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ballina shire council

Ballina Shire Council

CORPORATE EMISSIONS REDUCTION PLAN

FINAL REPORT

March 2024

ballina climate FOCUS

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Glossary of terms and abbreviations

This includes terms and acronyms that are used in this report, as well as some terms that are relevant to carbon accounting and offsetting in general.

Term	Definition
Activity data	Source data for an emissions generating activity, such as fuel usage and electricity consumption, used to determine greenhouse gas emissions through multiplication by an Emissions Factor.
ACCU	Australian Carbon Credit Unit – an emissions unit issued under the Carbon Credits (Carbon Farming Initiative) Act 2011.
AEMO	Australian Energy Market Operator
AR6	The IPCC's Sixth Assessment Reporting cycle
ARENA	Australian Renewable Energy Agency
Baseline	A scenario for what GHG emissions, removals or storage would have been in the absence of greenhouse gas (GHG) project activities.
Boundary (of emissions)	GHG accounting and reporting boundaries can have several dimensions, i.e. organisational, operational, geographic, business unit, and target boundaries. The inventory boundary determines which emissions are accounted for and reported.
Carbon account	A measure of the carbon dioxide equivalent emissions attributable to an activity. A carbon account can relate to the emissions of an individual, household, organisation, product, service, event, building or precinct. This can also be referred to as a carbon footprint or emissions inventory.
Carbon dioxide equivalent (CO_2-e)	A standard measure that takes account of the global warming potential of different greenhouse gases and expresses the effect in a common unit.
Carbon neutral	A situation where the net emissions associated with an activity are equal to zero because emissions have been reduced and offset units cancelled to fully account for all emissions.
Carbon Neutral Program & Standard (Climate Active)	Businesses that wish to have their carbon neutral status certified and recognised can participate in the Climate Active Carbon Neutral Program, administered by the Department of Climate Change, Energy, the Environment and Water. The program's Standard for making carbon neutral claims sets rules for measuring, reducing, validating and reporting emissions. The standard is available for organisations, products and services, buildings, precincts and events.
CAS	Ballina's 2012-2020 Climate Action Strategy
Category P & V	Streetlighting category P lights (local) and main category V lights (main roads)
CEFC	Clean Energy Finance Corporation
CERP	Ballina's Corporate Emissions Reduction Plan (this document)
Certified Emissions Reductions (CERs)	A unit of emission reduction generated by a CDM project. CERs are tradable commodities that can be used by Annex 1 countries to meet their commitments under the Kyoto Protocol.
Clean Development Mechanism (CDM)	A mechanism established by Article 12 of the Kyoto Protocol for project-based emission reduction activities in developing countries.
Climate Change Act 2022	The Federal Government legislated a target of 43% emissions reduction below 2005 levels by 2030 and net zero by 2050 through the Climate Change Act 2022. A new medium-term emissions reduction target for 2035 is in development
CSP	Ballina's Community Strategic Plan
DCCEEW	Australian Government Department of Climate Change, Energy, the Environment and Water: The Department leads Australia's response to climate change and sustainable energy use, and protects the environment, heritage and water. Among its services, it assesses claims of carbon neutrality and provides certified organisations, products, services or events with access to the Climate Active certification trademark. The certification trademark can be used for promoting

Term	Definition
	products or services to consumers, showcasing an organisation's action to address climate change or for other marketing purposes.
Direct GHG emissions	Emissions from sources that are owned or controlled by the reporting company.
DPOP	Ballina's Delivery Program and Operational Plan
EAP	Ballina's Environmental Action Plan
Eligible offset unit	An offset unit that has been deemed to meet the Climate Active Carbon Neutral Standard's offsets integrity principles.
Embedded/embodied/cradle-to-gate emissions	Cradle-to-gate emissions include all emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company).
Emission factor (EF)	Emissions Factors refer to numeric values that specify the kilograms of CO_2-e emissions per unit of activity.
Emission Reduction Unit (ERU)	A unit of emission reduction generated by a Joint Implementation (JI) project. ERUs are tradable commodities which can be used by Annex 1 countries to help them meet their commitment under the Kyoto Protocol.
Emissions	The release of GHG into the atmosphere.
Emissions abatement or carbon abatement	Either the removal of one or more greenhouse gases from the atmosphere or the avoidance of emissions of one or more greenhouse gases.
ERF	Emissions Reduction Fund
EV	Electric Vehicle (also EV charging)
FOGO	Food Organics and Garden Organics
GHG Protocol – Corporate Standard	The Greenhouse Gas (GHG) Protocol is an international standard for carbon accounting (https://ghgprotocol.org/)
	Supervisory control and data acquisition system (e.g. for water and wastewater systems)
Greenhouse gases (GHG)	The atmospheric gases responsible for causing global warming and climate change. The Kyoto Protocol lists six greenhouse gases – carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur -hexafluoride (SF_6) – with the addition of nitrogen trifluoride (NF_3) from the beginning of the protocol's second commitment period.
GreenPower®	A voluntary government-accredited program that enables an electricity provider to purchase renewable energy on a buyer's behalf. GreenPower® guarantees that the renewable electricity from energy suppliers meets stringent environmental standards and is additional to Australia's Renewable Energy Target.
Green Star	A national rating system for sustainable buildings
Gold Standard	A standard and logo certification mark program for non-governmental emission reductions projects in the Clean Development Mechanism (CDM), the Voluntary Carbon Market and other climate and development interventions.
HVAC	Heating Ventilation and Air Conditioning
ICT	Information and Communication Technologies, also 'Green ICT'
Indirect GHG emissions	Emissions that are a consequence of the operations of the reporting company, but occur at sources owned or controlled by another company.
Inventory	A quantified list of an organisation's GHG emissions and sources.
IPCC	Intergovernmental Panel on Climate Change
IP&R	Integrated Planning and Reporting framework for NSW local government
ISO Net Zero Guidelines	International Organisation for Standardisation (ISO) Net Zero Guidelines (IWA 422:2022), which defines net zero as "a condition in which human-caused *residual* greenhouse gas emissions are balanced by human-led *removals* over a specified time and within specified boundaries."
ISP	AEMO's Integrated System Plan for the National Electricity Market
kWh / MWh	Units of energy (electricity)

