategic Pillar 4: Connection
 - A connected Queanbeyan-Palerang
 - A well-connected community with good infrastructure enhancing quality of life

The five strategic pillars of the CSP, reflecting the desired outcomes are illustrated below.

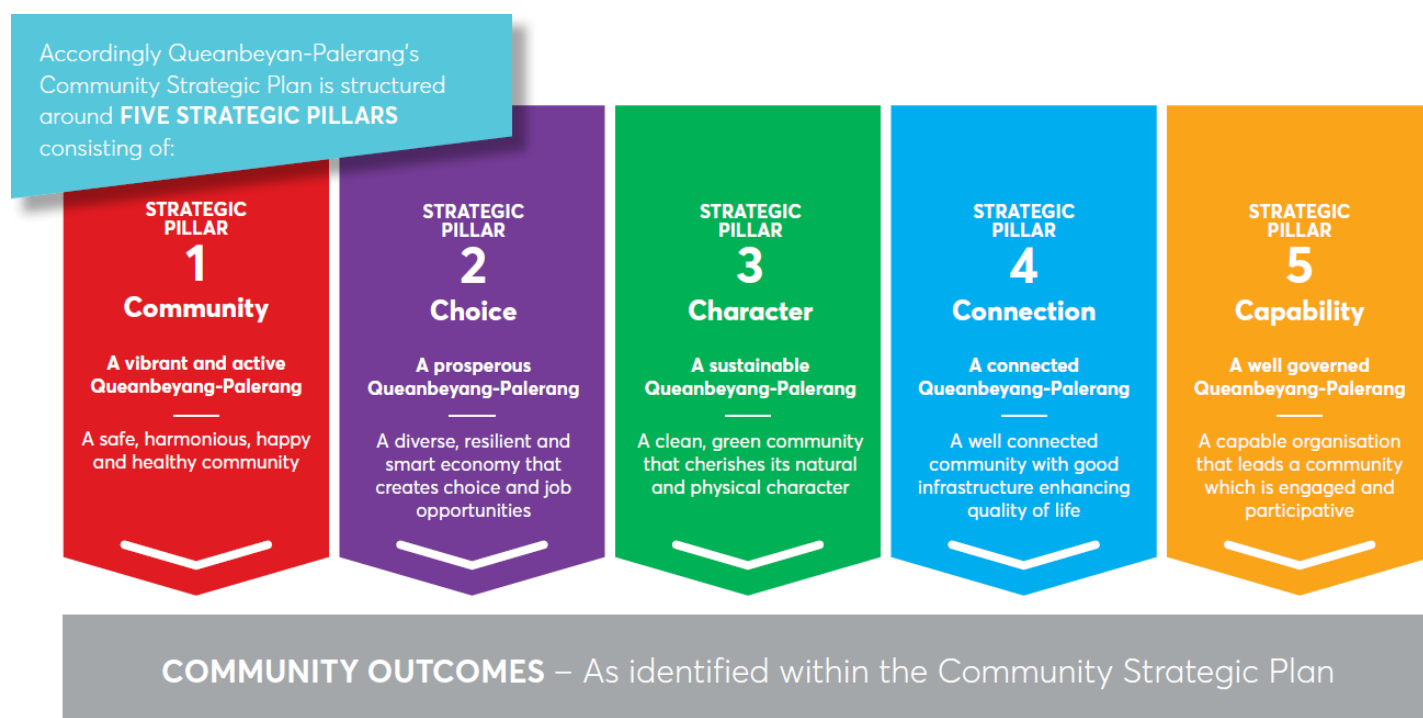


FIGURE 1: QUEANBEYAN-PALERANG COMMUNITY STRATEGIC PLAN – 5 STRATEGIC PILLARS

The five Key Goals associated with Strategic Pillar 3 provide further direction in relation to actions that need to be developed and pursued in order to meet the community's objectives.

- Key Goal 3.1: We consider the environmental impacts of future development
- Key Goal 3.2: Our region's urban landscapes are well managed and maintained promoting community pride
- Key Goal 3.3: Our natural landscapes and water resources are sustainably managed
- Key Goal 3.4: We actively promote and implement sound resource conservation and good environmental practice
- Key Goal 3.5: We ensure the future planning for the region is well coordinated and provides for its sustainable development

KEY STRATEGIES	COMMUNITY INDICATORS	DATA SOURCE
3.1 We consider the environmental impacts of future development	Level of community satisfaction on the state of the Queanbeyan-Palerang environment	Community Satisfaction Survey
3.2 Our region's urban landscapes are well managed and maintained promoting community pride	Level of community satisfaction with presentation of urban landscapes	Community Satisfaction Survey
3.3 Our natural landscapes and water resources are sustainably managed	Level of community satisfaction on the state of natural landscapes and water resources	Community Satisfaction Survey
3.4 We actively promote and implement sound resource conservation and good environmental practice	Level of community satisfaction with resource conservation and good environmental practice promoted by QPRC	Community Satisfaction Survey
3.5 We ensure the future planning for the region is well coordinated and provides for its sustainable management	Level of community satisfaction on strategic planning for the region	Community Satisfaction Survey

FIGURE 2: KEY GOALS ASSOCIATED WITH STRATEGIC PILLAR 3 – CHARACTER

The six Key Goals associated with Strategic Pillar 4 also provide further direction in relation to actions that need to be developed and pursued in order to meet the community's objectives.

- Key Goal 4.1: Our transport infrastructure and networks are well planned and maintained
- Key Goal 4.2: We plan for and provide access to potable water supplies for communities across our region
- Key Goal 4.3: We plan for and provide for the management of sewage, stormwater and recycled water within the communities of our region
- Key Goal 4.4: We actively promote and implement sound resource conservation and good environmental practice for our waste management system
- Key Goal 4.5: We plan for and provide regional facilities which promote better social connection and access for the community
- Key Goal 4.6: We undertake planning to ensure infrastructure is prepared for future growth

STRATEGIC PILLAR 4 - CONNECTION		
KEY GOAL	COMMUNITY OUTCOME	COMMUNITY STRATEGY – Service Objective
4.1 Our transport infrastructure and networks are well planned and maintained	The region's transport network and infrastructure allows for the safe ease of movement throughout Queanbeyan-Palerang	Support the safe and equitable movement of commuters, visitors and freight into and through the Local Government Area through contemporary maintained and renewed roads, bridge and paths infrastructure and public transport facilities
4.2 We plan for and provide access to potable water supplies for communities across our region	The region's potable water supply systems meet national standards and are managed to adequately meet community demand	Support public health and growth through integrated water cycle management and the safe and equitable delivery of potable supply to residents and businesses in Queanbeyan-Palerang
4.3 We plan for and provide for the management of sewage, stormwater and recycled water within the communities of our region	The region's sewage treatment, stormwater and recycled water systems meet national standards to support public and environmental health in our region	Support public and environmental health through integrated water cycle management and the safe and equitable treatment of sewage and stormwater, the delivery of recycled water supply to residents and businesses in the Local Government Area, and improved water quality flows into the regional environment
4.4 We actively promote and implement sound resource conservation and good environmental practice for our waste management systems	The region increases waste minimisation and greater recycling levels of our waste	Support public and environmental health and generation of business through changing community and business behaviours, minimisation of waste to landfill and greater utilisation of recycled waste
4.5 We plan for and provide regional facilities which promote better social connection and access for the community	Social connection within our region is provided for via access to a range of community facilities across the region	Support the safe and equitable access to facilities and amenities through well-presented, sited, efficient, secure and clean buildings for community, civic and recreational use
4.6 We undertake planning to ensure infrastructure is prepared for future growth	Changing community demand is met by well planned for and placed infrastructure	Provide the asset management logistics for the organisation through well planned, sited and designed infrastructure and support facilities

FIGURE 3: KEY GOALS ASSOCIATED WITH STRATEGIC PILLAR 4 – CONNECTION

1.2 2016 Census – snapshot of QPRC LGA

Underlying the emissions profile of the LGA is data on dwellings that can be drawn from the 2016 census and is reported by profile.id. The tables below highlight key trends and facts that are relevant to the potential for increased sustainability measures¹.

1.2.1.1 Residential dwelling types and comparison to 2011

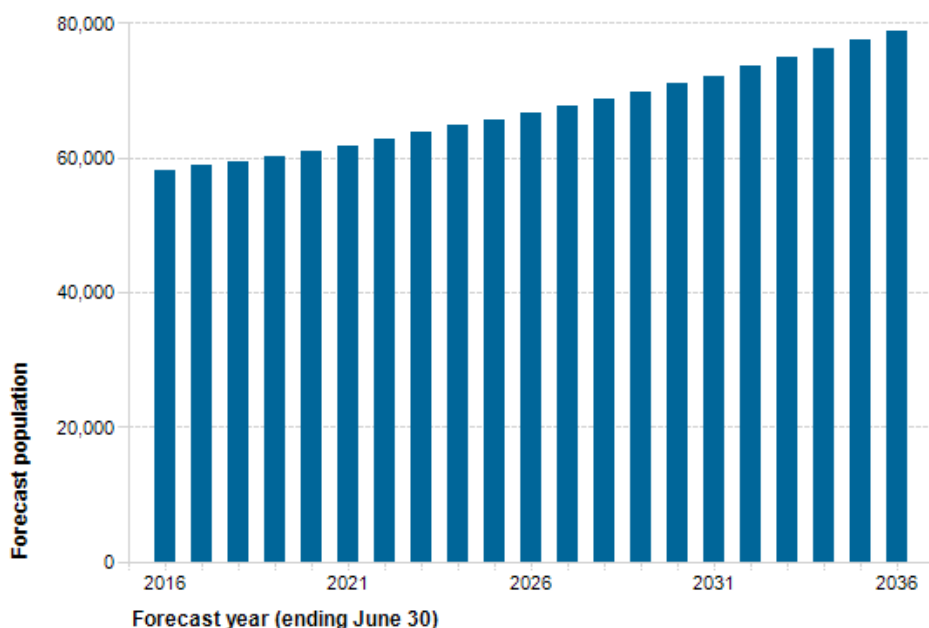
TABLE 1: DWELLINGS TREND IN QPRC LGA FROM 2011 TO 2016

QPRC - Dwellings	2016			2011			Change
	Number	%	Regional NSW %	Number	%	Regional NSW %	
Dwelling type							2011 to 2016
Separate house	17,156	71.5	80.2	16,047	72.7	81.5	1,109
Medium density	4,632	19.3	14.3	4,124	18.7	14	508
High density	1,872	7.8	2.5	1,504	6.8	2.2	368
Caravans, cabin, houseboat	148	0.6	1.7	282	1.3	1.7	-135
Other	95	0.4	0.7	96	0.4	0.5	-1
Not stated	82	0.3	0.7	21	0.1	0.2	61
Total Private Dwellings	23,985	100	100	22,074	100	100	1,910

¹ Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id, the population experts. <https://home.id.com.au>

1.2.1.2 Forecast population changes

According to Profile ID², the Queanbeyan-Palerang Regional Council's estimated resident population for 2018 is 59,959, with a population density of 0.11 persons per hectare. The population forecast for 2019 is 60,190 and is forecast to grow to 78,756 by 2036³ as shown in the graphic below.



Population and household forecasts, 2016 to 2036, prepared by .id, December 2017.



FIGURE 4: FORECAST POPULATION GROWTH FOR THE QPRC AREA

Of the forecast 19,000-person growth, approximately 10,500 are expected in Googong (248% growth) and approximately 6,000 in Tralee-Environs.

1.2.1.3 Solar uptake in Queanbeyan-Palerang Regional Council

Some 18.9% of dwellings (APVI <http://pv-map.apvi.org.au/>) in the LGA have installed solar PV as of mid-2019. This places Queanbeyan-Palerang Regional LGA in the middle of NSW councils in terms of the number of residents taking up solar panels. In addition to 4,067 residential systems, there have been 314 installations of 10-100 kW in capacity, which tend to be commercial-scale systems, plus two systems greater than 100 kW in scale.

Local governments near Queanbeyan-Palerang have comparable levels of solar PV uptake. Councils in the north of the state, including Tweed, Moree Plains and Narrabri, have reached solar uptake levels of 35% to 40% and lead the way for NSW councils.

² <https://profile.id.com.au/queanbeyan-palerang>

³ <https://forecast.id.com.au/queanbeyan-palerang>



1.2.1.4 Business profile of Queanbeyan-Palerang

Data reported by profile.id also includes businesses within the LGA. There are a total of 4,683 active and registered-for-GST businesses in QPRC. The data show high concentrations of businesses in Queanbeyan, as well as near Bungendore and Googong.

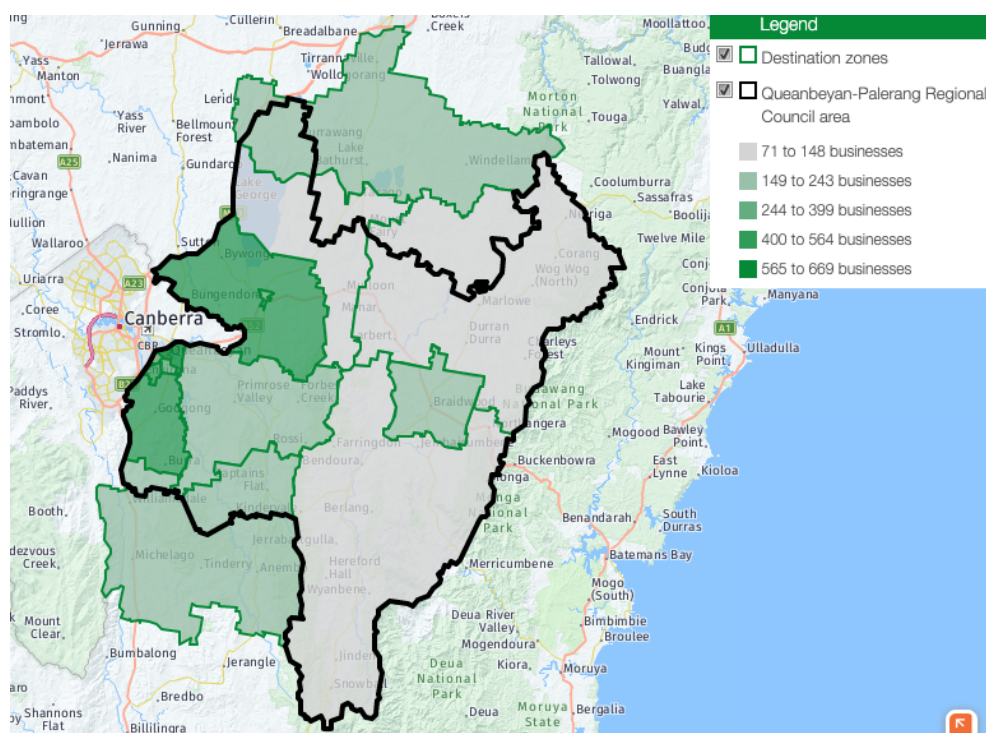


FIGURE 7: “HEAT MAP” SHOWING AREAS OF HIGH BUSINESS CONCENTRATION IN QPRC LGA⁴

1.3 Past Community Climate Change Action Plan 2013-17

The Community Climate Change Action Plan (CCCAP) 2013-2017 was developed by Queanbeyan City Council to recognise and address climate change through a local response. The CCCAP formed a framework for Council and the community to work together on addressing climate change issues.

The ‘Aspirational goal’ of the plan was that **‘Council and the community partner to work together for a significant reduction in Queanbeyan’s greenhouse gas emissions by 2020’**. This ‘goal’ would be likened to at least a 25% reduction in emissions and was established based on feedback from the community.

Difficulty in obtaining accurate data for many of the actions was a challenge to monitor in terms of actual greenhouse gas savings. Hence the aspiration goal of at least a 25% reduction in Queanbeyan Greenhouse Gas emissions was unable to be verified. Some major highlights included:

- Googong Sustainable Housing Project
- ActSmart Program for Local Businesses
- Education Campaigns e.g. Hey Tosser and Garage Sale Trail

There was no community climate change action plan for the previous Palerang local government area.

⁴ Sourced from <https://economy.id.com.au/willoughby/business-locations>

Part 2

Broader context for climate action

2 Broader context for action on climate

2.1 What is Climate Change?

Climate is the set of averages, variation and extremes of weather in a region over long periods of time. Thirty years or more is the usual period for estimating average climate. Geological and historical records show that the earth's climate has always been dynamic, with change driven by natural cycles and events. However, over the last three centuries (since the beginning of the Industrial Revolution in the mid-18th century) there is building evidence that the climate has been changing at a greater rate. Scientific evidence has found that it is extremely likely that human influence has been the dominant cause of the observed climate shift.

Significant quantities of greenhouse gases such as carbon dioxide, nitrous oxide and methane, have been added to the earth's atmosphere enhancing the greenhouse effect by absorbing infrared radiation and heating the planet, resulting in global warming and thus more severe weather events. The term climate change is now commonly used to refer to anthropogenic (human-caused) climate change, rather than the results from natural processes.

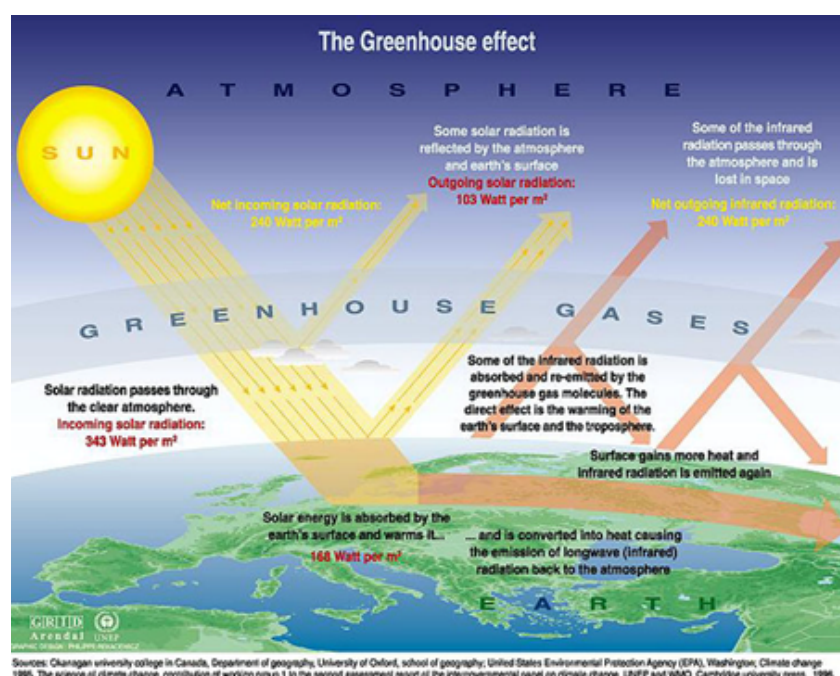


FIGURE 8: OVERVIEW OF THE GREENHOUSE EFFECT

Since the Industrial Revolution, there has been a large increase in human activities such as fossil fuel burning, land clearing and agriculture, which affects the release and uptake of carbon dioxide. Carbon dioxide and other greenhouse gases are produced in NSW by the following activities or sources:

- Stationary energy - 52%
- Transport- 21%
- Agriculture-13%
- Coal Mines-12%
- Industry- 10%
- Waste- 2%
- LULUCF- (negative) 10%

Data collected by the CSIRO shows that the concentration of carbon dioxide in our atmosphere in 2018 was approximately 404 parts per million. The level of carbon dioxide in the Earth's atmosphere is now higher than at any time over the past 800,000—and possibly 20 million—years.

This accumulation of atmospheric greenhouse gases is already having an economic, social and environmental impact. Some environmental changes are irreversible and if not addressed early enough will have severe future implications.

2.2 The difference between climate change mitigation and adaptation

Climate change mitigation means a reduction of greenhouse gas emissions to limit global warming and climate change. Climate change adaptation, on the other hand, means the preparation for the changes that come with climate change, such as extreme weather events, or an extended number of hot days.

2.3 Global response to climate change

Internationally, there are three primary drivers for urgent action on climate, additional to the second commitment period of the Kyoto Protocol from 2013 to 2020. These are:

1. Sustainable Development Goals (SDGs)

In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals. Governments, businesses and civil society together with the United Nations are mobilising efforts to achieve the Sustainable Development Agenda by 2030⁵. The SDGs came into force on 1 January 2016 and call on action from all countries to end all poverty and promote prosperity while protecting the planet.

2. Paris Agreement

To address climate change, countries adopted the Paris Agreement at the COP21 in Paris on 12 December 2015. The Agreement entered into force less than a year later. In the agreement, signatory countries agreed to work to limit global temperature rise to well below 2°C Celsius, and given the grave risks, to strive for 1.5°C Celsius⁶.

3. Special IPCC report on 1.5°C warming

In October 2018 in Korea, governments approved the wording of a special report on limiting global warming to 1.5°C. The report indicates that achieving this would require rapid, far-reaching and unprecedented changes in all aspects of society. With clear benefits to people and natural ecosystems, limiting global warming to 1.5°C compared to 2°C could go hand in hand with ensuring a more sustainable and equitable society⁷. The report states that limiting warming to 1.5°C implies reaching net zero CO₂ emissions globally around 2050 and concurrent deep reductions in emissions of non-CO₂ forcers, particularly methane⁸.

⁵ Sourced from <https://www.un.org/sustainabledevelopment/development-agenda/>

⁶ Sourced from <https://www.un.org/sustainabledevelopment/climatechange/>

⁷ Sourced from https://www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml

⁸ Sourced from <https://www.ipcc.ch/sr15/>



FIGURE 9: GLOBAL CONTEXT FOR ACTION ON CLIMATE

In addition, the World Economic Forum's Global Risks Report 2019⁹ highlights adverse climate change-related outcomes as among the most likely to occur with the highest impacts to the global economy.

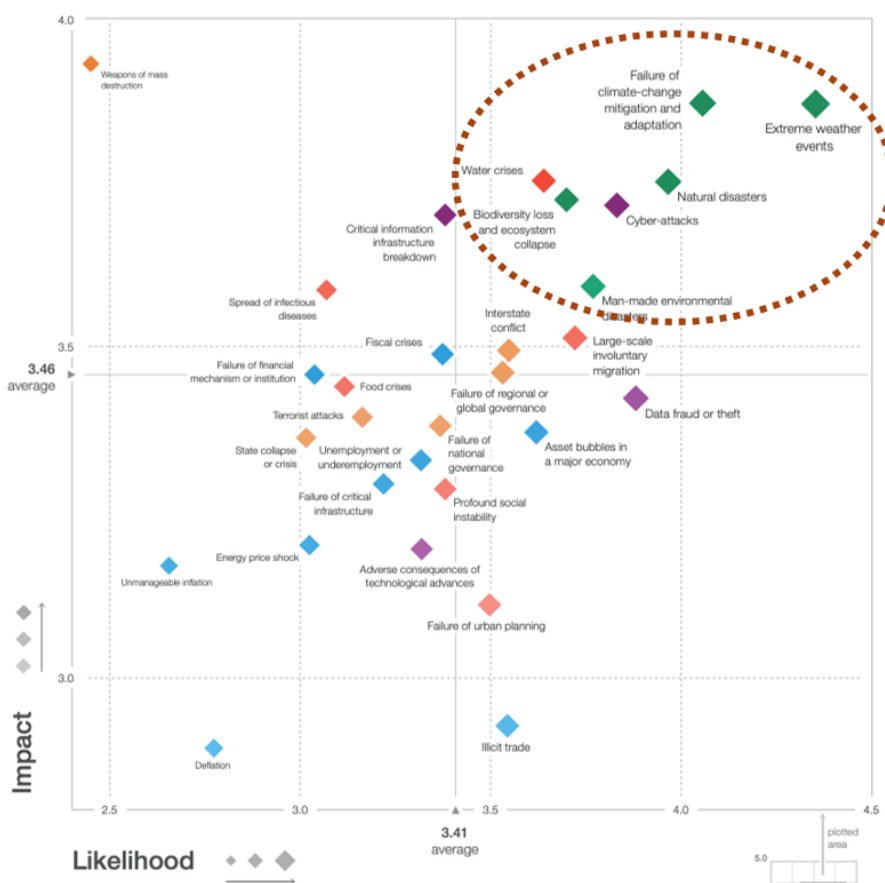


FIGURE 10: GLOBAL RISKS REPORT – LIKELIHOOD & IMPACT OF CLIMATE, OTHER RISKS TO GLOBAL ECONOMY

⁹ <https://www.weforum.org/reports/the-global-risks-report-2019>

2.4 National response to climate change

At a national level, Australia's response to the Paris Agreement has been to set a goal for greenhouse gas (GHG) emissions of 5% below 2000 levels by 2020 and GHG emissions that are 26% to 28% below 2005 levels by 2030. A major policy that currently underpins this is the Renewable Energy Target (RET). This commits Australia to source 20% of its electricity (33,000 GWh p.a., estimated to equate to a real 23% of electricity) from eligible renewable energy sources by 2020. The scheme runs to 2030. These two key targets are illustrated below.



FIGURE 11: AUSTRALIA'S RENEWABLE ENERGY AND CARBON GOALS – NATIONAL LEVEL

2.5 NSW Government response to climate

At a sub-national level, most states and territories have established aspirational emissions targets as well as some legislated targets for renewable energy, as seen below.

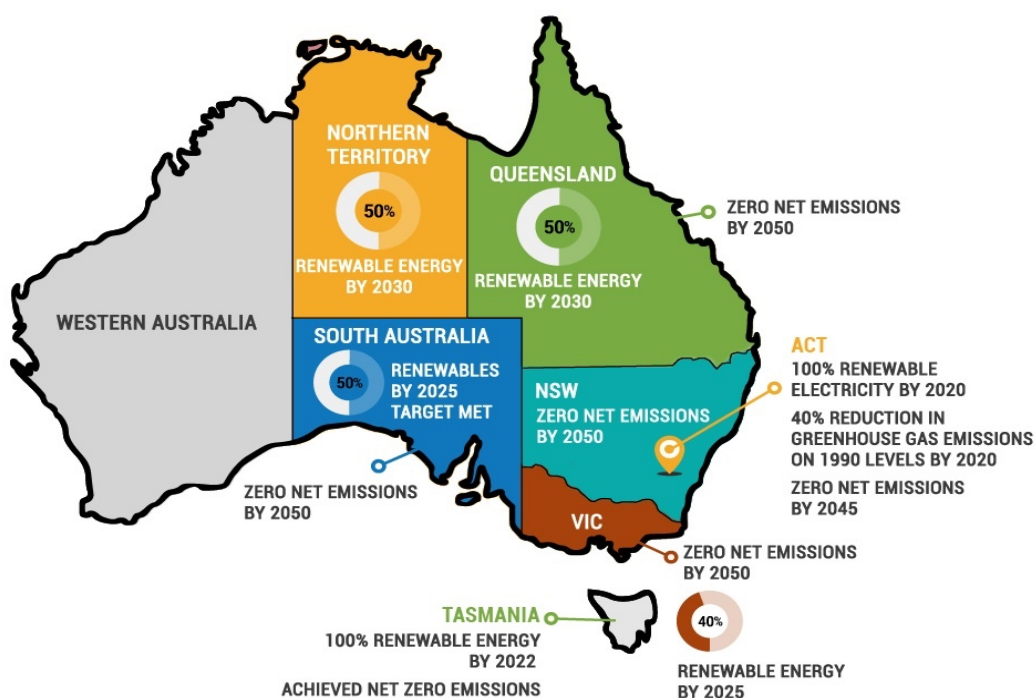


FIGURE 13: AUSTRALIA'S RENEWABLE ENERGY AND CARBON GOALS – STATE & TERRITORY LEVEL

The NSW Climate Change Policy Framework outlines the State's target of reaching net-zero emissions by 2050. This is an aspirational objective and helps to set expectations about future GHG emissions pathways to help others to plan and act. The policy framework will be reviewed in 2020.

Through the Government's Climate Change Fund (CCF) 2018-2022 Strategic Plan a number of initiatives will be progressed in the next four-year period with a total funding allocation of \$170 million.

2.6 NSW local governments response to climate change

While there are many examples of what local governments around the world are doing, we focus here on Australia and on New South Wales in particular, as this is broadly representative of what is occurring in many other countries or regions. Two approaches are relevant.

1. Adoption and publication of ambitious targets for renewable energy and/or carbon emissions for Council operations, and potentially adopting or setting targets for renewables or emissions reduction in the community. The chart below shows the current status of target-setting by local councils in NSW (as at November 2019). A total of 17 Councils in NSW, plus the ACT have set ambitious goals for renewable energy and/or carbon emissions – typically 50-100% renewable energy or renewable electricity, and some net zero emissions targets are seen. Most local councils have energy and/or sustainability plans in place for their operations, but relatively few councils have similar plans and targets for their communities, though this is beginning to grow. Example of target's set by Councils within NSW include:
 - Shoalhaven City Council- 50% renewable energy by 2030 and net zero greenhouse gas emissions by 2050.
 - Eurobodalla Shire Council- 100% renewable energy by 2030 (Council operations only)
 - Nambucca Shire Council - zero net carbon emissions within the 2030 to 2050 timeframe.
 - Broken Hill Council- 100% renewable energy status by 2030 (Council operations only)
2. Partnering with local government-focused emission reduction programs such as the Cities Power Partnership (CCP), as of May 2019 43 NSW local councils were part of CPP. While this doesn't involve setting specific targets per se, the commitment to key actions can either serve as a set of de facto targets or can provide a basis from which to set targets in future.

There has been a small but increasing trend towards examining the scope for renewables and abatement in communities, in terms of local action and how communities can participate more in the shift to renewable energy at scale. This is being informed by greater awareness of the need to act on climate, growing accessibility of information on community emissions, and the desire to ensure that communities and local business are part of and benefit from technology changes that are occurring.

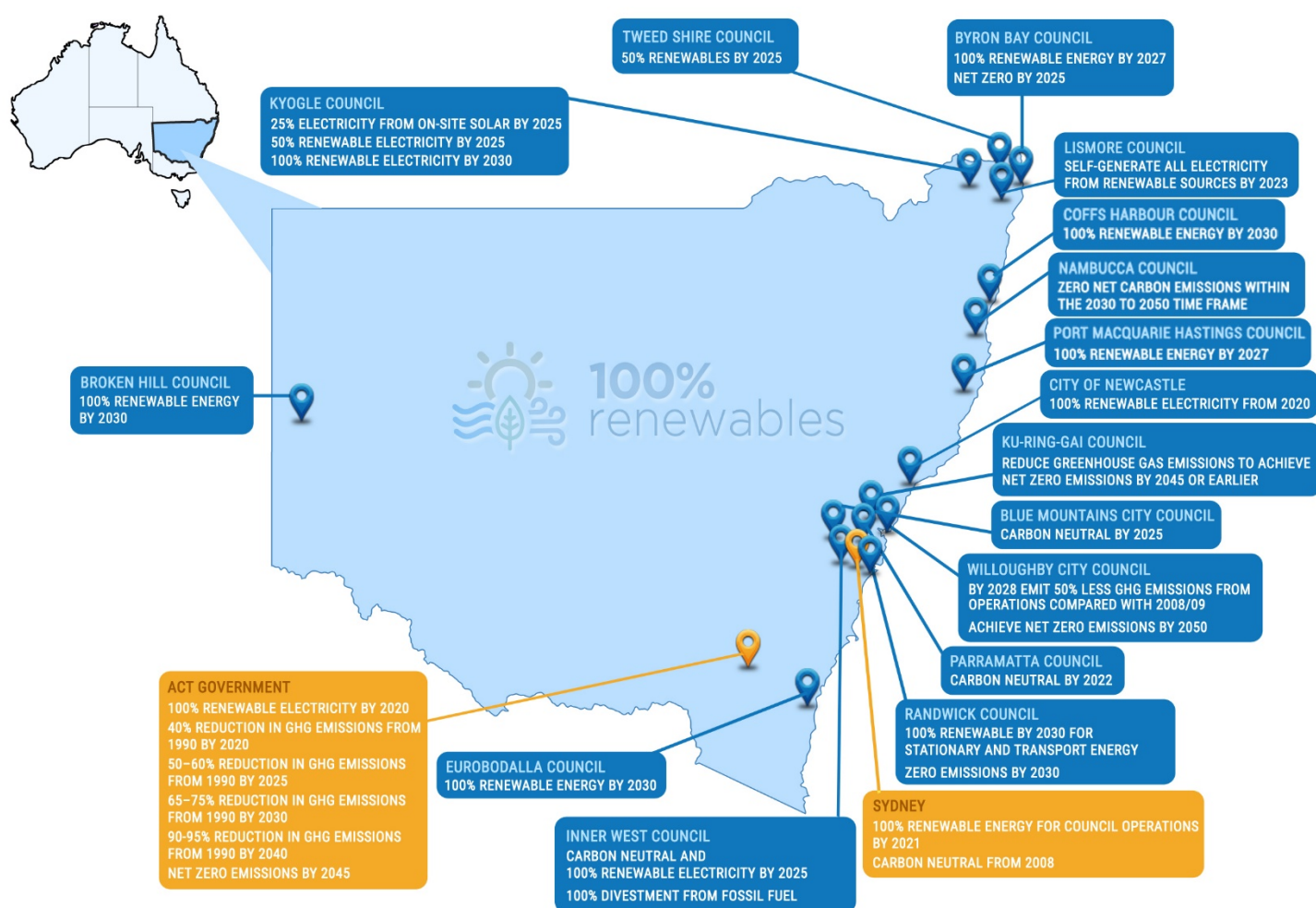


FIGURE 14: RENEWABLE ENERGY AND CARBON TARGETS BY NSW COUNCILS AND COMMUNITIES

Part 3

Community carbon footprint

3 Greenhouse gas emissions

3.1 Australia's greenhouse gas emissions

According to the Australian Government Department of the Environment and Energy, 'Australia is taking a strong, credible and responsible commitment to the Paris climate change agreement to reduce emissions by 26-28 per cent on 2005 levels by 2030'¹⁰. The Australia's government believes the 2030 target is achievable with current Direct Action policies that reduce emissions.

Contradictory however, the 2018 Climate Council of Australia's 'Rising Greenhouse Gas Emissions Report' found that Australia's emissions have actually increased over the past 3 years including by 1.5% in 2017 from 2016 levels. The report also stated that under current policy settings, Australia will not meet its 26-28% emissions reduction target¹¹.

It is important to note that Australia is only responsible for about 1.3-1.4 % of global greenhouse gas emissions or roughly 538.9 Mt CO₂e annually as of March 2019¹². Despite this Australia is still one of the highest emitters of greenhouse gases in the world per capita (21.4t CO₂e per person, annually).

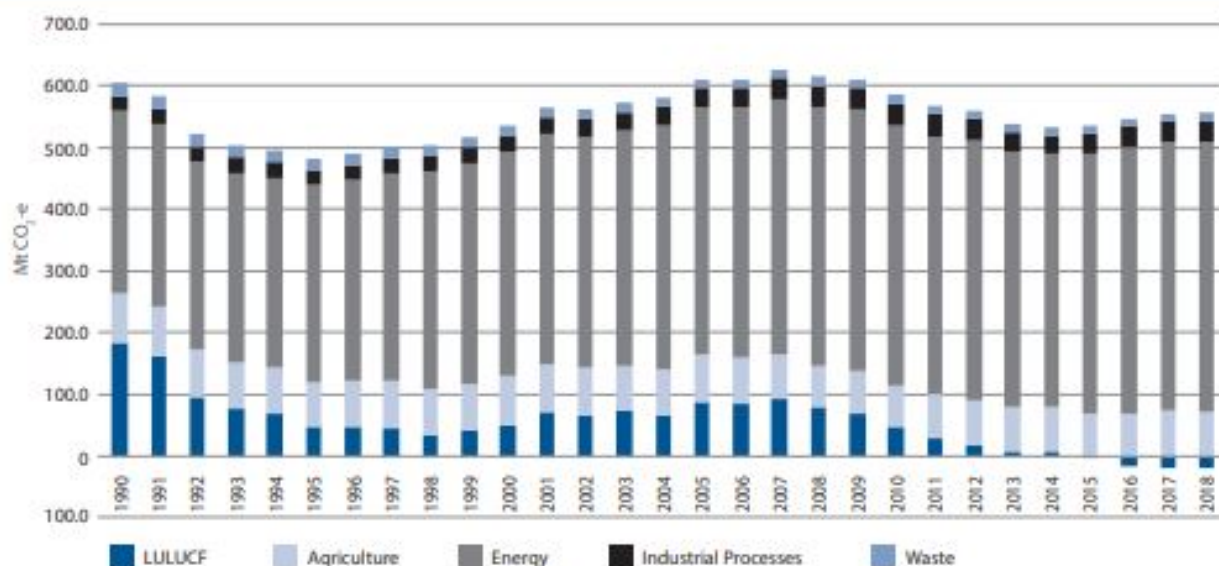


FIGURE 14: NET GREENHOUSE GAS EMISSIONS UNDER THE UNFCCC, BY SECTOR, AUSTRALIA, 1990-2018

¹⁰<https://www.environment.gov.au/climate-change/publications/factsheet-australias-2030-climate-change-target>

¹¹<https://www.climatecouncil.org.au/resources/australias-rising-greenhouse-gas-emissions/>

¹²<http://www.environment.gov.au/system/files/resources/29eca947-af49-4ed1-8369-e68d74730cf9/files/national-inventory-report-2017-volume-1.pdf>

3.2 The community's greenhouse gas emissions

Queanbeyan-Palerang community GHG emissions in FY16/17 were 1,009,820 tonnes of carbon dioxide equivalent (t CO₂-e). Most of these emissions (646,624 t CO₂-e) came from electricity and natural gas consumption in the community. This was followed by 221,061 t CO₂-e of transport emissions, 135,304 t CO₂-e of emissions from waste and 6,831 t CO₂-e of emissions from wastewater.

The graph below shows the percentage contribution of these emissions sources to the overall carbon footprint.