Term	Definition
LGCs	Large-scale Generation Certificates created by the generation of eligible renewable electricity
LGNSW	Local Government NSW
LPG	Liquefied petroleum gas
Offsetting	The activity of cancelling offset units
NEM	National Electricity Market
NGA Factors	National Greenhouse Account Factors, published annually by the Commonwealth to provide businesses with emissions factors to translate their activity data to emissions
NSW Climate Change (Net Zero Future) Act 2023	The NSW Government legislated a target of 50% emissions reduction on 2005 levels by 2030, 70% reduction on 2005 levels by 2035, and net zero by 2050 through the NSW Climate Change (Net Zero Future) Act 2023
NSW Electric Vehicle Strategy	Strategy to electrify government fleet by 50% by 2026, and 100% by 2030
NSW Electricity Infrastructure Investment Act 2020	An Act to facilitate the rapid transition to renewables in NSW
NSW Waste and Sustainable Materials Strategy 2041	Strategy for waste that aims to achieve 10% waste reduction, 80% recycling and 50% reduction in organics to landfill
Offset unit	Represents reductions of GHG or removals of GHG from the atmosphere by sinks, relative to a business-as-usual baseline. Offset units are tradeable and can be used to negate (or offset) all or part of another entity's emissions.
Paris Agreement	A legally binding international treaty on climate change, adopted in 2015 in Paris, and with a goal to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels."
PPA	Power Purchasing Agreement (typically to source renewable electricity)
PV	Solar PV systems
REF	Revolving Energy Fund
Removal Units (RMUs)	An emission unit issued by a Kyoto Protocol country on the basis of land use, land-use change and forestry activities under article 3.3 or 3.4 of the Kyoto Protocol.
REZ	Renewable Energy Zone
Scope	The categorising of emissions sources into direct and indirect sources. See individual definitions for scope 1, scope 2, and scope 3 emissions.
Scope 1 emissions	The release of GHG into the atmosphere is a direct result of activities occurring within a responsible entity's control (or geographic boundary).
Scope 2 emissions	The release of GHG into the atmosphere from the consumption of electricity, heating, cooling or steam that is generated outside of a responsible entity's control (or geographic boundary).
Scope 3 emissions	Greenhouse gases are emitted as a consequence of a responsible entity's activities but emitted outside the responsible entity's control (or geographic boundary).
Sequestration	The removal of atmospheric carbon dioxide, either through biological processes (e.g. photosynthesis in plants and trees) or geological processes (e.g. storage of carbon dioxide in underground reservoirs).
SPS	Sewer Pumping Station
STC	Small-scale Technology Certificates, created for small renewable energy systems under 100 kW
T5 CFL LED	Lighting technologies
UN SDGs	United Nations Sustainable Development Goals
UV / UV-LED	Ultra-violet and ultra-violet light emitting diode technology for wastewater treatment
Verified Carbon Standard (VCS)	Verra or VCS, formerly the Voluntary Carbon Standard, is a standard for certifying carbon emissions reductions. VCS is administered by Verra, a not-for-profit.

Term	Definition
Verified Carbon Units (VCUs)	An emission unit issued by the Verified Carbon Standard (VCS). Each VCU represents a reduction or removal of 1 t CO_2-e achieved by a project.
Voluntary Emissions Reductions (VERs)	An emission unit issued by the Gold Standard. VERs are a reduction in GHG from a project that is independently audited (i.e., verified) against a third-party certification standard. Each verified emission reduction represents 1 t CO_2-e.
VSD	Variable Speed Drive control (e.g. of a pump motor)
W / kW / MW	Units of power
WWTP	Wastewater Treatment Plant

Executive Summary

In 2019 Council declared a state of Climate Emergency and in response developed the Ballina Shire Council Climate Change Policy. The policy builds on Council's long history of taking action on climate change through organisational emissions reduction programs and through its corporate policies and strategies. The policy sets organisational targets of 100% renewable electricity and net zero emissions by 2030, and provides a framework for progressing climate change mitigation, adaptation, and resilience strategies for Council and the community.

The aim of this Corporate Emissions Reduction Plan (CERP) is to set out the pathway for Council to reach its 2030 climate change targets through short, medium, and long term actions and continuous improvements. The emissions plan was developed based on engagement with stakeholders, data analysis, and site visits. The biggest sources of emissions are electricity from the grid followed by diesel fuel for the vehicle fleet.

Opportunities for emissions reduction are identified within the report and are collated into an Action Plan at the end of the report for ease of reference. The key areas of emissions reduction opportunity in the short term are 'behind-the-meter solar', 'buying clean energy', and 'energy efficiency'. New areas of focus include adding Scope 3 emissions to Council's emissions profile and 'carbon sequestration and offsetting'.

The renewable electricity goal is well within reach through Council's existing electricity contracts. To achieve the net zero target by 2030 there will be challenges due to uncertainty about the timing of electric options for heavy plant and trucks. In addition, the International Organisation for Standardisation (ISO) Net Zero Guidelines have recently clarified 'net zero' and 'carbon offsetting' definitions which highlights that Council should consider aligning emissions accounting and reporting methods with international standards and commence development of a carbon offset strategy in the medium to long term to prepare for the 2030 target year and to align with global best practice.

The CERP provides a structured approach to facilitate planning and implementation of the actions to achieve Council's climate change policy objectives and goals during the target period and can be used to inform Council's Delivery Program and related annual Operational Plans.

1 BACKGROUND

Ballina Shire Council has a long history of taking action on climate change. In 2004 Council joined the Cities for Climate Protection program and commenced implementing emissions reduction and energy efficiency strategies and programs.

In 2010 Council engaged with the community to develop the 2012-2020 Climate Action Strategy (CAS) and Environmental Action Plan (EAP). The CAS and EAP provided direction for Council to integrate organisational and community climate change activities into the Community Strategic Plan.

In 2019 Council resolved to review the CAS and declared a state of climate emergency. In response, Council developed the Ballina Shire Council Climate Change Policy with 2030 corporate renewable energy and net zero goals. This Corporate Emissions Reduction Plan (CERP) sets out the pathway to achieve these goals.

1.1 STRATEGIC ALIGNMENT

Council's activities and operations are guided and directed by State and Federal Government policy. The Integrated Planning and Reporting (IP&R) framework for NSW local government provides the broader strategic direction for Council to develop its Community Strategic Plan (CSP) and Delivery Program and Operational Plan (DPOP).