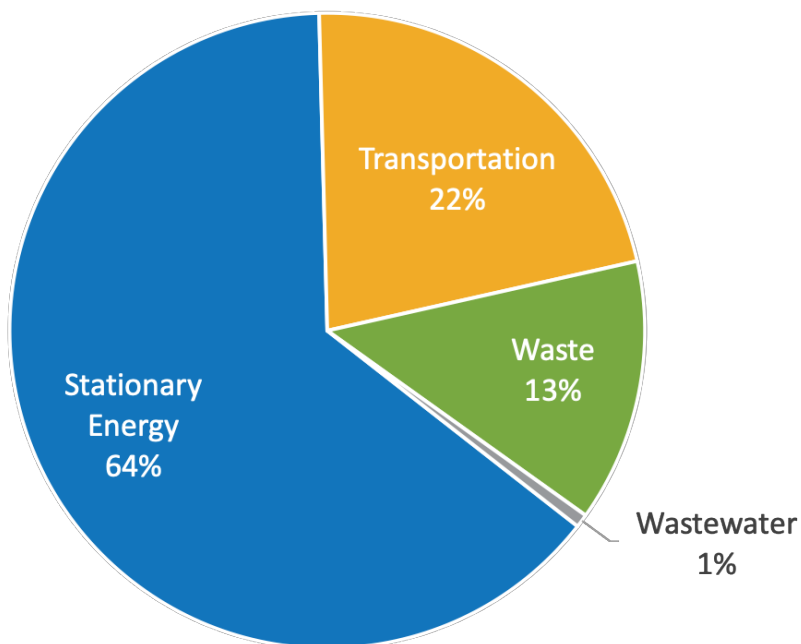


FIGURE 15: PERCENTAGE CONTRIBUTION OF EMISSION SOURCES TO THE COMMUNITY CARBON FOOTPRINT

Part 4

How climate change affects the region

4 How climate change will affect the region

According to the South East and Tablelands *Climate Change Snapshot* from *AdaptNSW*¹³, in the future, the Queanbeyan-Palerang area will be hotter, have more intense heat waves, and an increasing risk of flash floods, severe storms, fire and drought.

Based on long-term (1910–2011) observations, temperatures in the South East and Tablelands Region have been increasing since about 1960, with higher temperatures experienced in recent decades.

The region is projected to continue to warm in the near future (2020–2039) and far future (2060–2079), compared to recent years (1990–2009). The warming is projected to be on average about 0.6°C in the near future, increasing to about 2°C in the far future. There will be more hot days and fewer cold nights. The warming projected for the region is large compared to natural variability in temperature.

The South East and Tablelands currently experience considerable rainfall variability across the region and from year-to-year - this variability is also reflected in the projections. However, all the models agree that spring rainfall will decrease in the future.

The following table summarises these changes.

TABLE 2: PROJECTED CLIMATE CHANGES FOR THE QPRC REGION

	2030:	2060:
	Projected temperature changes	
	Maximum temperatures are projected to increase in the near future by 0.5–1.0°C	Maximum temperatures are projected to increase in the far future by 1.8–2.5°C
	Minimum temperatures are projected to increase in the near future by 0.4–0.7°C	Minimum temperatures are projected to increase in the far future by 1.4–2.3°C
	The number of hot days will increase	The number of cold nights will decrease
	Projected rainfall changes	
	Rainfall is projected to decrease in spring and winter	Rainfall is projected to increase in summer and autumn
	Projected Forest Fire Danger Index (FFDI) changes	
	Average fire weather is projected to increase in summer and spring	Number of days with severe fire weather is projected to increase in summer and spring

¹³ <https://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/Climate-projections-for-your-region/South-East-and-Tablelands-Climate-Change-Downloads>

Part 5

Community input

5 Community consultation

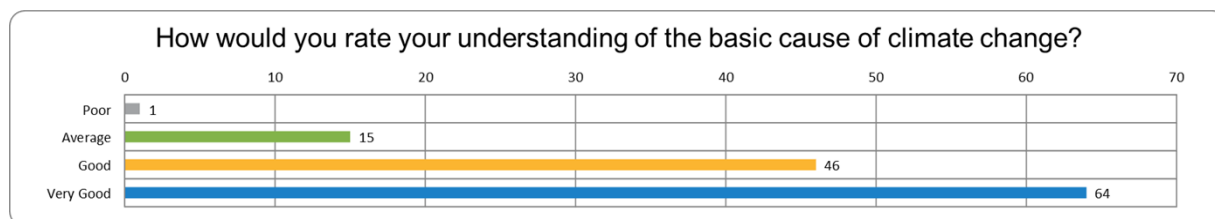
Community consultation for this Climate Change Action Plan consisted of a survey and two workshops that were held in Queanbeyan and Braidwood, in addition to the placement of the draft plan on public exhibition.



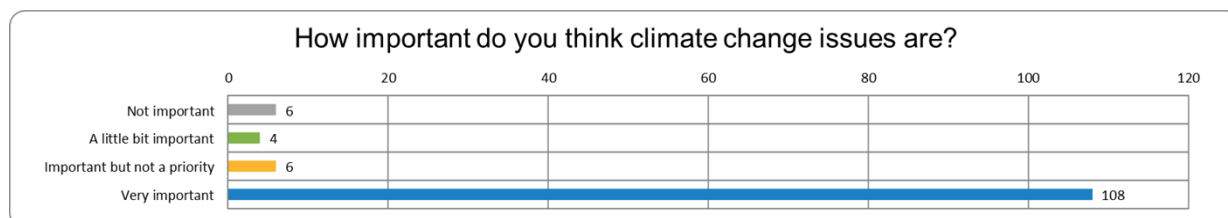
FIGURE 16: COMMUNITY & OTHER INPUTS TO THE DEVELOPMENT OF THE COMMUNITY CLIMATE CHANGE PLAN

5.1 Analysis of the survey results

The community survey was put on Council's 'Have your say webpage for a period of 6 weeks. In total 126 residents filled in the survey. Most respondents have a good or very good understanding of the basic cause of climate change. *Please note the below results do not represent the entire LGA community perspective.



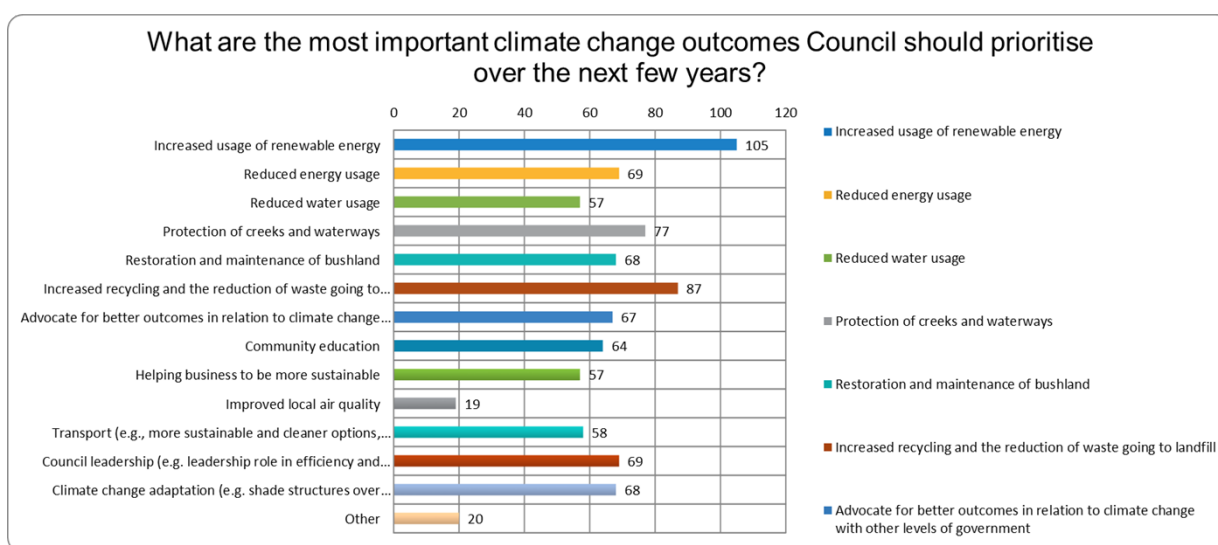
An overwhelming majority of respondents indicated that climate change issues are very important.



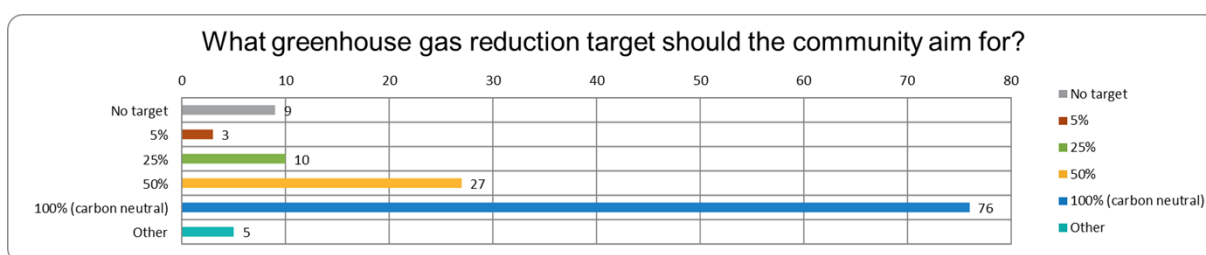
Respondents indicated that the most important climate change outcomes Council should prioritise over the next few years are, in order of preference:



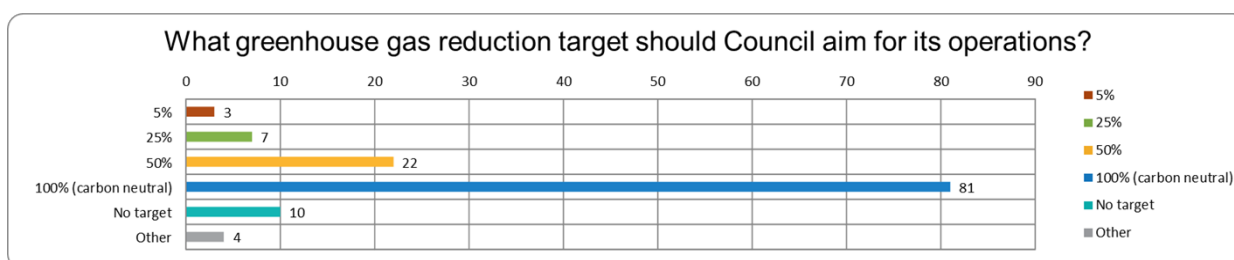
1. Increased usage of renewable energy
2. Increased recycling and the reduction of waste going to landfill
3. Protection of creeks and waterways
4. Reduced energy usage
5. Council leadership
6. Restoration and maintenance of bushland
7. Climate change adaptation
8. Advocate for better outcomes in relation to climate change
9. Community education
10. More sustainable transport
11. Reduced water usage
12. Helping business to be more sustainable
13. Improved local air quality



According to survey participants, the most preferred greenhouse gas reduction target for the community was carbon neutrality, followed by 50% carbon reduction.



According to survey participants, the most preferred greenhouse gas reduction target for council operations was carbon neutrality, followed by 50% carbon reduction.



5.2 Community consultation workshops

Two workshops were held in Queanbeyan and Braidwood in April 2019 to seek community input into the development of this plan. Following a presentation about the community's carbon footprint, workshop participants were asked to provide their recommendations and suggestions for action on posters. Examples of these posters can be seen in the picture below.

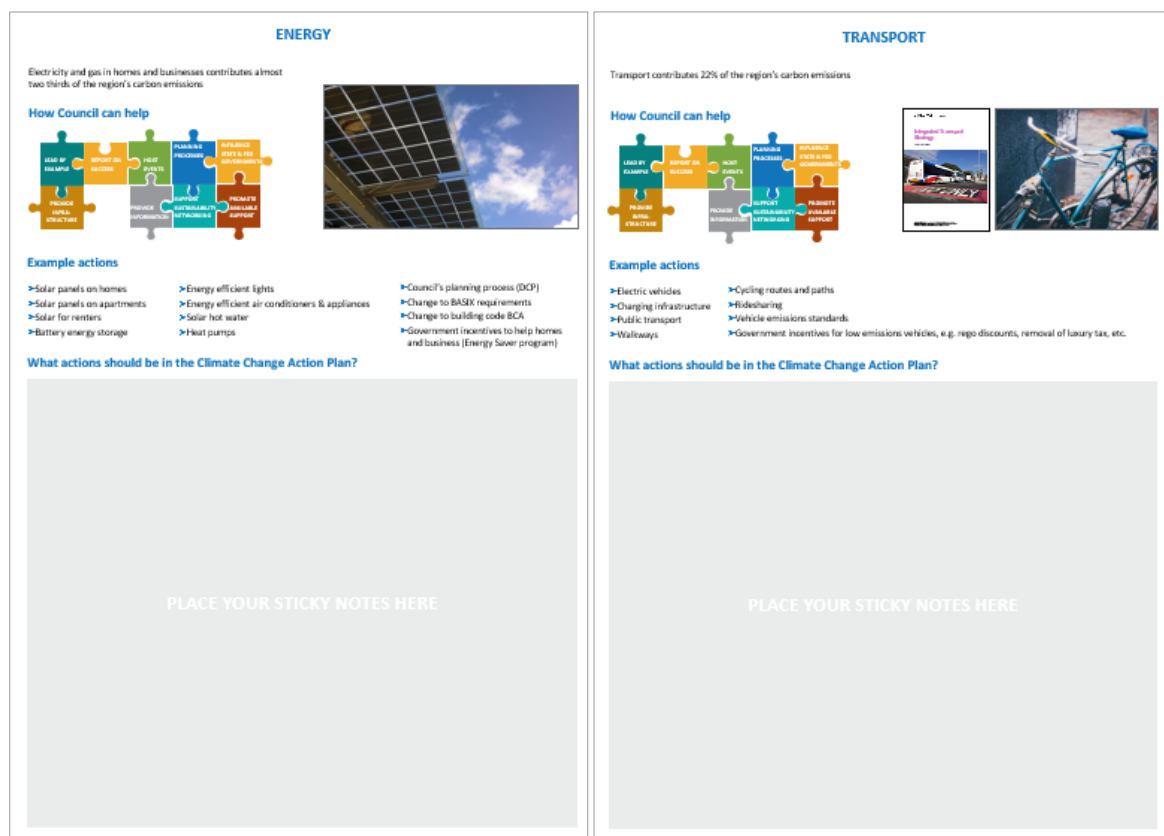


FIGURE 157: EXAMPLES OF POSTERS USED AT THE WORKSHOPS

In the two workshops, participants were also asked to provide feedback on recommended targets both for Council operations and the community.

5.2.1 Council targets Identified by Workshop Participants

Most workshop participants wanted to see a council target achieved no later than 2025. There was no clear preference for whether the council target should be on either renewable energy or carbon emissions. Most workshop participants wanted Council to adopt an ambitious target.

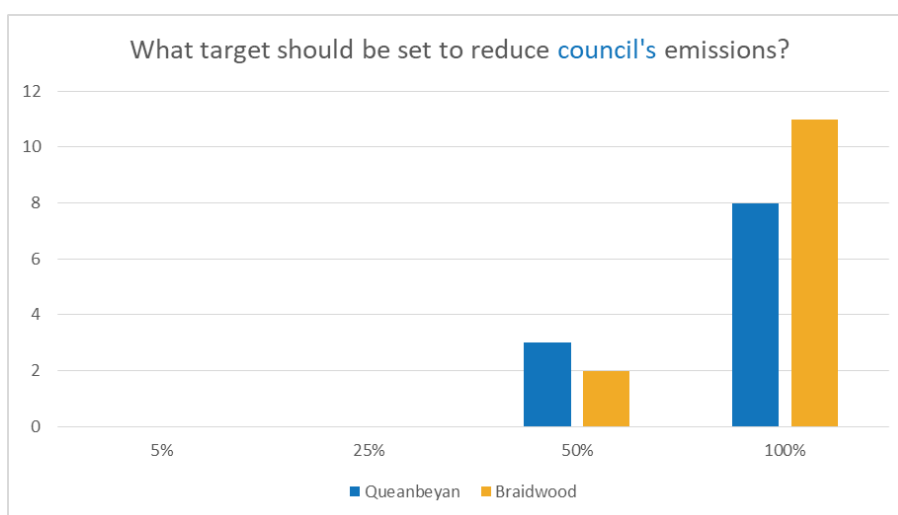
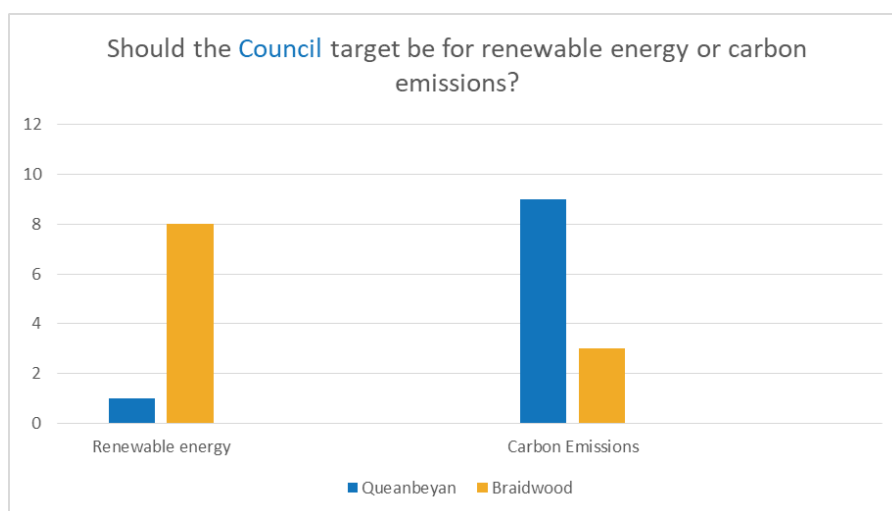
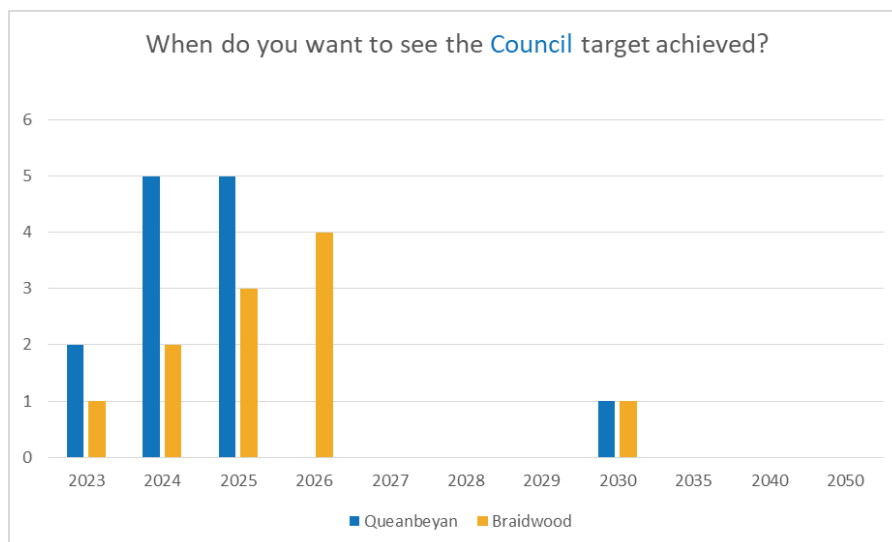


FIGURE 18: COMMUNITY WORKSHOPS – RECOMMENDATIONS FOR COUNCIL OPERATIONS TARGETS

5.2.2 Community targets Identified by Workshop Participants

Most workshop participants want to see a community target achieved no later than 2030. There was no clear preference whether the community target should be on either renewable energy or carbon emissions. Most workshop participants wanted the community to adopt an ambitious target.