These Plans translate the community's future goals, aspirations, and planning priorities into the key outcomes that the Council, other agencies, and the community will be working to achieve.

The CSP and associated strategies are Council's commitment to working in partnership with our residents, community groups and Governments to realise the community's vision:

"The Ballina Shire is safe, with a connected community, a healthy environment and a thriving economy".

Council's Climate Change Policy was prepared in line with the Community Strategic Plan, and Delivery Program and Operational Plan.

1.2 CLIMATE CHANGE POLICY AND TARGETS

Council's Climate Change Policy addresses mitigation with adaptation and resilience approaches for Council and the community. The targets are more ambitious than the NSW and Australian Governments and aim to achieve rapid emissions reduction by:

- using 100% renewable electricity for operations by 2030.
- reducing operational greenhouse gas emissions to net-zero emissions by 2030.

The ISO Net Zero Guidelines (IWA 422:2022) define net zero as "a condition in which human-caused *residual* greenhouse gas emissions are balanced by human-led *removals* over a specified time and within specified boundaries."

Net zero can be achieved by:

- **Reducing** greenhouse gas emissions at the source i.e. reducing electricity consumption and fuel use.

- **Removing** residual greenhouse gas emissions from the atmosphere after taking all possible actions. Methods include afforestation, habitat restoration, soil carbon capture, bioenergy and carbon capture and storage.
- **Offsetting** the remaining (residual) emissions that are unable to be removed using carbon credits.

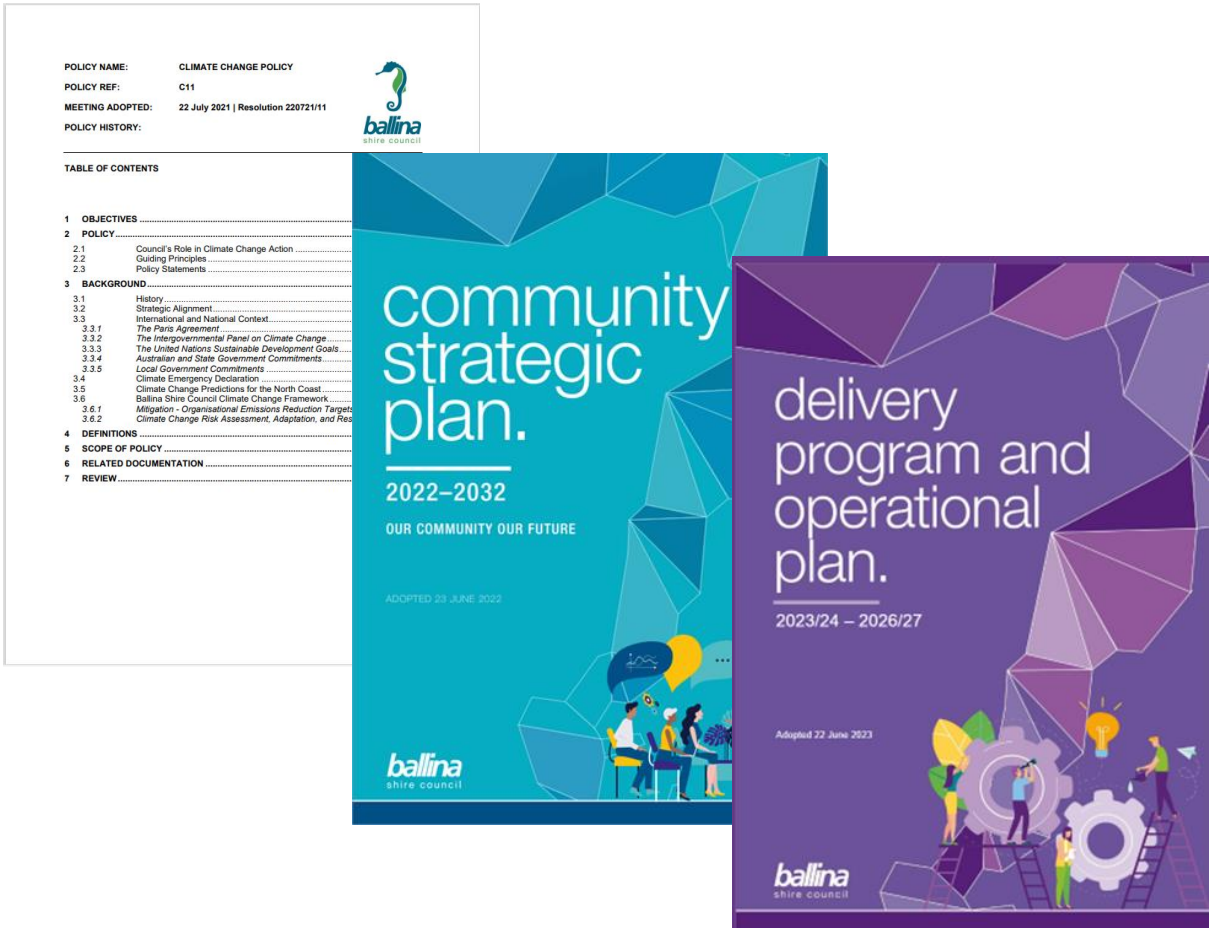

FIGURE 1: BALLINA SHIRE COUNCIL'S CLIMATE CHANGE POLICY, COMMUNITY STRATEGIC PLAN AND DELIVERY AND OPERATIONAL PLAN

1.3 WHY NET ZERO? THE GLOBAL CONTEXT

At a global level the call to action for countries to act on climate change has been increasing for several years.

The Paris Agreement, the Intergovernmental Panel on Climate Change, and the United Nations Sustainable Development Goals have been established to urge collaborative global action on climate change. Key agreements and reports that underpin international consensus to act include:

1. Sustainable Development Goals (SDGs)[1]
2. Paris Agreement[2]
3. Special IPCC report on 1.5°C warming (SR15)[3], and
4. IPCC Sixth Assessment Reporting cycle (AR6)[4]

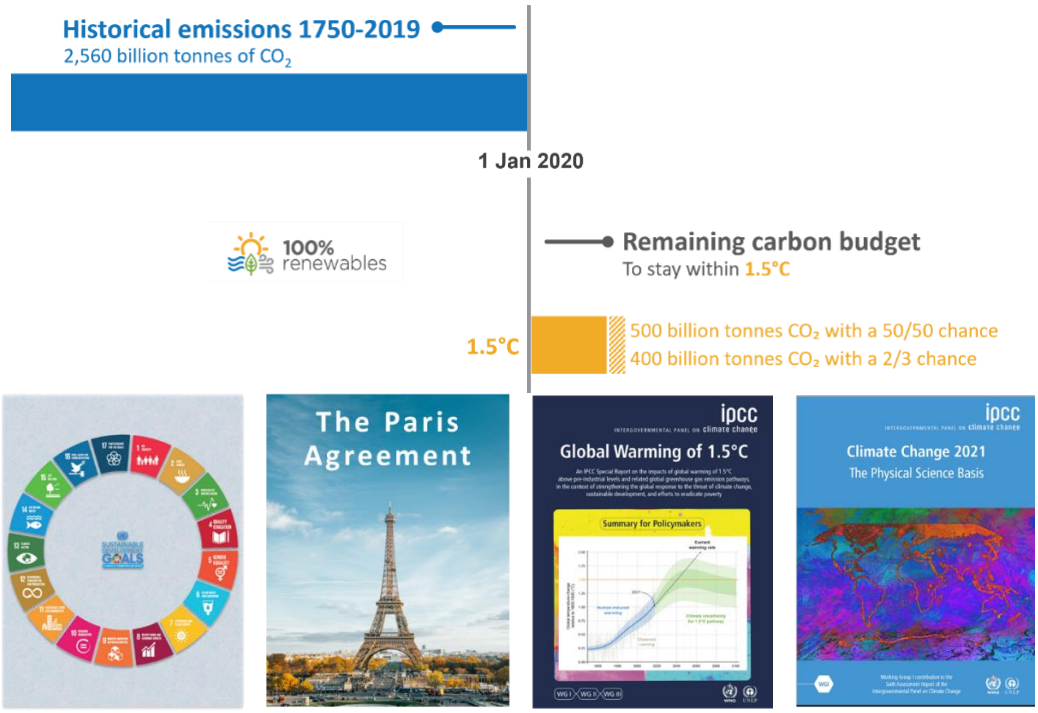

FIGURE 2: GLOBAL CONTEXT FOR ACTION ON CLIMATE

The agreements aim to keep a global temperature rise well below 2 degrees higher than pre-industrial levels, and to pursue limiting this increase even further to only 1.5 degrees. To achieve this, global carbon emissions should be Net Zero by 2050.

The Special IPCC report stated that the current global commitments may not be enough to reach the 1.5°C goal. The report indicates that prospects of succeeding will require emissions to reduce rapidly in the short term, and adaptation measures at all levels including resilience through technology, as well as changing behaviour and policy.

[1] Refer to https://www.un.org/sustainabledevelopment/development-agenda/
[2] Refer to https://www.un.org/sustainabledevelopment/climatechange/
[3] Refer to https://www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml
[4] Refer to https://www.ipcc.ch/assessment-report/ar6

According to the IPCC's report, *Climate Change 2021: the Physical Science Basis* we have emitted over 85% of all emissions we can emit if we are to have a chance of remaining within 1.5°C of warming in the long term. The chance of remaining within 1.5°C of warming in the long term will mean:

1. GHG emissions from stationary fuel combustion such as natural and LP gas are minimised, and
2. GHG emissions from electricity consumption are minimised, and
3. GHG emissions from transport fuel combustion are minimised, and
4. GHG emissions from waste to landfill and wastewater systems are minimised, and
5. Remaining emissions are offset or removed through new sequestration measures.

1.4 NATIONAL AND LOCAL CONTEXT

In Australia, the commitment to climate action is moving towards ambition at all levels of government that is aligned with the international consensus on the effort required to decarbonise by mid-century.

- In 2015 all United Nations (UN) Member States including Australia adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDG's). The link between sustainable development and limiting global warming to the 1.5°C goal by 2050 is recognised by the goal 13 for climate action (SDG 13).
- In 2015 Australia pledged to the Paris Agreement and adopted the UN Sustainable Development Goals.
- The Federal Government legislated a target of 43% emissions reduction below 2005 levels by 2030 and net zero by 2050 through the Climate Change Act 2022. A new medium-term emissions reduction target for 2035 is in development.
- The NSW Government legislated a target of 50% emissions reduction on 2005 levels by 2030, 70% reduction on 2005 levels by 2035, and net zero by 2050 through the NSW Climate Change (Net Zero Future) Act 2023, and,
- Many regional local governments and communities representing more than two thirds of NSW population are committed to deep emissions cuts by or before 2050.

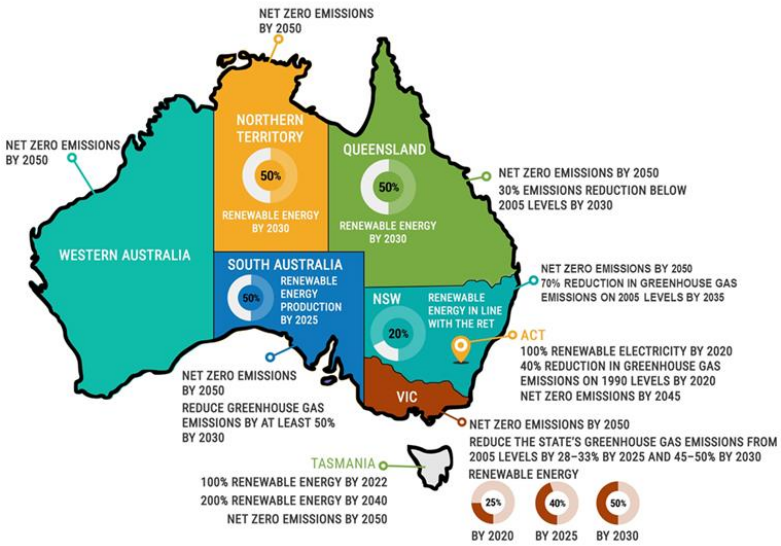

FIGURE 3: AUSTRALIA'S EMISSIONS REDUCTION GOALS ACROSS COMMONWEALTH & STATE LEVELS

To align with Council's climate emergency declaration, and to support the NSW Government targets, it is considered reasonable that Council's targets are in support of the lower of the Paris Agreements aims of limiting warming to only 1.5°C, and the IPCC's recommendation to achieve this with rapid short-term emissions reduction as well as a range of adaptation strategies.