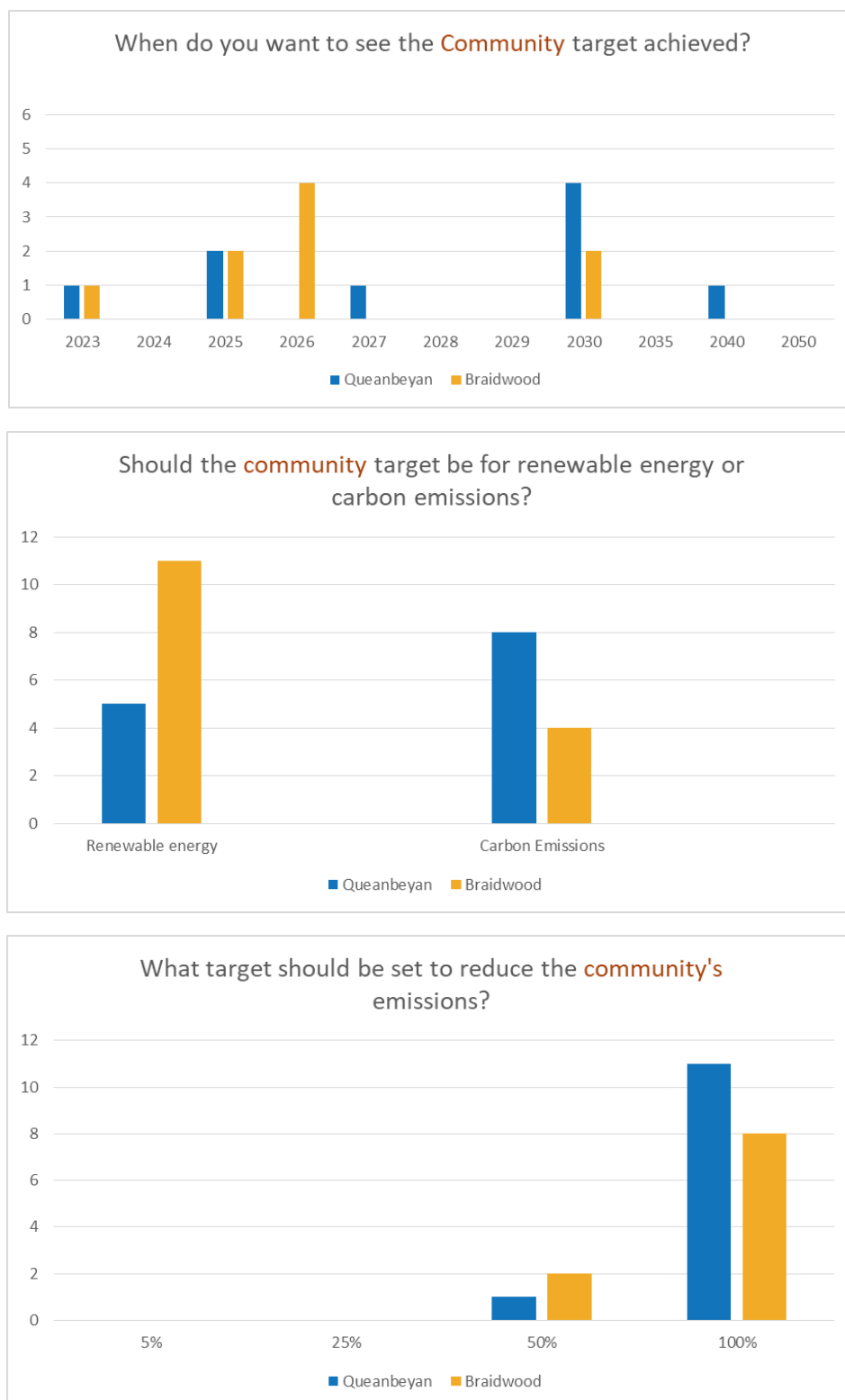


FIGURE 19: COMMUNITY WORKSHOPS – RECOMMENDATIONS FOR LGA TARGETS

5.3 Public exhibition

Feedback from the community to the Community Climate Change Action Plan will be reflected here following the public exhibition period.

Part 6

Community Climate Change Action Plans

6 Community Climate Change Action Plans

The actions listed below are specific ongoing responsibilities and tasks Council will undertake to support the community in taking the actions described in the action plans. Appendix C provides further data and information about potential abatement actions in the community, focused on areas where emissions are highest, such as stationary energy and transport.

Council will:

- Lead by example and improve the sustainability of Council operations
- Report regularly to the community on Council and the community's progress against the Climate Change Action Plans
- Host events to educate and engage the community around climate change and environmental issues
- Communicate information on climate change issues more regularly through the newspaper, City Life publication, website etc and have climate change and sustainability information at the front desk and in the library
- Support sustainability networking – through mailing lists, events, and providing meeting rooms for community groups at community rates or free (if approved under Donations Policy)
- Promote and inform the community about government grants available and energy saving and other education services

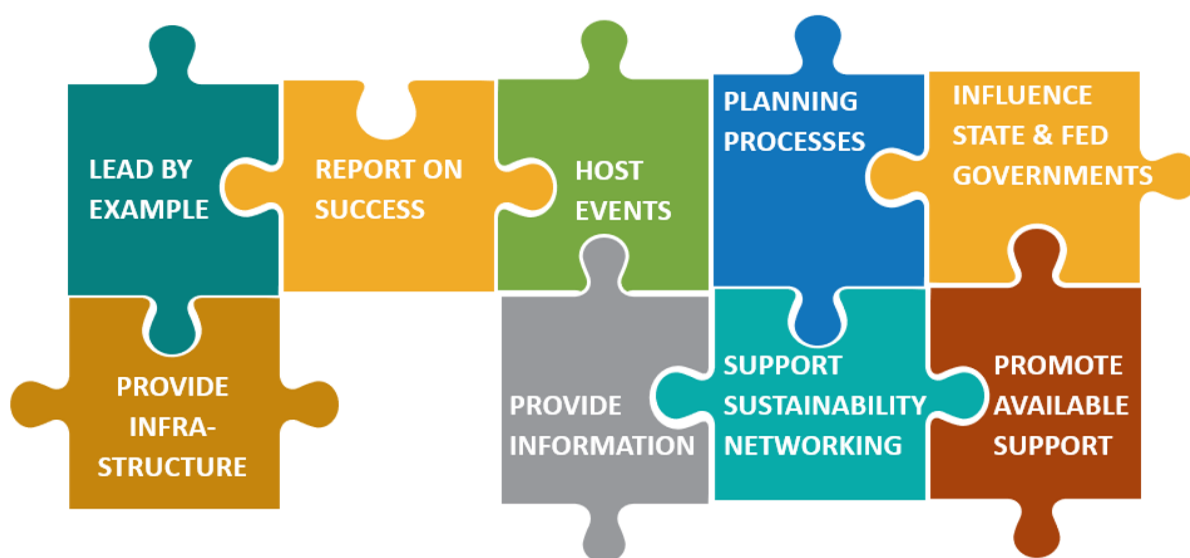


FIGURE 2016: EXAMPLES OF HOW COUNCIL CAN SUPPORT THE COMMUNITY

6.1 Energy action plan

Table 3: Action Plan – energy

Energy Action Plan	Initiative	Action	Timeframe	Responsibility	Resources Required	Benefits
CU 6.1.1	Education	Encourage the community to be more energy efficient.	Short	Council	Internal staff time: promotion, information and education	Fewer carbon emissions in the community
CU 6.1.2	Education	Provide up-to-date information on how emissions can be reduced in the community.	Short	Council	Internal staff time: information and education	Fewer carbon emissions in the community, higher energy literacy
CU 6.1.3	Renewable energy	Investigate how council can support community energy projects.	Short	Council	Internal staff time	Fewer carbon emissions in the community, increased energy independence
CU 6.1.4	Street lighting	Investigate innovative options to reduce the energy consumption of streetlights.	Short	Council	Internal staff time and budget or grant funding	Fewer carbon emissions in the community
CU 6.1.5	Education	Encourage the community to install solar photovoltaic panels and help address current barriers for renters and strata dwellings.	Short to medium	Council	Internal staff time: promotion, information and education	More renewable energy and fewer carbon emissions in the community
CU 6.1.6	Education	Provide information to residents about available support programs offered by the state and federal government.	Short, medium and long term	Council	Internal staff time: promotion and information	Fewer carbon emissions in the community
CU 6.1.7	Incentives & rebates	Encourage or help to provide energy audits for households and business to help reduce emissions.	Short, medium and long term	Council & External Expertise	Grant funding	Fewer carbon emissions in the community
CU 6.1.8	Renewable energy	Investigate opportunities for council and the community to collaborate on a local renewable energy project as they arise.	Medium	Council & Community	Internal staff and community time	Fewer carbon emissions in the community, increased energy independence, economic benefits for the region

CU 6.1.9	Renewable energy	Investigate bulk buys for solar PV and solar hot water for the community.	Medium	Council	Internal staff time	Fewer carbon emissions in the community, increased energy independence
CU 6.1.10	Self-sufficiency	Investigate the opportunity of a microgrid development in the community.	Medium	Community	Grant funding or investment opportunity	Fewer carbon emissions in the community, increased energy independence
CU 6.1.11	Collaborate with other local governments	Work with the ACT and other local councils to develop a regional partnership to reduce carbon emissions.	Medium	Council & CRJO	Internal staff time	Efficiencies and potential cost reduction of measures through collaboration. More momentum for carbon reduction.

6.2 Transport action plan

TABLE 4: ACTION PLAN – TRANSPORT

Transport Action Plan	Initiative	Action	Timeframe	Responsibility	Resources Required	Benefits
CU 6.2.1	Advocacy	Lobby for grants / incentives for low emissions and electric vehicles.	Short term	Council & Community	Advocacy	Fewer carbon emissions. Less noise.
CU 6.2.2	EVs/charging stations	Facilitate installation of electric car recharging points.	Short term	Council	Internal staff time and budget or grant funding	Fewer carbon emissions. Less noise.
CU 6.2.3	Active transport	Support community bikes or other active transport means.	Short to Medium	Council	Advocacy	Health benefits. Fewer carbon emissions.
CU 6.2.4	Cycling	Increase permanent bike racks and maintenance stations throughout the LGA.	Short to Medium	Council	Internal staff time and budget or grant funding	Health benefits. Fewer carbon emissions.
CU 6.2.5	Cycling	Increase walking and bike paths in the community and improve existing ones.	Short, medium and long term	Council	Internal staff time and budget or grant funding	Health benefits. Fewer carbon emissions.

Transport Action Plan	Initiative	Action	Timeframe	Responsibility	Resources Required	Benefits
CU 6.2.6	Cycling	Encourage businesses to support cycling for their employees.	Short, medium and long term	Council & Community	Advocacy	Health benefits. Fewer carbon emissions.
CU 6.2.7	Education	Educate the community around cycle awareness.	Short, medium and long term	Council	Internal staff time: promotion and information	Health benefits. Fewer carbon emissions.
CU 6.2.8	Education	Encourage the community to walk more, use buses and share car rides.	Short, medium and long term	Council & Community	Internal staff time: information and education	Health benefits. Fewer carbon emissions.
CU 6.2.9	Public transport	Provide better local & inter-city bus services.	Medium to long term	Council	Advocacy and Internal staff time	Fewer carbon emissions.
CU 6.2.10	Public transport	Provide Park & Ride and Bike & Ride.	Medium to long term	Council	Internal staff time and budget or grant funding	Fewer carbon emissions.
CU 6.2.11	Public transport	Subsidise bus service between Braidwood and Canberra.	Medium to long term	Council	Internal staff time	Fewer carbon emissions.
CU 6.2.12	Decreased transport needs	Investigate the opportunity of increased population density of the city centre to lower transport needs and invigorate the city centre.	Medium to long term	Council	Internal staff time	Fewer carbon emissions
CU 6.2.13	Decreased greenhouse gas emissions	Advocate for frequent low to no greenhouse gas emission buses to lower car usage.	Long term	Council & Community	Advocacy	Fewer carbon emissions. Less noise.
CU 6.2.14	Incentives & rebates	Advocate for incentives for low emission vehicle users.	Long term	Council & Community	Advocacy	Fewer carbon emissions. Less noise.
CU 6.2.15	Public transport	Advocate for extending Canberra light rail to Queanbeyan.	Long term	Council	Advocacy & cross government collaboration	Fewer carbon emissions.

6.3 Waste action plan

Actions on waste are highlighted from the community engagement for this climate change action plan. It is noted that Council's Waste Strategy will be the primary document that sets out actions, timeframes, resources and responsibilities. Accordingly only the recommendation from the community are recorded here.

TABLE 5: ACTION PLAN – WASTE

Waste Action Plan	Initiative	Action	Benefits
CU 6.3.1	Education	Educate the community on waste avoidance strategies.	Less waste. Fewer emissions from waste.
CU 6.3.2	Education	Encourage local businesses to enable a circular economy by reusing waste streams.	Less waste. Fewer emissions from waste.
CU 6.3.3	Shared facility	Provide a re-use centre or repair café.	Less waste. Fewer emissions from waste.
CU 6.3.4	Self-sufficiency	Encourage the community to use local produce.	Less waste. Fewer emissions from waste. More community cohesion. Increased knowledge on how to repair things. Fewer emissions from transport.
CU 6.3.5	Waste management	Encourage the community to use less single use plastics.	Fewer emissions from production of plastic bags and bottles. Fewer emissions from plastic waste. Less leachate. Less danger for fauna.
CU 6.3.6	Use of recycled materials	Use recycled glass in road surfaces.	Less use of virgin materials. More sustainable.

6.4 Water action plan

TABLE 6: ACTION PLAN – WATER

Water Action Plan	Initiative	Action	Timeframe	Responsibility	Resources Required	Benefits
CU 6.4.1	Education	Provide guidelines and incentives for the community to reduce water consumption and spend.	Short term	Council	Internal staff time: information and education	Less costs for households. Fewer emissions from treatment of water.
CU 6.4.2	Education	Provide workshops on sustainable gardening	Short term	Council	Internal staff time and budget or grant funding	More knowledge in the community of how to live and garden more sustainably. Fewer carbon emissions. Improved resilience.
CU 6.4.3	Alternative water supply	Encourage the community to install water tanks or water harvesting systems (i.e. water bladders in new houses).	Medium to long term	Council	Internal staff time: information and education	More self-sufficiency. Less town water consumption. Fewer emissions from treatment of water. Council can be a national leader in Water Cell Harvesting Systems.
CU 6.4.4	Development controls	Encourage new developments to be water efficient and install water cell harvesting under houses.	Medium to long term	Council	Internal staff time: planning, information and education	More self-sufficiency. Less town water consumption. Fewer emissions from treatment of water. Council can be a national leader in Water Cell Harvesting Systems.

6.5 Natural environment action plan

TABLE 7: ACTION PLAN – NATURAL ENVIRONMENT

Natural Environment Action Plan	Initiative	Action	Timeframe	Responsibility	Resources Required	Benefits
CU 6.5.1	Natural environment management	Research methods to save historic trees.	Short to medium term	Council	Internal staff time	More habitat, shelter and food sources for wildlife.
CU 6.5.2	Biodiversity	Increase local tree canopy.	Short, medium and long term	Council	Internal staff time and budget or grant funding	Provide more habitat for animals.
CU 6.5.3	Lobbying	Lobby state and federal governments.	Short, medium and long term	Council & Community	Advocacy	More support for biodiversity from state and federal governments.
CU 6.5.4	Natural environment management	Plant more deciduous trees to reduce urban heat island affects where appropriate.	Short, medium and long term	Council & Community	Internal staff time and budget or grant funding. Community time and budget	More habitat, shelter and food sources for wildlife.
CU 6.5.5	Recycled water	Investigate increased usage of recycled water.	Medium to long term	Council	Internal staff time	Less town water consumption.
CU 6.5.6	Storm water	Install filters and GPT's at storm water collection to stop litter and pollutants entering waterways.	Medium to long term	Council	Internal staff time and budget or grant funding	Healthier waterways.
CU 6.5.7	Biodiversity	Establish formal wildlife corridors (where appropriate) in addition to planting more trees to store carbon.	Medium to long term	Council	Internal staff time: planning	Allow wildlife to freely move across a larger area.
CU 6.5.8	Incentives & rebates	Investigate incentives to increase green space of roofs to decrease surface temperature in urban areas.	Medium to long term	Council	Internal staff time and budget or grant funding	More biodiversity in metropolitan environments.