1.5 BENEFITS OF NET ZERO

In addition to the environmental benefits, working towards net-zero emissions presents significant opportunities for councils to reduce operational costs through energy savings, to show leadership, and to align with increasing community expectations to act on climate change.

Local governments and communities across Australia are leading the way in acting on climate change. There are a wide range of commitments from targets that align State and Territory Government goals, to more ambitious targets which align with the lower Paris Agreement aim of limiting warming to only 1.5°C (Figure 4 and Figure 5).

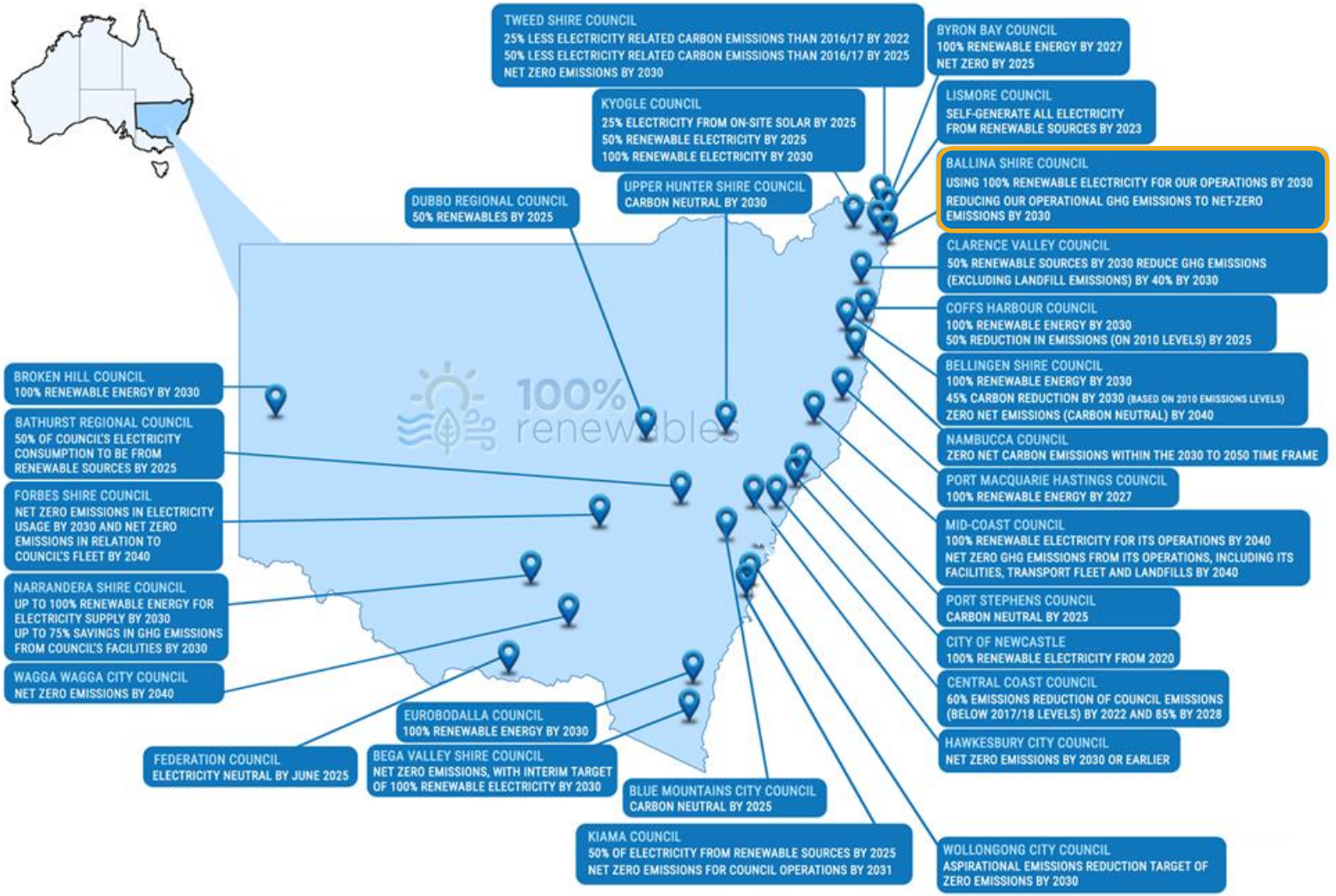

FIGURE 4: NSW LOCAL GOVERNMENTS EMISSIONS REDUCTION GOALS (2022)