6.6 Climate change adaptation action plan

TABLE 8: ACTION PLAN – CLIMATE CHANGE ADAPTATION

Climate Change Adaption Action Plan	Initiative	Action	Timeframe	Responsibility	Resources Required	Benefits
CU 6.6.1	Drought	Provide a list of trees that will grow in poor soil and are drought tolerant/climate ready. Support local plant nurseries for growing such trees and shrubs.	Short term	Council	Internal staff time	Maintain and increase tree cover. Create cooler cities. Less chemicals entering human food chain.
CU 6.6.2	Drought	Encourage uptake of drought-resistant/climate ready plants within community residential gardens.	Short term	Council	Internal staff time: information and education	Less water consumption. Better visual amenity. More removal of carbon from the atmosphere.
CU 6.6.3	Education	Hold workshops that help the community with drought-proofing their farming.	Short term	Council	Internal staff time and budget or grant funding	More yield for farmers leading to less financial stress.
CU 6.6.4	Extreme heat	Provide more water bubblers and water refill stations.	Short to medium term	Council	Internal staff time and budget or grant funding	Help the community with extreme heat days.
CU 6.6.5	Resilience	Develop resilience indicators and gather data.	Short to medium term	Council	Internal staff time	Better management of community resilience.
CU 6.6.6	Extreme heat	Develop a heatwave response plan aligned with the NSW state Heatwave plan.	Short to medium term	Council	Internal staff time	Better planning for extreme heat days.
CU 6.6.7	Flooding	Review capacity of drains to cope with flooding.	Short to medium term	Council	Internal staff time	Less local flooding. More safety on roads.
CU 6.6.8	Evacuation planning	Map key sites of particular vulnerability, e.g. the Queanbeyan River floodplain and overlay with location of evacuation centres. Ensure business continuity planning.	Short to medium term	Internal and external expertise	Internal staff time	More safety for the community.
	Continuity of	Council to ensure business continuity is well	Short to	Council	Internal staff time:	Continuity of water supply for the

CU 6.6.9	sewerage treatment	planned for. Pre-deployment of backup generators prior to extreme weather.	medium term		planning	community during power outages.
CU 6.6.10	Extreme heat	Plant tall, fire retardant and deciduous street trees for shade and cooling.	Short, medium and long term	Council	Internal staff time and budget or grant funding	More shade for the community during extreme heat days. Create cooler cities.
CU 6.6.11	Extreme heat	Increase tree canopy throughout the LGA to reduce heat island effects.	Short, medium and long term	Council	Internal staff time and budget or grant funding	More shade for the community during extreme heat days. Create cooler cities.
CU 6.6.12	Carbon sequestration	Investigate opportunities for carbon sequestration in the community.	Medium term	Council & Community	Internal staff and community time	Remove carbon gases from the atmosphere, slow down climate change.
CU 6.6.13	Extreme heat	Provide more versatile shade structures.	Medium term	Council	Internal staff time and budget or grant funding	More shade for the community during extreme heat days.
CU 6.6.14	Resilience	Educate/map what is produced in the QPRC LGA to meet local and growing needs.	Medium term	Council	Internal staff time: information and education	Self-sufficiency – less dependence on external food supplies.
CU 6.6.15	Resilience	Update construction works technical specifications. Factor climate into design and materials selections.	Medium term	Council, Community & Businesses	Internal staff and business/organisation time	New structures to cope better in a changing climate.
CU 6.6.16	Resilience	Put in place agreements for the prioritisation of generators, or to be reconnected to the grid after extreme weather events.	Medium term	Council	Internal staff time: planning	Access to power after extreme weather events. Energy independence, fewer carbon emissions in the community if backup power is based on renewables.
CU 6.6.17	Resilience	Investigate the opportunity of renewable energy with battery storage for key infrastructure.	Medium term	Council	Internal staff time and budget or grant funding	Access to power after extreme weather events. Fewer carbon emissions
CU 6.6.18	Resilience	Telecommunications are increasingly reliant on power supply. Council to retain and keep active communication networks across council and the community for alternative communications under emergency conditions.	Medium term	Council	Internal staff time and resources	Ability to communicate during extreme weather events.
	Resilience	Council to work with essential services owners that	Medium	Council &	Internal staff and	Essential services to continue to work

CU 6.6.19		are highly dependent on power like retirement villages, aged care, traffic lights, supermarkets to ensure business continuity planning is in place.	term	Organisations/ Businesses	business/organisation time	during power outages ensuring the safety of the community.
CU 6.6.20	Resilience	Increase community preparedness programs, including enabling community led solutions.	Medium term	Council	Internal staff time and budget or grant funding	More preparedness for extreme weather events. A safer community.
CU 6.6.21	Resilience	Develop a plan for cleaning up actions after extreme weather events, with specific attention to asbestos and green waste disposal.	Medium term	Council	Internal staff time	More preparedness for extreme weather events. A safer community.
CU 6.6.22	Evacuation planning	Review current evacuation plans which rely on buses. Prioritisation needs to be considered to ensure normal service disruption is minimised.	Medium term	Council	Internal staff time	Making sure that the QPRC community can exit the area under evacuation scenarios.
CU 6.6.23	Environmental impacts	Develop an environmental impact plan. Multiple extreme weather can exacerbate background environmental impacts like soil erosion and water quality – drought followed by fire followed by extreme rain increases runoff and changes water conditions like pH, suspended solids, etc.	Medium term	Council	Internal staff time and budget or grant funding	Better managed environmental impacts following extreme weather.
CU 6.6.24	Carbon sequestration	Work with rural property and agricultural owners to reduce and store (sink) carbon emissions.	Medium to long term	Council & Community	Internal staff time	Remove carbon gases from the atmosphere, slow down climate change.
CU 6.6.25	Development controls	Encourage climate resilient design like light coloured roofs, wide eaves and good drainage.	Medium to long term	Council	Internal staff time: information and education/advocacy	Less heat stress during summer and warmer houses in winter. Mitigation against climate change.
CU 6.6.26	Development controls	Encourage energy efficient home design.	Medium to long term	Council	Internal staff time: information and education/advocacy	Less heat stress during summer and warmer houses in winter. Mitigation against climate change.
CU 6.6.27	Development controls	Investigate changing planning regulations to allow off grid developments.	Medium to long term	Council	Internal staff time	More resilience in the community in case of power outages.
CU 6.6.28	Flooding	Investigate innovative road surface technology, like porous surface.	Medium to long term	Council	Internal staff time	Less local flooding. More safety on roads. More visual amenity.
CU 6.6.29	Resilience	Encourage the planting of more fruit trees.	Medium to long term	Council and Community	Advocacy	Local food supply.

CU 6.6.30	Resilience	Council to consider insulation and passive cooling for essential computer systems that are dependent on cooling systems that require power.	Medium to long term	Council	Internal staff time and budget or grant funding	Less reliance on power to provide cooling services for IT infrastructure.
CU 6.6.31	Water management	Investigate opportunities to slow down the flow of water over vegetated surfaces to maintain water flow and retention in rivers and creeks.	Medium to long term	Council and Community	Internal staff and community time	More water available for local vegetation. Less bushfire risks.
CU 6.6.32	Continuity of water supply	Council to ensure business continuity is well planned for. Pre-deployment of backup generators prior to extreme weather.	Medium to long term	Internal staff time	Internal staff time	Continuity of water supply for the community during power outages.
CU 6.6.33	Continuity of water supply	Council needs to prepare a business continuity plan for the supply of chlorine to water treatment plants. Chlorine is being transported in B doubles, which reduces road options during extreme weather.	Long term	Council	Internal staff time	Ensuring continued safe water supply for the community.

6.7 Education action plan

TABLE 9: ACTION PLAN – EDUCATION

Education Action Plan	Initiative	Action	Timeframe	Responsibility	Resources Required	Benefits
CU 6.7.1	Engagement	Support education programs in schools.	Short term	Council	Internal staff time/advocacy	More knowledge in the community of how to live more sustainably. Fewer carbon emissions. Improved resilience.
CU 6.7.2	Provide knowledge	Provide information on local businesses who are producing sustainable goods.	Short to medium term	Council	Internal staff time	More local production and consumption. Improved resilience. Fewer emissions from transport.
CU 6.7.3	Demonstration	Investigate the provision of sustainable living centres in major towns that provide advice, workshops and demonstration.	Medium to long term	Council	Internal staff time	More knowledge in the community of how to live more sustainably. Fewer carbon emissions. Improved resilience.

Appendices

Appendix A: Survey Results

TABLE 10: SURVEY RESULTS #1

What makes it hard for you to take action on climate change and reduce greenhouse gas emissions?

Nothing. I'm on solar power and recycle/reuse where I can.

It isn't we are doing as much as we can to reduce our impact. Mostly others have issues, cos it is too hard, or complicated or they just don't care.

Is all our recycling going to be recycled, cos the system at Bungendore tip is not that convincing as it is linked to the land fill section!! Seriously it isn't separated how do I know what I recycle winds up being recycled.

Lack of facilities in the area. More recycling stations and/or pickups along would be great. Improved public transport would assist as well and the introduction of Tesla charging stations would also be an incentive.

We live in a city and area which requires large amounts of private transport. At a personal level we reduce the energy and water we use as much as practical. We are in the process of designing a house and we will be installing the largest possible solar system for our roof. It is a perception that becoming more efficient is expensive, so practical education seems to be the key. Not the end of the world education, but good practical things that individuals can achieve to be as efficient as possible.

It is not hard, but it is pretty pointless - it is governments and business that will have an impact - not Mr and Mrs Average.

Living in a unit.

We take what action I can, in the home and in our private and business lives. However, time is an issue as we are running a small international engineering company, which often involves us working days and nights due to time zone constrictions. I also believe that all levels of government need to take the lead by example and inspire this community to aspire to better outcomes for our descendants. Let's be responsible ancestors.

There is no bus that will go to Belconnen where I'm currently studying. If I take a bus, I have to pay a NSW fee then the ACT fee. Surely there is a better way? Also, a better bike path to get to the ACT so I could ride to a bus stop with ease? So maybe more cycling lanes that aren't in the 100 zone as that freaks me out....

Transport and staying warm in a cool climate, renewables are part of the solution for both those issues.

I live in Googong and like many others here, I work at Russell. There is no appropriate public transport to take me from Googong to Russell offices in anything like an efficient timeframe, or indeed to reach work without being hours late. I'd love to take my car off the road and catch the bus!

That everything comes in plastic - noting QPRC has made small movements in this area. Car transport is really the only option for travel.

Cost of infrastructure to become carbon neutral.

Low income households find it difficult to prioritize actions that combat climate change.

The inability of all levels of government to make worthwhile changes. It starts at a local level and grows from there.

Everything runs on coal powered electricity and home solar is not yet affordable. Biodegradable and low emission products are more expensive than cheap single use plastics which are so prolific it's hard to even actively avoid them.

It's difficult to make much impact as an individual, which is why I think it's so important for all levels of government to take action.

What makes it hard for you to take action on climate change and reduce greenhouse gas emissions?

Cost.

Lack of public transport or green waste bins.

Transport is the area where I have not taken action, without sufficient charging points electric cars are not yet an option.

Availability of recycling locations for things like polystyrene and other things that can't go in the yellow bin.

Not knowing what options are available to help reduce my greenhouse gas emissions. There is also not enough awareness of the effects and damage that greenhouse gas emissions have in relation to climate change.

Lack of support from Government

No public transport to Braidwood, a shuttle bus to Canberra and back during commuting times would see me and I reckon lots of others leave their cars at home.

Cost of installing renewable energy sources e.g. solar

Cost of renewable energy and sustainable building options

Action needs to be taken at governmental and international levels- individual actions are never going to create the change we need in time. But individuals (and especially local gov) can become really positive case studies and if achievements are well communicated, they can set the agenda. If we get it right, it will draw people to the area so is a smart economic decision as well.

Necessity to use petrol/diesel for long vehicle trips.

Do not think it is an issue.

Lack of clean, efficient, public transport.

Cost of capital equipment. i.e. Solar Batteries.

Cost of solar batteries

Taking meaningful and substantive action at an individual level is difficult - individuals can take steps to adapt to climate change; taking individual action that will have a material influence on the risks and consequences and progress of climate change is not going to have a material impact.

Funds

I find it hard to believe in anthropogenic climate change. However, if true then the root cause is the pressure of population worldwide and neither I nor Council can do anything about that.

Climate has always been changing. Nothing you do will make any difference. Letting people clean up dead branches and rubbish on the sides of roads would help with Bush fires.

I am doing what I can.

We have solar panels and try to reduce water usage. We religiously use recycling bins, green waste recycling. Should provide recycling bins at major sporting venues. I believe Queanbeyan Tigers have requested this to no effect! Council should use more solar panels on their workshops and wherever possible on Council owned buildings ... will help climate change and reduce Council costs in the long term.

My interest is with those who do not have the education and resources or capacity to make changes. Those who rent cannot change much in their households and those in NSW Housing have even fewer choices about how they run their households in relation to energy efficiency. People are given housing where rents are affordable, but the utilities and energy efficiency options are shameful. As a community worker in this region I see bills of \$1500 for the quarter and many with accounts over \$10,000.

Expense of batteries to combine with roof-top solar. If more houses could install batteries, a 'virtual' power-station for non-sunshine hours could be developed using smart grid technology.

We, as residents, are already taking action. We have PV panels and a modest electricity bill because we generate electricity. We mulch our garden as far as possible to reduce water evaporation. We

What makes it hard for you to take action on climate change and reduce greenhouse gas emissions?

have a series of water tanks which reduces our demand for artesian water supplied by the Council. The lack of incentives (Federal/State) and vehicle fast charging infrastructure (Council) to help me and others transition from fossil fuel to electric powered vehicle ownership. Council should partner with NSW State Govt to make this kind of thing a reality.

The community's influence and lack of opportunity to.

It's easy. The knowledge that as a resident I am already paying for and catching my own water supply, paying for the supply and maintenance of my own sewage, and millions of others in the world, ahead of Australians, are doing nothing.!!!!!!!

The community/political negative attitude/dismissal, and either total inaction or counteraction on climate change, the cause of climate change and its effect on the future of humanity.

It isn't hard to take action on climate change. I own a fuel-efficient car, minimise my journeys, I do burn wood for heating which is a contributor to climate change but not when compared with burning coal and I minimise energy consumption in my home.

The cost among other things. Traditional forms of energy production using High Efficiency Low Emissions (HELE) coal power technology along with Carbon Capture and Storage (also using the new technologies that are being developed) will keep costs down and the lights ON.

Many of the green options available are not cheap - i.e. the installation of solar panels for powering a private residence

No difficulties in reducing energy use. That should be the focus. A greenhouse gas reduction target as a measure is non-sensical in a discreet council environment. I suggest finding another measure would take much of the angst out of the debate.

I live in the bush and as public transport is poor, I have to have a car

Red tape around permission to build a simple dwelling.

Lack of public transport so that we are forced to use private cars to get from Burra to anywhere else.

Convincing others especially those who believe in fake news about the benefits of renewables. I think the comments on Climate change from people like D Trump should NOT be broadcasted in ANY way. Far too many people think that our small contribution WON'T have any effect.

Lack of access to public transport and excess plastic packaging that can only be disposed of in landfill.

Most of the available information is in academic scientific reports which are difficult to "wade" through. QPRC's interest in community involvement in QPRC Climate change policy is perhaps indicated by utilizing only 6 lines out of 264 on page 7 of the Tuesday April 2, 2019 Chronicle/Queanbeyan Age to advise the public. No mention in the QPRC library!

Nothing is hard about it. It's just a convenience factor for most, and lack of investment.

My lack of belief that it is anything other than a religion, followed by misguided zealots. If anything, I wish I had enough money to establish a coal, or nuclear power station to bring energy costs down for the disadvantaged, rather than virtue signalling.

I do as much as I can, but I find it's hard when other people in the community/workplace don't understand the importance of it.

Lack of public transport and electric vehicles

I try to do the best that I can for the environment, but I could still do better.

Nothing. It's hard to see what impact I'm having though when there is inaction by government.

Reliance on non-renewable power sources, packaging of products which is non-recyclable. Would love to be able to put compostable scraps in the green bin.

Lack of public transport, need to rely on private vehicle, lack of available affordable electric vehicles suitable for use in rural areas.

We are on self-funded stand-alone solar power. Transport is our main issue of difficulty.

Access to options means no choices.

What makes it hard for you to take action on climate change and reduce greenhouse gas emissions?

The expense of getting solar panels and batteries for storage.

The price of alternate energies.

Lack of transport integration and options to work and study in Canberra - the Transport Canberra should be universal over the combined metropolis of Canberra and Queanbeyan. QCity as a separate entity is non-sensical.

Lack of hydrogen or electric car options in the absence of decent public transport, and a manager that insists I have a car.

A town that is designed for cars - Bungendore Road is downright dangerous to cross on bicycles and walking.

Financial burden, e.g. cost of installing rooftop solar PV and batteries, unfavourable feed-in tariffs.

Lack of support from government. Sense of disempowerment.

Lack of cost effective and available options

Reduce waste going to landfill we need different recycling options; supermarkets should remove plastic wrappers from products that don't need it

Individual cost of transitioning to renewable energy such as solar power.

Climate change is a natural phenomenon- you cannot change nature

Price. Without the push from government to have a more environmentally friendly products in companies etc. it remains expensive to be Environmentally orientated.

As an individual, a lack of information on what to do and lack of resources.

Don't have a problem as lead a very low carbon lifestyle without using my fellow ratepayers' funds to educate me

Lack of opportunity

Time poor

Low income and a lack of political power/options of polities who are DOING SOMETHING about this

Have an electric car but live rural so a charge point in Queanbeyan would be helpful.

We have a state member who does not prioritise clean energy.

Cost of green energy. Cost of and poor efficiency of solar storage options

Living a half hour drive from services.

Cost and availability of alternative technology.

Cost, living remotely, lack of policy incentives to create and develop alternative industries

Lack of public transport between towns, inability to recycle some categories of waste.

Great question!

I think it's about access to info e.g. where and how best to recycle and refuse waste.

Access to info or ideas around best suppliers in terms of industry to purchase from who are log a I and have low carbon footprint.

Keeping our recycling local. E.g. making products from plastic here locally.

Growing veg and producing locally.

Good transport options as a community. Services close to people's home to reduce travel etc.

Policy and legislation to positively shape behaviour.

Encouraging neighbourhoods to plant more trees, cooler green shaded surfaces, incentives for gardening to produce food and encourage native birds, bees etc

Nothing makes it hard. It's all about thinking before you buy, go shopping or travelling. Don't be wasteful.

Living in rural area means travelling, cost of solar panels and other renewable energy

Not all options always available to do the right thing

What makes it hard for you to take action on climate change and reduce greenhouse gas emissions?

Very poor public transport services

Insufficient and poorly connected bike paths (and drivers who drive dangerously around cyclists)

Poor building design regulations - makes it difficult for people to have passive solar heating; loss of eaves in new buildings

We should be recycling our waste products and creating new uses for the materials

Everything coming in plastic. Vegetables come in plastic. Plastic is cheaper and that sucks.

Initial cost of solar power.

Transport, flushing toilets, food distribution

Transition costs to renewables. Including cars.

Federal Government policies and lack of support for renewable industries and support for local councils to work locally with their communities

Poor waste management and recycling access.

I try very hard to reduce my greenhouse gas. Walk to the shops frequently, installed solar panels and retrofitted insulation. Establishing a new garden requires a bit more water but it is essentially a native more drought proof garden. Not much more I can do...it is up to the big energy suppliers and the governments to help the transition. Subsidies for cheaper electric vehicles, household batteries.

Customary living. Since business and word of mouth has been convincing that the environment can supply our needs and cope with our waste and input of biosphere much education is needed. Do we limit car and machine operation as much as possible save power substituting solar or wind as energy source, producing our own food if possible, own energy if possible and so on? Hard is due to cost, (P Hawken, ignorance or do not care attitude combined with an economic model that demands growth (and profit) including our approach to the needs of the environment, meant to serve us we command, broad acre chemical farming should be replaced by no till rotational etc

I can't afford to replace my LPG car with an electric car

Lack of cycling infrastructure.

Climate change is a natural occurrence, since the implication of renewable energies and the shutdown of various coal fired power stations over the last 20yrs, the CO2 in the atmosphere is still steadily rising and is at 400ppm, the data needs to be continually updated to be able to determine if what has been done is working, not just going off old data and hysteria.

We already collect our own rainwater, provide our own solar power and grow some of our food. However, we would like to buy an electric vehicle, however, the cost is prohibitive, and a lack of charge points makes it logistically more difficult to own one.

Living on Wanna Wanna Rd I have poor access to public transport and need a car.

Council's rude and dismissive attitude to concerns about herbicide misuse.

1. Sceptics, misinformation, social division, political grandstanding and stupidly, greed and self-interest.
2. Material focused culture and community. E.g. The 'must-have' huge 4WDs, SUVs and oversized vehicles for everyday commuting.
3. Lack of infrastructure, for example; limited EV interstate charging options, Energy providers actively limiting rooftop solar sizing while not upgrading the network to facilitate decentralised generation, a lack of cycling and encouragement of smaller vehicles on our roads, limited recycling/reuse processing industry either locally or in Australia.
4. Lack of leadership and gumption to embrace the changes needed to transition to a carbon-free economy that will provide the alternatives needed and at an affordable and cheaper than fossil option cost.
5. No embodied cost for the pollution and energy used in the goods and services we buy and use.