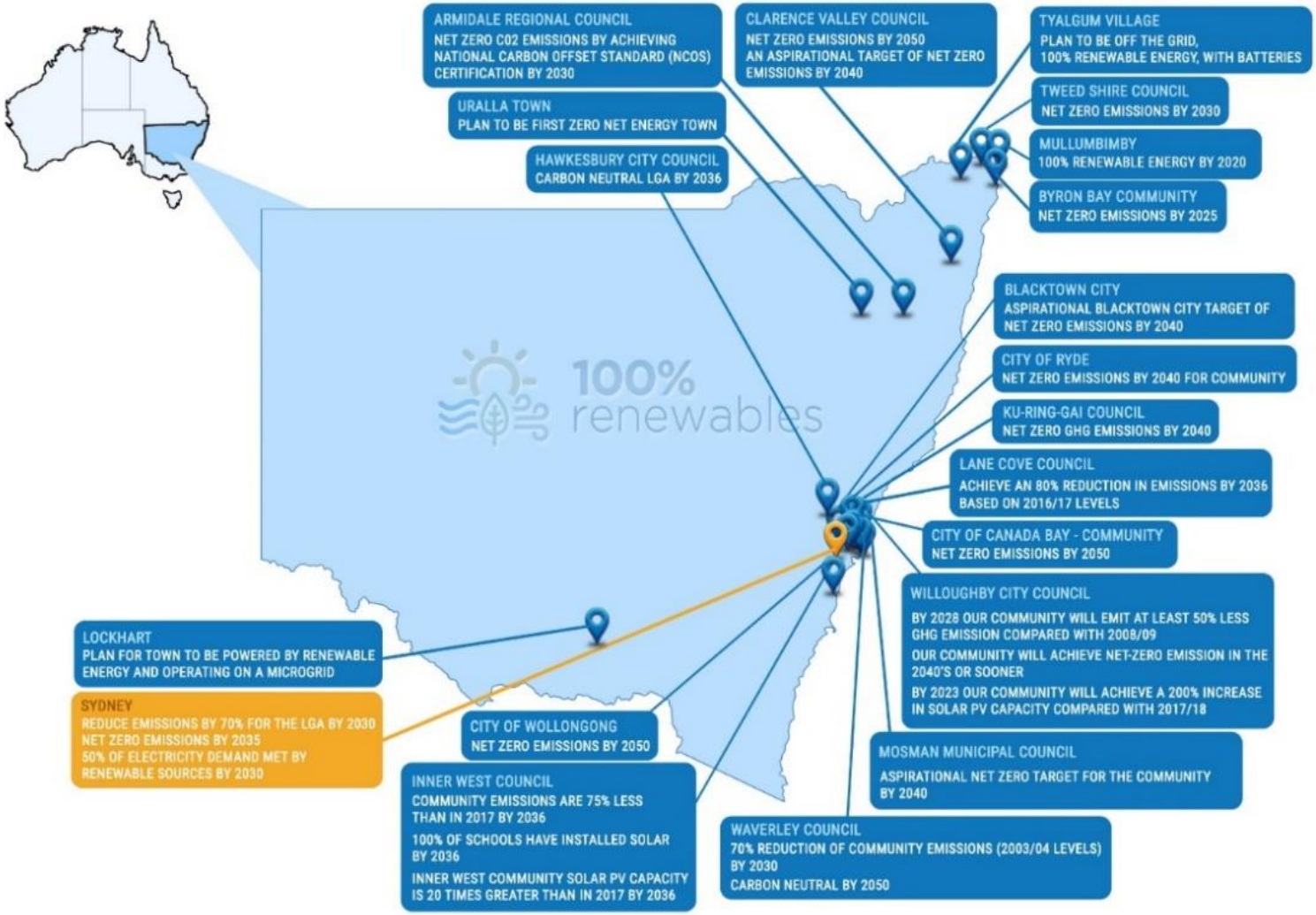

FIGURE 5: NSW LOCAL COMMUNITIES AND LGA EMISSIONS REDUCTION GOALS (2022)

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SCOPE OF WORK AND METHODOLOGY

2 SCOPE OF WORK AND METHODOLOGY

The purpose of this project was to develop a Corporate Emissions Reduction Plan (CERP) of short, medium, and long term actions that Council can implement to achieve its 2030 goals.

The plan was developed through engagement with stakeholders drawing on baseline and projection data and assessment of opportunities in relation to Council operations and assets. The three-step process "Align, Analyse, Adopt'' was used which is detailed below.

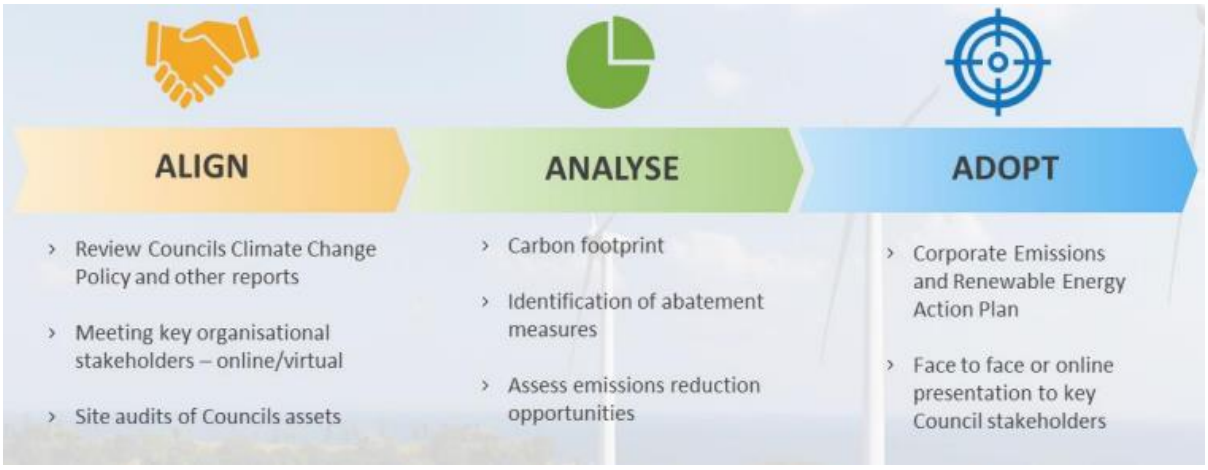


FIGURE 6: METHODOLOGY ALIGN, ANALYSE, ADOPT

Align

- Review Council's Climate Change Policy and existing strategies to enable the Action Plan to be integrated into the Community Strategic Plan (CSP), Delivery Program and Operational Plan (DPOP) and the broader strategic direction of the Integrated Planning and Reporting (IP&R) framework.
- Consult and engage with key Council stakeholders via a workshop.
- Conduct site audits of Council's assets, including streetlighting and pedestrian lighting.

Analyse

- Undertake an assessment of Council electricity, fuel, and emissions data including projection of a business-as-usual approach (BAU) to the target year.
- Identify and provide a technical assessment of short, medium, and long term energy efficiency, renewable energy, battery storage, and fleet actions to meet the net zero emissions and renewable energy targets by 2030.
- Review Council's procurement guidelines and systems and provide recommendations on modifications to align with Councils Climate Change Policy objectives and targets
- Identify emissions offset options to meet the net-zero emissions 2030 target.
- Where applicable, provide business cases for capital works based on benefits and return on investment, including capital costs, cost savings, energy savings, emissions reduction, and payback periods.

Adopt

- Council to review and make comment on the draft Action Plan prior to finalisation.
- Present the final Action Plan to key Council stakeholders and the elected Council.