We need a price on carbon, whether it be called a tax, levy or what-ever. It is totally unfair and

What makes it hard for you to take action on climate change and reduce greenhouse gas emissions?

immoral to expect the younger and future generations to pay for the current and previous generations exploitation of finite resources.

Whole-of-society approach is needed to support individuals who are trying to do their bit

Current costs

Lack of viable alternative transport.

Cost of installing solar. Organic waste disposal.

Increased cost and time and substantial lifestyle changes

Lack of public transport options meaning I must own a car

TABLE 11: SURVEY RESULTS #2

Are there any other ideas, feedback or comments you would like to make in relation to the Climate Action Plan that is currently being developed?

Every council owned building should have solar panels on them, and they should probably be a requirement for every new home.

I think council should work with which ever government in NSW is planning that new high school to ensure it is sustainable and set up properly so it can recycle everything. Council should support schools with their waste initiatives as you are teaching the younger kids who then become adults who make good decisions.

Make the "green shed" at the tip much bigger and open Saturday and Sunday so more people will use it.

Compulsory solar power for all new buildings. Hybrid engines as a minimum for council cars (that don't require diesel, like trucks) and perhaps a rate benefit for those that bring their houses in line with environmental incentives like water tanks and solar power.

Council should always be aiming to have the least amount of impact possible. Not just on the environment but also rate payers. If a climate action plan increases the cost to rate payers, then at the end of the day it only has a negative effect on our region. I believe council should be looking at projects like the natural sequence farming principles demonstrated along Mulloon Creek outside Bungendore. This project has an actual benefit to the environment and water quality, QPRC should be a leader and adopt this concept wherever possible in our council area.

I think that council should be adopting an ENERGY EFFICIENCY PLAN rather than a climate action plan which people don't think they can do anything to help, be a practical leader rather than following what all the PC hippie councils are doing around the state.

Council should be putting solar panels on all Council owned property and aiming for 100% renewable energy sources

There would be considerable benefit in accessible community education in energy efficiency with a focus on low income households, who are most likely to be financially affected by climate change but have the least capacity to be able to take steps to contribute.

We need to aim for the highest possible carbon reduction scheme, we may not reach it, but is it not always better to strive for the absolute best?

I don't know what's in it. But I really want Queanbeyan to have sustaining reusable clean energy. I believe it would prompt Canberra to do the same. This would also lower rates and make Queanbeyan more affordable as we are struggling to pay rent or utilities now.

Thanks for including the bike lane out to Googong in the Old Cooma road upgrade. Buses linked with decent safe cycle paths will make a real difference.

Are there any other ideas, feedback or comments you would like to make in relation to the Climate Action Plan that is currently being developed?

Higher levels of vegetation in suburban areas would be a good idea. In older areas but particularly in areas of new development.

I would love to see solar and other forms of renewable energy become commonplace. Rebates for solar panels are very important to encourage to offset the upfront costs. The technology is there, we need to embrace it.

Keep the recycling 10 cent rebates. It encourages recycling and helps the unfortunate and homeless. I'd like to see all new homes required to have tanks for garden water and mandatory solar hot water with govt rebates to make affordable.

It would be good to see council and businesses investing in renewable energy and divest from mining and big polluters that do not have adequate climate change policies.

I would like to see QPRC supporting the development of community-owned renewable energy infrastructure, such as solar farms and small-scale hydro.

I'm happy to pay extra rates for planting more local action on climate change. Easy options - consider centralised city design using mass to justify mass transit options. Planting of trees etc. Down to local initiatives like promoting backyard chickens for waste disposal.

Working with local businesses to:

1. Installing solar
2. Upgrade lights to more energy efficient ones
3. Reduce waste
4. Incentives to be more initiative around sustainability.
5. Look at increasing requirements for energy efficiency and water smart gardens for new dwellings.

See above. More electric charging points.

We need a strong and immediate response from governments to make a difference to climate change especially in the primary industry sector. An emissions trading scheme would be an effective and cost-efficient means for industries to reduce greenhouse gas emissions.

We need to raise this to the highest priority. The climate appears to be changing more rapidly than any models predicted. If we don't move soon then the fate of our whole society will be in jeopardy

More street trees, particularly in Braidwood, streets like Duncan street with the large old plane trees are so much cooler. More footpaths around town to encourage people to walk. More cycle paths. LED streetlights well maybe install streetlights first. A green waste station in Braidwood where the community can buy the compost produced. Recycling bins in the Main Street of Braidwood, Bungendore had new bins installed with recycling options and Braidwood got these stupid black ones. A link bus to Bungendore to meet up with the Canberra explorer train to get to Sydney and Canberra without a car. Community education centres to advise people how to reduce energy, waste and save water. Mandate higher insulation ratings in new builds and renovations.

Very keen to see what the council comes up with, but I also think it was a missed opportunity to make Googong a carbon neutral community.

Council should take the lead in reduction of water, fuel and electricity use by installing reduction methods then letting the residents rate payers know how it can be done. Also reduce, reuse, recycle. etc. It's not new but we need to be reminded.

Long term data falsified to skew results to support notions of Climate Change.

Make all new development applications, adhere to tougher compliance rules that are environmentally friendly.

Stop mowing down native forests.

Localised solar farm for communities.

Are there any other ideas, feedback or comments you would like to make in relation to the Climate Action Plan that is currently being developed?

It is important that governments of all levels incorporate climate risk assessment into legislation, planning and approval processes and policy aspects for:

1. physical risks (including to people and assets) associated with rising aggregate global temperatures, the consequences such as dryer periods, severe weather events; and
2. transition risks associated with developments that may (or may not) occur in the process of adjusting towards a lower carbon economy – legal risks, financial risks.

These risks each give rise to tertiary risks, stemming from litigation including, liability for breach of directors duties – this is relevant for company directors under the Corporations Act; it is also relevant for governments when considering litigation risks in relation to planning appeals, public or private, nuisance, failure to exercise relevant consideration for decisions. The risks from climate change are simply an extension of risks that business, farmers and industry consider in managing their operations. Until recently governments have only been considering historical meteorological data in making decisions regarding major infrastructure and other significant developments.

Given that Australia's global footprint is about 3% of manmade greenhouse gases, and Australia's Chief scientist has stated that a 3% reduction globally would have little or no effect. In other words, shutting down all industry, coal fired power stations, stopping all vehicles etc, in Australia would have little or no effect on climate change. Therefore, the setting of targets does not make sense. That is not to say we shouldn't be doing what we can, but it should not have an adverse effect on our economy or way of life.

Small solar systems or community solar systems are by far the easiest and most effective way to contribute, but climate change is going to happen regardless of what we do or do not do. So, we need to do what we can (within reason), but also adapt to the changes.

The most precious resource bestowed upon us by nature is water which comes in the form of rain. The Climate Action plan should include substantial measures to harvest rainwater. This would be much more economical than building dams (which won't happen in today's Australia).

I would like to see the Plan when it's ready.

Encourage Council to do whatever it can together with sound business plan.

We have formed an Energy Efficiency Group who have offered workshops to the public and would like to take this action further with council employing a worker who can assist residents to draft proof their homes, advocate with NSW Housing to upgrade appliances to be more sustainable. Hot water services, Heaters and stoves and lighting can be subsidised to homeowners in NSW and it would be good to see NSW Housing take up some of the options.

The fleet of vehicles operated by the Council should be, as far as is possible, electric or hybrid electric powered.

All night lighting in the Bungendore township should be powered from battery stored solar power. The future water supply for Bungendore could be secured through pumped water from the Canberra network of freshwater dams. This major infrastructure project would create jobs as well as secure Bungendore's water supply well into the future.

As well as the above issues there should be widespread tree planting, minimal land clearing and sustainable very energy efficient houses.

Educate community about climate change. Include simple, illustrative graphs of causes and results of climate change, e.g. rising percentage of Carbon dioxide in the atmosphere, in Council's newsletter on a regular basis.

Yes. But I bet you don't pass these comments onto your superiors.

A QPRC action plan will do two things only. Pacify loud unqualified voices and use ratepayer's money to appear to achieve something important, that can't be qualified.

Are there any other ideas, feedback or comments you would like to make in relation to the Climate Action Plan that is currently being developed?

The situation on climate change is dire! Real action on climate change should have happen over 30 years ago! Therefore, unconditional and immediate action on the three areas mentioned above must happen now! To do this a suite of innovative, integrated and synergistic initiatives are needed. These initiatives must: 1. limit the 'locked in' effects of climate change. 2. adapt to a new climate and degraded/unstable environment with limited resources and options. And, 3. built a new economy that is sustainable and promotes prosperity, fairness and harmony. For us to survive and shift to the new economy, these initiatives, will unfortunately, be unpalatable for the broaden community and will be met with strong resistance. It will require STRONG and GENUINE leadership. QPRC must lead by example, it must 'walk the talk'; and its commitment to the cause, it's targets, it's every decision; must be aligned and doubled that of any community expectation. For example; as mentioned above the council greenhouse reduction target should be 200%.

I haven't read it.

The focus should be on reduced energy use and adaptation. I don't see it as the council's role to lead any transition to renewables; that said, appropriate technologies should be phased in as they become available. Any focus on renewables should also recognise the need for base load power. Unlike some other states/territories/councils, we should not claim the high moral ground while drawing on base load from other regions.

Use fans in schools instead of air conditioning, and double glaze windows

Do not approve houses that are not properly orientated and have e.g. solar panels

I believe that climate change exists, and we should do everything we can to minimise it; but I believe that action to try to stop or reverse it is misguided.

The natural forces of global warming having been taking place for 15,000 years and will not stop anytime soon. Ice melting, global warming and rising sea level are inevitable. It just a matter of time. Stopping climate change is not feasible, we should be directing efforts to modify our society and coastal infrastructure to move away from areas at risk of inundation. All long-term new developments should be planned on higher ground, not in low lying coastal areas.

Listen more to climate experts and less to shock jocks.

Haven't yet seen the developing Climate Action Plan, but public transport, renewable energy, support for electric vehicles should all be in it.

Stop or at least reduce the use of weedkiller... there are more and SAFER ways of killing off weeds!

Reduce waste materials.... it really is quite easy

Education on water and energy demand reduction also relatively easy to implement.

A bit arrogant you are a tiny little council in a big world. Try concentrating on reducing rates and fixing roads. How are you going to do anything? Put a big curtain around QPRC!

Council should do everything within its power to reduce our influence on climate change and to reduce waste/increase recycling efficiencies across QPRC.

What effect will climate change (CC) have on structures within the present 100 year flood area? Will the "100 yr. flood" area be increased to account for increased flood frequency? What effect will it have on the design of storm water pipe and channel systems, culverts and bridges?

Will the QPRC change to non-polluting vehicles. Perhaps electric or hydrogen?

Will the QPRC convert entirely to LED lighting.

Build a power station fuelled by coal or nuclear.

It would be great if Council had more community education around the area -even just start with basic information and stats about climate change and then start by showing how people can make a difference in their household and workplace and then the wider community (and explain how it would benefit them not just the earth)

Are there any other ideas, feedback or comments you would like to make in relation to the Climate Action Plan that is currently being developed?

Council should lead by example showing that it is an important issue for everyone not just “greenies” e.g. it’s great that we have new street bins in Braidwood but a shame that there isn’t a recycling option for the main street.

We only have one planet and if we continue the way we are going we will destroy it and no amount of money can fix that.

Ban single use plastics

Involve school children. Educate the broader community

100 percent target is long term, no specific term was given in above questions.

Incentives for use of alternate energy sources such as solar.

Like the children striking for climate change, more needs to be done at the highest levels to implement change that makes impact. Council s should be setting the example for their communities and to show the Govt it can be done.

Every shopping mall outdoor parking should have shade structures that are solar panels to power the malls. Grants for people to put in wind and solar should be increased.

I would strongly encourage QPRC to join the Cities Power Partnership, a program run by the Climate Council. The CPP makes resources available to local governments for free and supports them to implement sustainability and energy efficiency policies by connecting them with other councils and experts who can share knowledge and experience.

Provide the right resources for long term change.

Being considerate of the efficient use of energy and resources would be a good start.

Push for greater reward for implementing renewable energy such as solar from a local level.

Having Council take leadership and create actionable ideas/alternatives where the community can come together would be amazing. - it is a HUGE challenge, but it is needed

We DESPERATELY NEED renewable energies in place.

We could get schools and workplaces involved?

Could Council pressure governments for high rebates for electric cars? We need a fast and affordable transition in this area.

Thank you for all that you do. Will continue to support you!!!

I do not believe this is a matter for the council - please keep to your core work

We have no future without addressing climate change. And not just us, we already have so many climate change refugees, and others suffering the effects. For me climate change is about justice, and our current non-action is about selfishness.

A cloth nappy rebate such as what Brisbane city council have

More recycle drop off locations (currently only at Coles)

Keep up the good work, keep it as community based and sustainable as possible

Consult with solar providers. ... not just the big companies.

Look at plans currently used to make it achievable for those on low income /rented properties.

Subscribe to ReNew magazine to keep abreast.

Set the example by adapting to solar on council properties.

Local industry around training unskilled youth in manufacturing products locally using recycled plastic. There are online plans of set ups for this industry. Using container style dwellings Promoting local sustainable-like businesses involving recycling, reusing (e.g. repair cafe) Incentives for recycling, reusing.

Supporting more energy efficiency in homes especially Housing homes.

A community expo of what is available in the region now or what could be available in the future would be useful. People to share what they do in Queanbeyan and rurally. Aspects to think about

Are there any other ideas, feedback or comments you would like to make in relation to the Climate Action Plan that is currently being developed?

are climate change, renewable energy, land degradation, tree planting, flora and fauna. Unfortunately, I will be away and am unavailable to attend the upcoming forum in Queanbeyan.

Poor building design regulations - makes it difficult for people to have passive solar heating; loss of eaves in new buildings.

Would like to see more community gardens and helping people learn to grow their own food. Support for community renewable energy projects.

Let's be a Transition town!

Small solar farms/ joint community energy projects should be developed for the various smaller communities where there is often not the income for people to do things alone. Could you put solar pumped hydro on Gillamatong?

Responding to reduction in greenhouse gas emissions along with stopping native forest logging and planting trees is crucial - next 10 years are vital according to very reliable scientific advice.

Establishing a 350 group

It is hard to know what more to do but agreeing that Climate Change is happening and needs to be actioned against is a good start. Council taking a stand is fantastic! Boast about it! And educate the community. We need leadership from all forms of Government, and it is very lacking from the current Federal Govt.

1988 to 2019 apart from increase in knowledge little has been done. Climate intense fire incidence drought frequency and time loss of habitat etc has happily continued whilst restoration gets harder and harder. Governments disguise the reality as do oil firms etc. I don't suppose the lawyers will agree but charging with manslaughter should be on the table

I don't agree with acres and acres of Solar panels and wind turbines destroying wildlife and habitats whilst being constructed, they are ugly.

WHO and WHERE, are these Solar panels and Lithium batteries going to be recycled once their use by date is realized?

I appreciate council's commitment to recycling; however, I believe business should be reducing waste and packaging that the end consumer must dispose of somehow. The amount of plastic packaging and the multiple layers of packaging on everything (including a banana) is not sustainable at all. In addition, the reusable plastic bags that have replaced the single use plastic bags from the supermarket are now breeding out of control in people's cupboards - not really a win for the environment.

I commend the Council for this Action Plan.

Soil compaction is a huge issue.

Soils under grazing have lost capacity to store water and air.

This has broken the water cycle which cools the climate near the ground.

Grazing properties are now huge heat banks which store sun energy and release at night to make temperature increases locally far above global increase.

Spray grazing now exacerbates the heat exchange problem whilst poisoning water ways with spray drift and soil wash.

Council also abuses herbicides and is part of the problem of careless attitudes to poisons.

Yes, but run out of my time at this stage.

A long-term view is needed, more than 10 years to ensure any investments now reap benefits for future generations

I believe Council is taking steps to address climate change however, given the enormity of the crisis. More swift action needs to be taken.

Are there any other ideas, feedback or comments you would like to make in relation to the Climate Action Plan that is currently being developed?

I've only just moved to the area however it is very heartening to know that this issue is a priority for the council. It gives me hope and makes me proud to be a member of this community.

Bike paths and hiking trails

Selling compost bins and tumblers at cost price to public

Keeping chicken seminars

Government rebate information

There are so many other great ideas and initiatives related to climate change mitigation and adaptation options that make a real difference on the ground (and in the atmosphere!) - it would be worthwhile borrowing the best ideas for QPRC.

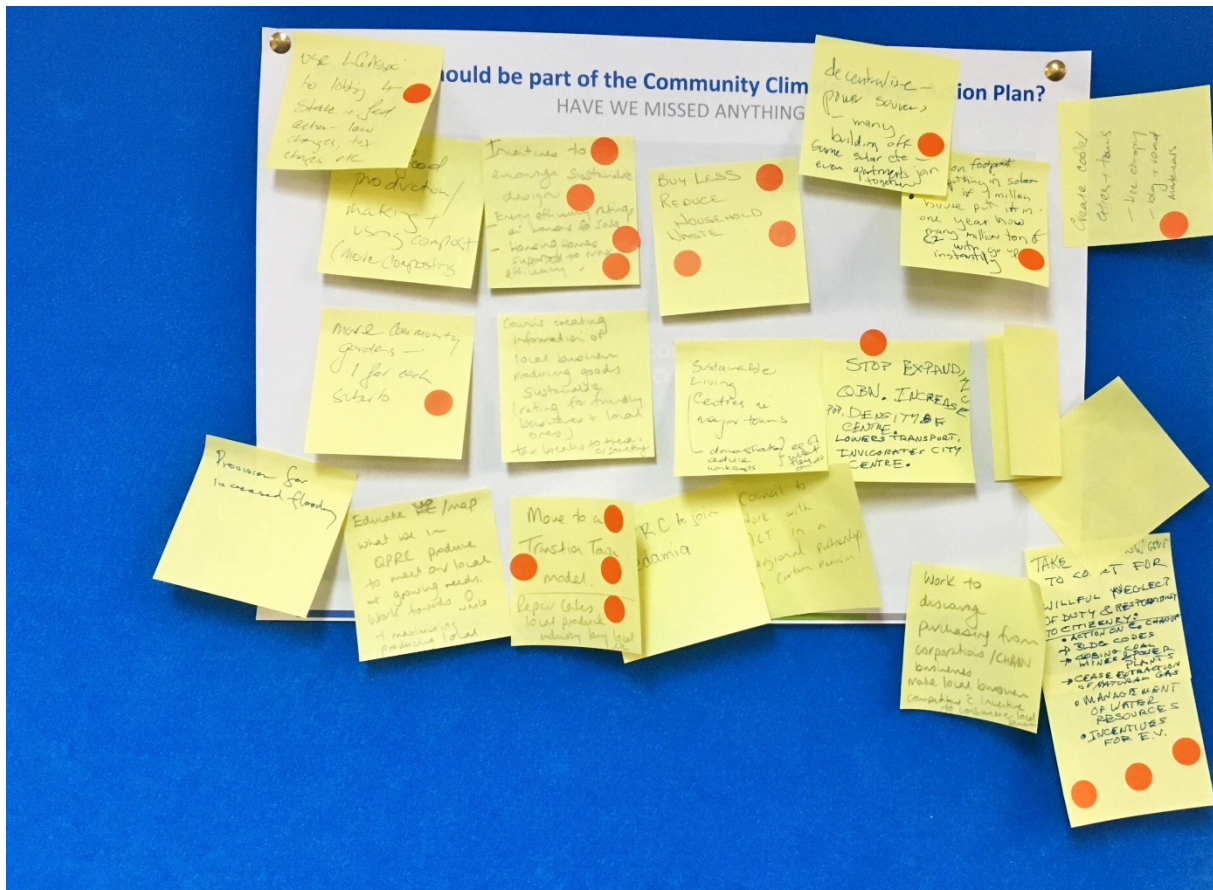
Appendix B: Impressions from the workshops



Braidwood



Queanbeyan



Appendix C: Energy Abatement supporting information

Many of the actions recommended for the Queanbeyan-Palerang community are aimed at reducing greenhouse gas emissions – i.e. climate mitigation. The ‘greening of the grid’ will aid in this; as more renewable energy projects are built the overall carbon intensity of electricity delivered in Australia will reduce.