2.1 STAKEHOLDER WORKSHOP

Around 20 key stakeholders across Ballina Shire Council were engaged via a face-to-face workshop to provide their input on the major opportunities available to Council to further reduce emissions, and to advise on the major barriers there are to achieving abatement targets. There were nine categories of emissions reduction opportunities reviewed which are listed below and illustrated in Figure 7.

1. Grid decarbonisation
2. Buying clean energy
3. Behind-the-meter solar
4. Energy efficiency
5. Sustainable procurement
6. Sustainable transport
7. Waste Management
8. Gas to electric technologies
9. Carbon sequestration / offsets

FIGURE 7: NINE CATEGORIES OF EMISSIONS REDUCTION OPPORTUNITY

The workshop complemented responses to a survey sent out to key stakeholders ahead of the workshop. All responses – 77 opportunities and 73 barriers / obstacles – were collated and arranged relative to emissions & abatement areas. A summary of stakeholder feedback is shown below in Figure 8 and 9.

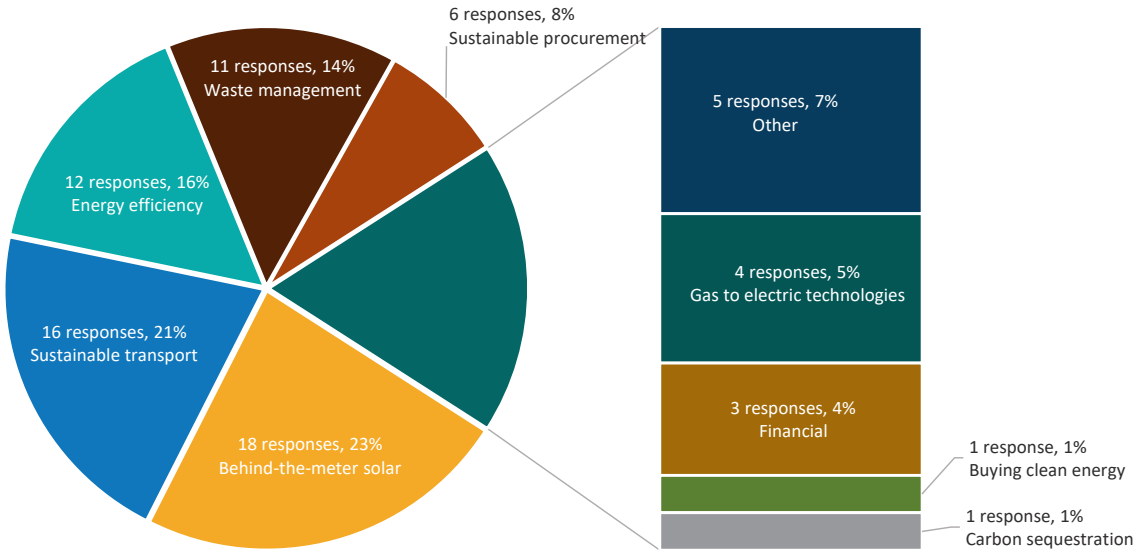


FIGURE 8: STAKEHOLDER FEEDBACK - ABATEMENT OPPORTUNITIES

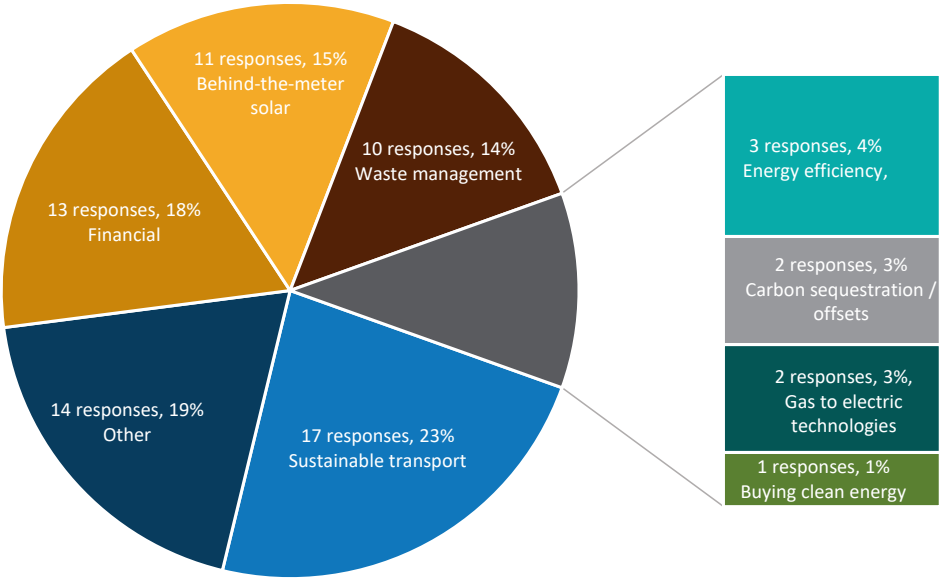


FIGURE 9: STAKEHOLDER FEEDBACK - BARRIERS TO ABATEMENT

2.1.1 KEY FINDINGS OF THE WORKSHOP

Some key findings from the workshop include:

- Overall, Council's key stakeholders see onsite renewable energy and sustainable transport (such as electric vehicles) to be the most important abatement initiatives, while energy efficiency and waste are also important. Even though not a key focus of this work, influencing value chain emissions through sustainable procurement is also an emerging area of opportunity for abatement. Opportunities for abatement through a transition from gas to

electric technologies, buying clean energy or buying offsets were not highlighted by many respondents.

- While sustainable transport abatement opportunities are recognised, stakeholders also clearly highlighted that the commercial and technology solutions to deliver this abatement potential are not yet in place, so this transition will be slow, particularly for heavy vehicles and plant.
- Barriers to the uptake of solar relate primarily to declining feed-in rates from energy retailers, the cost and availability of battery storage (that could enable larger PV systems), and physical space available to accommodate more onsite solar.
- Availability of funds to progress abatement initiatives was also recognised to be a barrier to progress, as was a range of 'other' barriers such as behavioural change, culture, and knowledge / awareness of Council's targets.

2.2 WALK-THROUGH SITE VISITS

A walk-through audit of key Council facilities was carried out to verify implemented energy efficiency and solar PV installations and to identify what new initiatives could be considered by Council to further reduce grid energy demand. The table below highlights the sites visited and the operating details.