However, Queanbeyan-Palerang is a high growth region, and with the population of the LGA expected to grow by more than 30% to 2036, local action to reduce carbon emissions is needed if overall emissions are to reduce. This will be largely focused on efforts to reduce energy demand, switch to renewable energy, and transition to electric, hydrogen and hybrid vehicles over time.

Projected growth is illustrated in the chart and table below, from profile.id.

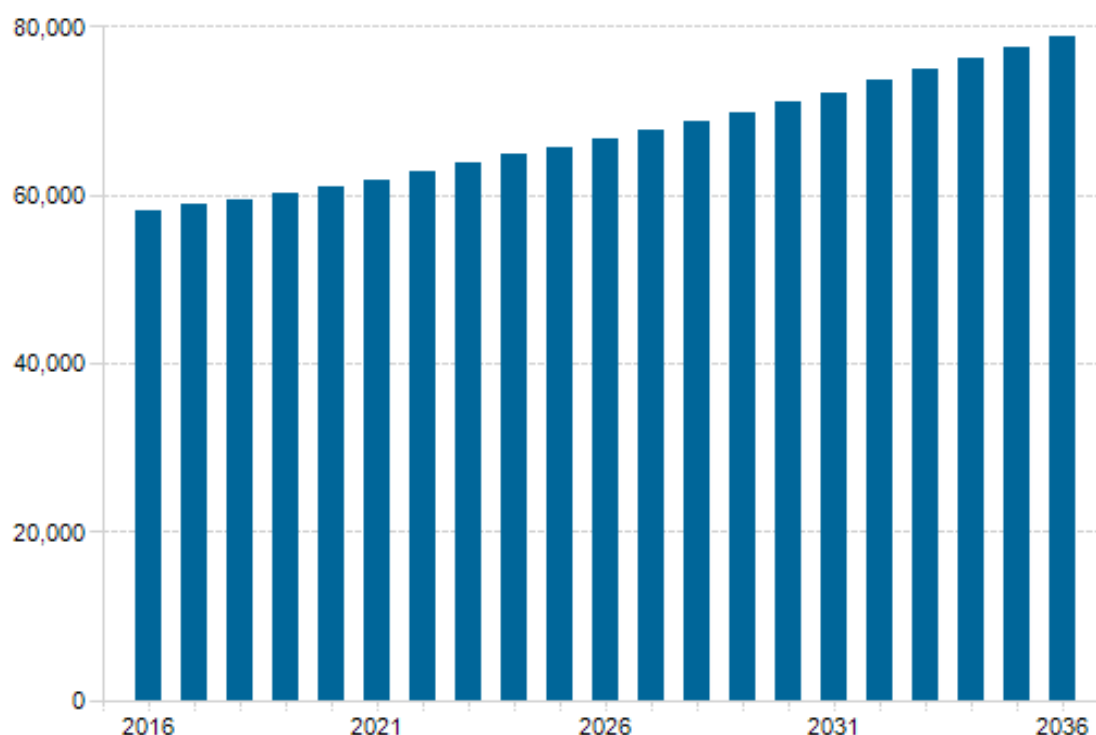


FIGURE 171: PROJECTED POPULATION INCREASE TO 2036 IN QUEANBEYAN-PALERANG¹⁴

TABLE 12: PROJECTED POPULATION INCREASE TO 2036 IN QUEANBEYAN-PALERANG

Summary	2016	2021	2026	2031	2036
Population	58,119	61,832	66,593	72,177	78,756
Households	22,636	24,332	26,260	28,447	30,890
Average household size	2.54	2.52	2.51	2.51	2.52
Dwellings	24,266	25,965	27,902	30,101	32,563

¹⁴ Population and household forecasts, 2016 to 2036, prepared by .id , the population experts, December 2017, <https://home.id.com.au>

As well as population growth forecasts, profile.id includes information about the types of dwellings in the LGA. Data for 2016 show that the majority of housing is single dwelling, with just 7.8% of dwellings being high density. Data on dwelling types is shown below.

TABLE 13: DWELLING TYPES IN QUEANBEYAN-PALERANG IN 2016¹⁵

Dwelling type	Number	%
Separate house	17,156	71.5
Medium density	4,632	19.3
High density	1,872	7.8
Other dwelling types	325	1.3
Total Private Dwellings	23,985	100.0

Vehicle ownership in the LGA is high, and data show that there are more than 36,000 motor vehicles owned by local residents. This figure will grow as the region's population continues to increase.

TABLE 14: CAR OWNERSHIP IN QUEANBEYAN-PALERANG IN 2016¹⁶

Number of cars	Number of dwellings	%	Number of motor vehicles
No motor vehicles	843	3.9	0
1 motor vehicle	6,332	29.4	6,332
2 motor vehicles	7,615	35.4	15,230
3 or more motor vehicles	4,796	22.3	>14,388
Not stated	1,947	9.0	Unknown
Total households	21,533	100.0	>35,950

Further contributing to energy demand and resultant greenhouse gas emissions in the region, there are nearly 4,700 registered businesses in Queanbeyan-Palerang. While many businesses (e.g. many in Construction) will be non-employing and/or not have business premises, most businesses will occupy premises in buildings within the LGA. The data below are taken from profile.id for 2018.

TABLE 15: REGISTERED BUSINESSES IN QUEANBEYAN-PALERANG IN 2018¹⁷

Industry	Number	%
Construction	1,117	23.8
Agriculture, Forestry and Fishing	606	12.9
Professional, Scientific and Technical Services	510	10.9
Rental, Hiring and Real Estate Services	408	8.7
Transport, Postal and Warehousing	332	7.1
Financial and Insurance Services	262	5.6
Retail Trade	220	4.7
Manufacturing	218	4.7
Administrative and Support Services	161	3.4

¹⁵ Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id , the population experts. <http://www.id.com.au>

¹⁶ Profile.id, ibid

¹⁷ Australian Bureau of Statistics, Counts of Australian Businesses, including Entries and Exits, 2016 to 2018 Cat. No. 8165.0. <http://www.id.com.au>

Health Care and Social Assistance	151	3.2
Accommodation and Food Services	145	3.1
Wholesale Trade	91	1.9
Other businesses	471	10.0
Total business	4,694	100.0

Greenhouse gas abatement opportunities in Queanbeyan-Palerang LGA

As outlined earlier, GHG emissions in Queanbeyan-Palerang LGA (stationary & transport energy and waste) are estimated to be 1,009,820 t CO₂-e in 2016/17, dominated by emissions from stationary energy (electricity and natural gas), and emissions from transport (petrol and diesel). Emissions from waste and wastewater are smaller and are being largely addressed via Council's waste master plan.

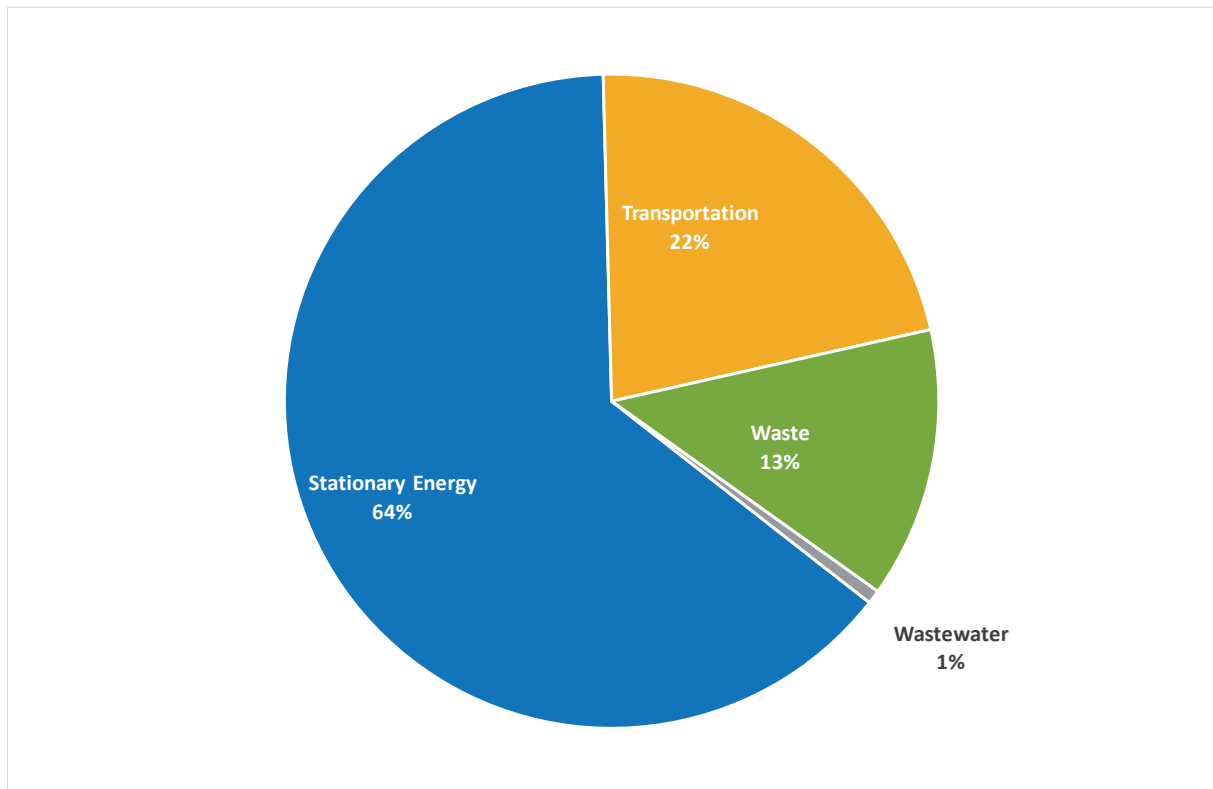


FIGURE 22: PERCENTAGE CONTRIBUTION OF EMISSION SOURCES TO THE COMMUNITY CARBON FOOTPRINT

Based on existing and emerging technologies, there is significant potential for emissions reduction:

- Solar PV uptake is at 18.9%, however the average size per residential system is just 3.7 kW, so there is considerable scope for new solar installations, and scope for existing solar PV systems to be expanded. Commercial businesses have also begun to implement solar PV (est. 10% of buildings), but there are likely to be many more opportunities for new PV. Larger solar PV systems will be able to supply energy on demand, store for later use, and power electric vehicles.
- Energy efficiency remains the cheapest form of GHG abatement, and there will be ongoing opportunities across all sectors and technologies to make further gains.

- Households and businesses can choose to buy their electricity from renewable energy sources. While there is a cost premium to do this, this has been reducing as the cost of renewables has decreased.
- With almost 25,000 dwellings and over 4,000 businesses, many hot water services will be replaced/upgraded over the next ten years, with a significant opportunity to see solar PV, solar hot water and heat pumps become the predominant forms of energy supply for this service¹⁸.
- Nearly 7,000 new residential dwellings are forecast to be built over the next 20 years, presenting opportunities to lock in low energy / renewable energy solutions at design and planning stages.
- Electric, hybrids and in the longer term potentially hydrogen vehicles will provide residents and businesses with opportunities to reduce costs and emissions by switching from diesel and petrol-fuelled vehicles.

Energy-related abatement opportunities for Queanbeyan-Palerang LGA can be considered across four broad categories as illustrated below.

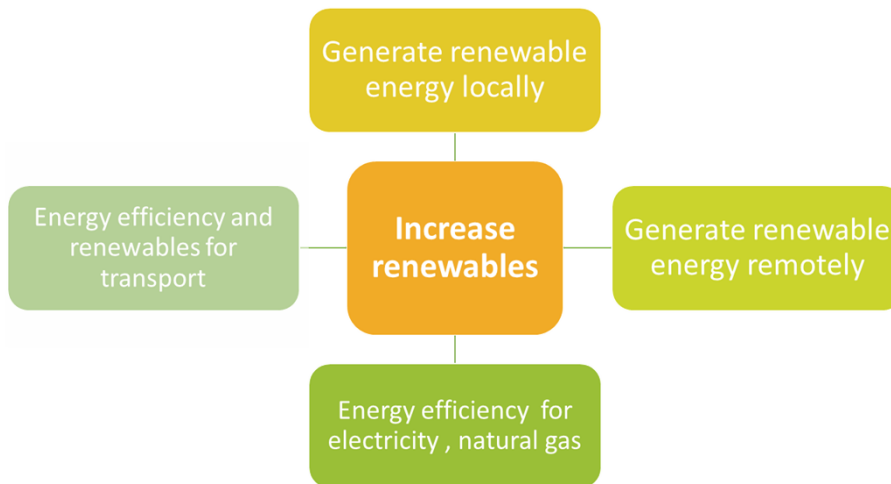


FIGURE 23: FOUR BROAD CATEGORIES OF ABATEMENT FOR QUEANBEYAN-PALERANG COMMUNITY

- **Locally generated** (within LGA) renewable energy such as solar PV and from the use of heat pumps and solar hot water.
 - Some local governments have modelled the potential for **solar PV** within their region, drawing on mapping tools such as SunSPoT¹⁹ (from APVI) as well as bespoke modelling. With a strong bias towards free-standing dwellings the capacity (i.e. useable roofspace) for solar PV in the area is very high. As batteries become more affordable and as electric vehicle market share grows, rooftop solar PV is likely to be a very significant opportunity for the Queanbeyan-Palerang area to reduce its emissions. Solutions to help renters and strata schemes to implement solar PV are also maturing and will enable this opportunity to be exploited in future. If for example two thirds of

¹⁸ NSW Hot Water Guide for Households and Businesses: <https://energy.nsw.gov.au/media/1476/download>

¹⁹ <https://pv-map.apvi.org.au/sunspot>

free-standing houses (in 2036) could implement 7 kW of solar PV each then the total potential carbon abatement would be more than 160,000 t CO₂-e from over 150 MW of solar PV capacity (at today's grid carbon intensity).

- Renewable heat is available to heat water for domestic and commercial applications. Over the next say 15 years it is likely that nearly all hot water systems in the region will be replaced and that all new hot water systems can be energy efficient and low-emissions, providing an excellent opportunity to achieve GHG savings in one of the most energy-intensive appliances used in homes. This can be via:
 - Air-source heat pumps (ASHP) for water heating that use a quarter to a third of the energy of an electric-heated system and qualify for certificates under the Renewable Energy Target scheme (RET). Where used with either solar hot water or solar PV systems, close to 100% renewable energy can be achieved.
 - Solar hot water (usually with electric or gas boost) systems are also eligible to claim rebates under the RET. Savings in energy from solar hot water systems are typically in the range 50-90% depending on location and use.
 - Ground-source heat pumps (GSHP) systems are more efficient than air-source systems. However, these are not eligible under the RET, are more expensive, and tend to be more prevalent in industrial and commercial situations.

Allied to water conservation measures such as flow control for showers, the potential abatement for hot water heating is considerable.

- **Remotely generated** renewable energy: The scope for residents and businesses in Queanbeyan-Palerang LGA to access renewable electricity is only limited by consumption levels. Hence the raw abatement potential from the purchase of renewable energy is up to the level of 2016/17 stationary GHG emissions assuming that households and businesses can also switch from gas to electricity (e.g. for hot water, heating and cooking).
- **Energy efficiency** opportunities for business and residents in the LGA (stationary energy) remains the most cost-effective way to reduce carbon emissions. Drawing on analysis by ClimateWorks Australia it is estimated that stationary energy savings potential over a 10-year period for households and businesses is around 25-30% (excluding hot water). This equates to around 160-190,000 t CO₂-e annually, based on today's grid carbon intensity.
- **Transport** energy, through the purchase of electric, hybrid and in future hydrogen vehicles: With a growing population transport fuel consumption will rise. Increased access to public transport and demand management measures may mitigate this increase, however the emissions intensity of vehicles is likely to be the main factor that could drive emissions down, with smaller and hybrid vehicles currently offering the greatest abatement potential. Going forward, electric and hydrogen powered vehicles may offer new opportunities for abatement, subject to the source of electricity used to power an EV or to manufacture hydrogen.

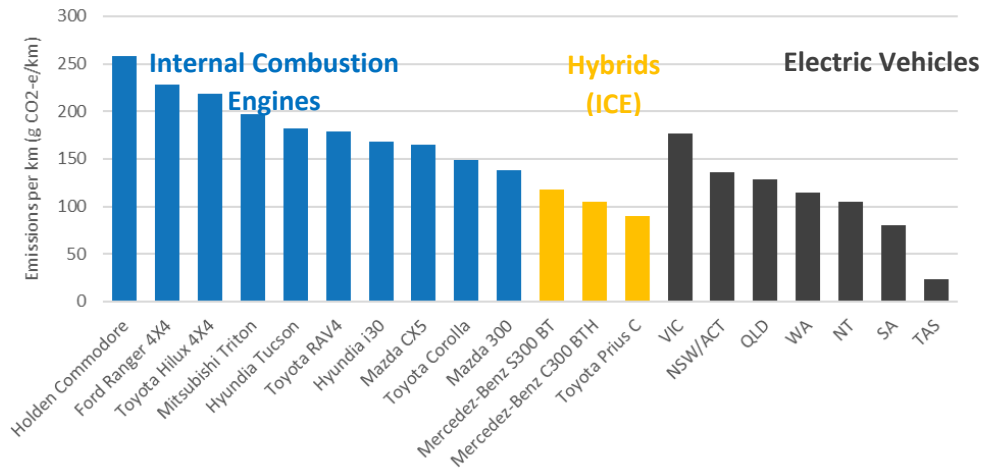


FIGURE 18: COMPARISON OF EMISSIONS PER KILOMETRE FROM MOTOR VEHICLES IN AUSTRALIA²⁰

Opportunities to unlock the abatement potential

The community is made up of many building types and many different stakeholders. There are:

- Owners-occupiers in houses, apartments and in business,
- Owners – landlords in houses, apartments and in business, and
- Tenants in houses, apartments and in business

Abatement solutions need to meet the needs of different stakeholders, in particular solutions are needed that overcome owner-tenant split incentives.

Opportunities that Council can implement or help to facilitate in coming years to see some of this potential realised are outlined below, including:

1. Measurement of whole-of-LGA GHG emissions
2. Increase solar PV uptake in separate houses and business
3. Increase solar PV uptake in strata
4. Battery storage
5. Water heating with renewables
6. Community energy
7. Peer-to-peer energy trading
8. Purchasing renewable energy
9. Energy efficiency
10. Review Council's Development Control Plan
11. Education and engagement initiatives to place greater emphasis on carbon abatement
12. Electric vehicles

²⁰ <http://www.arnhem.com.au/how-green-are-electric-vehicles/>

Measurement of whole-of-LGA GHG emissions

Description	The setting of targets for abatement calls for the establishment of a base against which future performance can be measured. A framework to report on all major GHG emissions sources should ideally be aligned with the Greenhouse Gas Protocol for Cities known as Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)²¹. <i>The GPC is the result of a partnership between World Resources Institute, C40 Cities Climate Leadership Group and ICLEI – Local Governments for Sustainability (ICLEI). It provides a robust framework for accounting and reporting city-wide greenhouse gas emissions. It seeks to:</i> ➤ <i>Help cities develop a comprehensive and robust greenhouse gas inventory in order to support climate action planning</i> ➤ <i>Help cities establish a base year emissions inventory, set reduction targets, and track their performance</i> ➤ <i>Ensure consistent and transparent measurement and reporting of greenhouse gas emissions between cities, following internationally recognized greenhouse gas accounting and reporting principles</i> ➤ <i>Enable city inventories to be aggregated at subnational and national levels</i> ➤ <i>Demonstrate the important role that cities play in tackling climate change, and facilitate insight through benchmarking – and aggregation – of comparable data</i> Through the Compact of Mayors, hundreds of cities across the globe have committed to use the GPC to report their greenhouse gas emissions. In NSW the Office of Environment and Heritage has provided financial support to a number of councils to help them prepare GPC-compliant LGA inventories including transport, and to date more than 50 Australian councils have adopted this reporting standard. This included Queanbeyan-Palerang LGA.
Council facilitation	Council can investigate methods and costs to annually or periodically update the community's emissions using a consistent GPC-aligned method, so that future emissions in the community can be tracked and reported.

Increase solar PV uptake in separate houses and business

Description	Houses & SMEs Residential and SME energy rates have increased significantly in recent years and rates from 25-30c/kWh are common. IPART guidance on feed-in-tariffs (FiT) was 11.9-15 c/kWh in 2017/18, but reduced for 2018/19 to 6.9-8.4 c/kWh as wholesale electricity prices dropped. The combination of high electricity prices, FiTs and falling solar panel prices means that the business case for solar PV is stronger than it has ever been. Medium to large Business Commercial premises often have good potential for solar PV because they often satisfy several 'attractiveness' criteria for solar; that is:
--------------------	---

²¹ <https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities>

	➤ Large roof spaces, ➤ Long-term tenure and ➤ High daytime energy consumption For the Queanbeyan-Palerang LGA three areas appear to be of significant interest in terms of solar PV potential: ➤ Queanbeyan East industrial area ➤ Queanbeyan West industrial area ➤ Queanbeyan CBD In addition to these areas there are numerous schools in the Queanbeyan-Palerang LGA. Co-benefits of schools installing PV include the education benefits that can be realised when the project outcomes are used within the education program.
Council facilitation	There are a range of options available to Council to facilitate greater uptake of solar PV on separate houses. ➤ Solution expos' that bring suppliers to the community, particularly solutions for renters (e.g. SunTenants model). ➤ Solar (PV / storage and hot water / heat pump) bulk buy (reduces capital cost of acquisition and uncertainty by selecting reputable suppliers and installers). ➤ Offering rebates for the installation of solar PV. ➤ Become a member of 'Cities Power Partnership' and have access to resources and other Councils with similar aims and objectives for the uptake of solar in their area. ➤ Map the Queanbeyan-Palerang LGA for solar capacity. Upskill, employ or hire someone to educate the community in the use of this solar resource. ➤ Install more solar on council-owned assets and promote more (e.g. develop a calendar to promote a range of RE options over a year including PV on free-standing homes, apartments, renewable heat, etc). ➤ Adopt ambitious renewable energy targets to lead the way. ➤ Review the range of solar PV advice on Council's website and update regularly to reflect changing trends. ➤ Run workshops / education sessions on renewable energy to meet the needs of more community stakeholders. There are several ways in which Council can engage with business to promote and facilitate greater uptake of solar PV. ➤ Engage with Essential Energy to lobby for incentives for large solar. Solar and storage can be very beneficial to network owners, enabling them to defer or avoid costly network upgrades. ➤ Engage directly with businesses that have suitable roof space. ➤ Chamber of commerce seminars and engagement. ➤ Subsidised feasibility assessments for solar PV. ➤ Engage with schools Parents and Friends / Communities (P&F / P&C) committees to educate on the benefits of solar (cost, emissions, education, etc). ➤ Access to pre-screened suppliers and installers, for example by extending a bulk-buy offer to the business sector.

Increase solar PV uptake in strata

Description	27% of residential dwellings in Queanbeyan-Palerang LGA are in medium and high-rise strata developments, and this will include both owner-occupiers as well as renters. Strata can be well suited to solar PV. Low-rise apartment buildings often have a good roof area relative to the number of apartments and are on residential tariffs; medium to high rise buildings tend to have 24/7 common property demand. Physically, townhouses are no different from houses. The uptake of solar PV in strata is very low due to the multitude of stakeholder's involved, poor understanding of the business case/options and low engagement. There are often competing priorities for capital works funds. However, pilot projects, early movers (with good advice) and emerging hardware and software solutions can unlock this potential. An owner's corporation may be allowed to sell electricity to its residents, or landlords to their tenants and be considered exempt sellers under AER rules. An exempt seller is different to a normal electricity or gas retailer. Exempt sellers buy the electricity and/or gas from an electricity or gas retailer and resell it to customers in a multi-dwelling building, such as an apartment building, shopping centre, caravan park or retirement village. A range of solution providers are emerging, who are seeking to develop the solar PV potential in strata schemes (owners and tenants).
Council facilitation	Strata represents a small to mid-sized opportunity for abatement from renewable energy in the Queanbeyan-Palerang LGA. Some initiatives that Council can progress include: ➤ Collate case studies of solar (and batteries) in apartments that covers both new build and retrofit scenarios and publish these on Council's website ➤ Develop a guide and/or infographic for solar on apartments, outlining the processes that may be required, possible configurations, and spelling out AER rules such as for exempt seller status, for example. At this time there are four options for how solar PV can be deployed on a strata-titled property: 1. Single system for common areas 2. Multiple systems, one per unit 3. Single system shared by all – embedded network 4. Single system shared by all – behind the meter technology solution ➤ Notify Council's interest to providers of strata / apartment solutions for solar and storage, and maintain connections for opportunities to explore innovative solutions in the Queanbeyan-Palerang community ➤ Strata seminars and engagement ➤ Solution expos' that bring suppliers to the community ➤ Smart Blocks supplier directory ➤ Green Strata supplier catalogue ➤ Extend any future bulk-buy to experienced suppliers to strata developments

Battery storage

Description	Battery storage improves the case for larger solar PV systems, which results in greater carbon reduction. The main targets at present are residential (stand-alone, in micro-grids and in Virtual Power Plants or VPPs), and utility-scale. There may be a role for batteries (fed from off-peak electricity, as well as solar) in resolving local network and transmission-level constraints. This could further enable renewables uptake. The current residential payback is around 10+ years. Some retailers offer \$0 upfront and multi-year plans for solar & storage. The principal benefit is to increase the value of savings to the end user and allow larger PV systems to be installed. For commercial / industrial users, batteries will be able to store and use solar, help with peak demand management, and allow cost-shifting from peak to off-peak. There is a lot of potential for the future use of batteries for peer-to-peer (P2P) trading. A range of options are emerging for battery storage, ranging from own-use to PPA or financed offers, to control solutions that can increase the value of each unit of energy stored via interaction with the market and other users – i.e. via P2P or in a VPP.
Council facilitation	Council can potentially play an important role in helping to increase the uptake of battery storage technology. This can be a key factor in raising the average size of solar PV systems installed in the LGA, and therefore enabling higher GHG abatement and higher levels of self-consumption of solar generation. Potential measures include: ➤ Engage with battery suppliers, retailers, Essential Energy and integrated solutions providers to develop strategies for storage & solar that will work best in the Queanbeyan-Palerang community, and provide appropriate support to prioritised solutions, ➤ Provide online content and run workshops / education sessions in the community for residents and business on battery storage.

Water heating with renewables

Description	Water heating is a sizeable percentage of energy use and carbon emissions in residences and business. Many residential water heating systems will be more than 10 years old. Turnover of all stock typically happens over a 15-year timeframe. Solar hot water and heat pumps can save 70%+ of emissions, greater if solar PV can meet daytime heating requirements. Low / zero emissions hot water heating systems are commercially viable and widely available, covering: ➤ Heat pumps ➤ Solar hot water ➤ Solar PV (e.g. diverter to hot water) ➤ (Gas heating)
Council facilitation	Council can provide information via its website and can provide links to key sites and case examples. Councils can also periodically review the marketplace for existing solutions and update information for its residents and businesses accordingly.

Community energy

Description	Community energy projects enable communities to participate actively in the response to climate change. They are renewable energy initiatives: ➤ instigated by the local community ➤ scaled to the community's own energy needs ➤ funded and owned by the community ➤ welcomed within the community ➤ accountable to their host community ➤ built and managed to maximise local jobs. Community energy can involve energy supply projects such as renewable energy installations and storage, and energy reduction projects such as energy efficiency and demand management. Community energy can even include community-based approaches to selling or distributing energy. Interest in community energy is high and in nearly all cases there are more subscribers than available shares. Current trends are an increasing focus on community projects where the host site is the user to maximise the value of solar energy generated. The benefits of community energy projects are that they demonstrate leadership, make renewable energy affordable for the host and provide a fair return on investment for community investors. They provide accessibility to renewable energy for people who cannot install solar PV. They also forge new community partnerships, provide energy education and literacy, local sustainable investment and showcase a model for further community energy projects. The roles involved with setting up and running a renewable energy project are: ➤ Host ➤ Owner ➤ Developer, financier
--------------------	--

	➤ Operator ➤ Retailer, network operator ➤ Energy buyer Anyone in the community can participate through: ➤ volunteer or pro-bono provision of labour and services; ➤ investment; ➤ purchase of resultant products and services. Community energy projects can usually be structured as a PPA or a community loan. With a PPA, renewable energy is developed and owned by the community, the host buys the energy (example: Repower Shoalhaven). With a loan, funds are raised from investors and lent to the host who builds and operates renewable energy projects. The host repays the loan (example: Lismore City Council, Farming the Sun). There is a significant body of information and 'how to' available through the National Community Energy Strategy, which was developed by the Coalition for Community Energy (C4CE). It is a collaboration of The Institute for Sustainable Futures (ISF), Starfish Initiatives, Community Power Agency, Embark, Alternative Technology Association (ATA), Total Environment Centre, E2Q. The Community Energy Strategy received input from numerous clean energy groups, like the Moreland Energy Foundation, Repower Shoalhaven, Clearsky Community Solar, New England Wind and Hepburn Wind. ARENA has also sponsored a Community Renewable Energy Financing Toolkit, which was developed by Frontier Impact Group.
Council facilitation	Council can provide information via its website on community energy and can provide links to key sites and case examples. Council could consider being a host for a community energy project. Council could facilitate presentations by community energy organisations who wish to explore opportunities in the LGA, or to have them present to groups in the community who wish to explore new opportunities themselves. For projects that do commence and find suitable hosts and business models, Council support can be used to: ➤ Provide pro-bono expertise – financial modelling, community engagement, government grant application process etc.; ➤ Provide credit backing or directly provide loan; ➤ WCC's investment horizon and return expectations may provide a better fit than commercial operators; ➤ Provide board expertise, particularly financial

Peer-to-peer energy trading

Description	"Peer-to-peer" energy trading promises to enable direct trading of energy from one party (e.g. household) to another, thereby cutting out the "middleman" and allowing transparent dealings between peers. The regulatory environment does not yet allow for peer-to-peer trading, but a number of trials using "blockchain technology" are currently being conducted.
--------------------	--

	These include those by Power Ledger in Perth and Auckland; Transactive Grid in New York; Grid Singularity in Austria and AGL in Melbourne and Adelaide. Ideally, P2P trading allows users to control the source and the destination of their power and allows them to set their own terms, especially the price. P2P trading allows producers of renewable energy to be treated the same as a power station, even if they only have a small solar PV system.
Council facilitation	➤ Targeted communications to recognised industry leaders in Clean Energy ➤ Provide online resources to include emerging opportunities in P2P ➤ Education / workshop delivery on emerging RE sourcing opportunities ➤ Engage with P2P equipment and project developers: - facilitate Queanbeyan-Palerang LGA businesses or residents as trial participants ➤ Investigate the feasibility of these opportunities for Council

Purchasing renewable energy

Description	There are multiple ways that renewables can be purchased, most obvious examples are GreenPower® and renewable energy buyers groups. However, large corporations can also buy LGCs in the spot market, or enter into a Power Purchase Agreement with a renewable energy developer. There is also an option to purchase carbon neutral electricity. This is achieved by the electricity retailer purchasing Australian and overseas carbon offsets (not necessarily based on renewable energy) to make the electricity supply carbon neutral. This option is currently only available from a few retailers. Purchasing groups are still a new idea. Establishing a corporate PPA is complex, time-consuming and contains approaches and risks not previously considered by most participants. These take time and resources to resolve. Theoretically, all of Queanbeyan-Palerang's energy demand can be met by purchasing renewable energy. This could include existing electricity demand, growth through fuel switching from gas to electricity, and future fuel switching for passenger vehicles to EVs.
Council facilitation	➤ Provide online advice on renewable energy purchasing ➤ Engage with GreenPower® to get them to present – e.g. a new Guide for business was developed including PPA options which could be promoted to business. The NSW Dept of Planning and Environment also developed a new hot water guide, so both guides could be presented to the Queanbeyan-Palerang community to promote both renewable electricity via GreenPower® and renewable heat.

Energy efficiency

Description	Energy efficiency remains the cheapest form of carbon abatement for many householders and business. Residential ➤ Energy efficient lighting solutions ➤ Heat pumps for air conditioning
--------------------	---

	➤ Solar hot water, heat pumps, solar PV for heating water ➤ Energy efficient appliances and equipment ➤ Energy Saver program by NSW Government for residential Businesses ➤ Energy efficient lighting solutions ➤ Energy efficient HVAC solutions ➤ Building Management Systems ➤ Energy efficient appliances and equipment ➤ Energy Saver program by NSW Government for business
Council facilitation	Council can help increase the uptake through the following measures: ➤ Information and awareness programs ➤ Education and training for tradespeople ➤ Audits ➤ Bulk procurement programs ➤ Incentives to replace existing lighting and appliances (e.g. link to the Energy Saver program) ➤ Engage with and/or develop a local business program to work with businesses to increase their energy efficiencies ➤ Educate Queanbeyan-Palerang businesses on changes to Section J of the Building code that will require new buildings and refurbishments to achieve significantly higher levels of energy efficiency

Review Council's Development Control Plan

Description	There has been rapid evolution in a range of technologies in recent years, including: ○ Solar/renewable technologies ○ Battery storage ○ Buildings exceeding 4.5-Star NABERS ○ Efficiency of heat pumps/reverse cycle air conditioning and appliances Changes to the BCA will set more stringent targets for energy efficient buildings, including consideration of renewable energy.
Council facilitation	Council could review and update DCP and related documents to include guidance or recommendations regarding: ○ Carbon positive precincts ○ Higher targets for NABERS & Green Star and encouragement to go beyond BASIX requirements ○ Review detailed energy efficiency requirements and update to reflect current status and technologies ○ Strengthen requirements on renewable energy – i.e. show why renewable heat for space or water heating, or solar PV should NOT be implemented ▪ For example: Require all Development Applications to include assessment of options for rooftop PV including • Technical assessment of opportunity • Financial assessment of opportunity • Proposed installation or justification for exclusion ○ Recognise emergence of battery storage ○ Include EV provisions Council planning could encourage low- and zero carbon built environments, embedding passive solar design into all new and re-developments, preserving solar access and minimising barriers to low-impact forms of renewable energy (such as PV) in the urban environment. In addition Council can review its Development Application (DA) processes as these relate to solar installations, to help ensure good communication and information flows between Council and proponents

Education and engagement initiatives to place greater emphasis on carbon abatement

Council facilitation	Business ➤ Increase the number of business events delivered that focus on existing and emerging carbon abatement topics ➤ Review resources available to business and potential to be updated to reflect current and future trends, e.g. ○ Energy Saver program ○ Revised Building Code ○ Solar potential of Queanbeyan-Palerang LGA ○ Solar in commercial strata and solar for business tenants ○ Virtual Power Plants & microgrids ○ New Greenpower guide for business ○ Power purchase agreements, buying RE, joining an RE buyers group Residential ➤ Increase the number of community events delivered that focus on existing and emerging carbon abatement topics ➤ Review resources available to community and potential to be updated to reflect current and future trends, e.g. ○ Energy Saver program ○ Virtual Power Plants & microgrids ○ Solar potential of Queanbeyan-Palerang LGA ○ Solar in residential strata and solar for residential tenants ○ New hot water guide for households and business ○ Buying GreenPower® or switching to renewable energy supplier
-----------------------------	---

Electric vehicles

Description	There are relatively few electric vehicles in use at this time, with just 0.3% of vehicle sales in Australia in 2018 being electric. However trends in sales of EVs are increasing, more states including NSW are seeing rollouts of rapid DC charge networks, and cities and towns are seeing increasing EV infrastructure rolled out that will support charging on-street, in shopping centres, in carparks, as well as in homes and businesses. A rapid-charge unit in Braidwood forms part of a network of around 40 DC charge stations being rolled out by NRMA in NSW for example. The ACT Government has committed to transition all of its passenger fleet to EV within the next few years, and many ACT government employees will reside in the Queanbeyan-Palerang area. As such there is a case for Council to assess and implement measures that will facilitate this transition and provide fuel supply security to drivers of EVs in and through the LGA.
Council facilitation	Council can potentially: ➤ Implement a local network of suitable charging infrastructure (e.g. roadside, Council carparks, at Council facilities) to support EV charging. ➤ Engage with the ACT to understand their plans and work cooperatively to develop and implement measures to support the rollout of EVs in the region. ➤ Lead by example and source EVs in Council's fleet. ➤ Link with electric vehicle providers (passenger vehicles, commercial vans and trucks, chargers, integrators, etc) to provide education and information that will assist the community to take informed decisions when purchasing vehicles.

QPRC