TABLE 1: SITE VISIT SCHEDULE

Site	MWh	Rank by electricity usage	Operating details
Ballina WWTP	1,805	1	• 24/7 operation • Membrane filters, UV, recycled water supply
Lennox Head WWTP - Treatment Plant - Inlet & Treatment Process	1,801	2	• 24/7 operation • Belt press, 3 x EAT with 9 x 37kW aeration blowers
Lennox Head WWTP - Recycled Water Pump Station & Treatment Plant - UV / Recycled Treatment	116 15	15 49	• Recycled water pump station • UV membranes, low lift pumps 5 x 55kW VSD, ocean pumps 2 x 110kW • Increasing number of connections to recycled water
Streetlighting	1,324	3	• Approx 2,310 category P lights (local) • Approx 1,070 main category V lights (main roads)
Ballina Airport	894	4	• Carport solar commissioned Oct/Nov 2022 • Front extension to terminal completed in 2022 • 500,000-600,000 passengers annually, doubled over the last ~10 years
Ballina War Memorial Pool	747	5	• Open 11 months a year • 50m outdoor pool • 25m undercover pool • LPG shower heating
Alstonville Aquatic Centre	652	6	• Open 11 months a year • 50m outdoor pool at 27C • 25m undercover pool 31C
Alstonville WWTP	535	7	• 24/7 operation 2 x EAT tanks, VSD-controlled aeration blowers

Site	MWh	Rank by electricity usage	Operating details
			• Low lift pumps to recycled water system or bypass to nearby creek via UV system
Swift St, Ballina Island SPS	150	8	• Upgraded in 2018 • 2 x 55kW VSD pumps (replaced 2 x 80kW DOL)
Montwood Drive SPS	150	9	• Upgraded in 2021 • 2 pumps
Angels Beach Drive SPS	145	10	• Upgraded 2018 • 3 x VSD controlled pumps
Council Administration Centre	144	11	• Weekday operation supporting Council admin functions • Council meetings held on the ground floor
Council Operations Depot	139	12	• Limited access to site • Typical depot operations
Lennox Head Cultural Centre	125	13	• New theatre A/C installed 2020 • Solar expanded in 2020 • Solar hot water removed
Byron St SPS	123	14	• Upgraded in 2017 • Soft start control of SPS pumps
Ballina Indoor Sports Centre	56	20	• Typical sports centre operations 7 days a week, Council sports and leased agreements with sporting clubs ie basketball, futsal, hired out for meetings weekdays.

An audit of facilities and assets was conducted to identify specific energy efficiency and solar / battery opportunities beyond those already implemented and planned.

A process to progress a carbon offset strategy as 2030 nears was developed. The key policy, education/training and activities that could be amended in Council's purchasing systems have been identified to effect emissions reduction in its value chain in future (sustainable procurement). All the identified actions are set out in Section 6 and are collated into quick reference tables in Section 10.

The pathway to net-zero emissions follows the reduction hierarchy of avoid, reduce, produce and purchase as illustrated below.

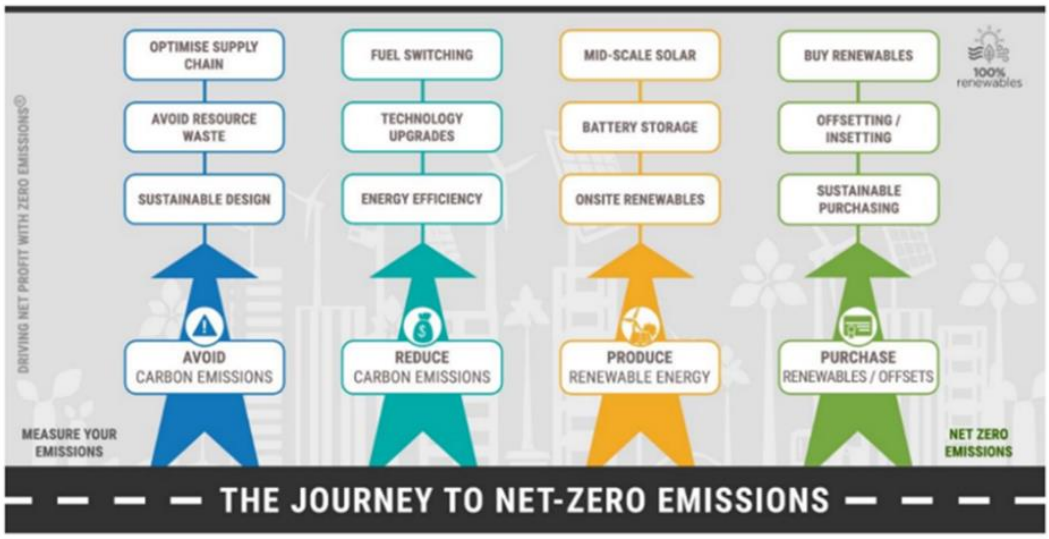


FIGURE 10: NET ZERO REDUCTION HIERARCHY

100% renewables

CORPORATE CARBON FOOTPRINT

3 CORPORATE CARBON FOOTPRINT

This section describes Scope 1, 2, and 3 greenhouse gas emissions, Council's carbon footprint, and Council's emission reduction progress since 2012.

3.1 SCOPE 1, SCOPE 2, AND SCOPE 3 EMISSIONS

To help differentiate between different greenhouse gas emission sources, emissions are classified into the following scopes according to the GHG Protocol[5] – Corporate Standard:

- **Scope 1 emissions** are emissions directly generated at Council's operations such as emissions from driving company cars, or refrigerant gases in air conditioning equipment. It also includes fugitive emissions from Council's wastewater treatment processes. Fugitive emissions are gases released during the treatment processes at Council's treatment facilities.
- **Scope 2 emissions** are caused indirectly by consuming electricity. These emissions are generated outside the organisation (think coal-fired power station), but the organisation is indirectly responsible for them.
- **Scope 3 emissions** are also indirect emissions and happen upstream and downstream of your business. Typical examples are staff commute, air travel, the purchase of goods and services, contractor emissions, or leased assets. Landfill waste is considered to be an upstream Scope 3 source for Ballina since Council transports waste to be managed outside of Ballina.

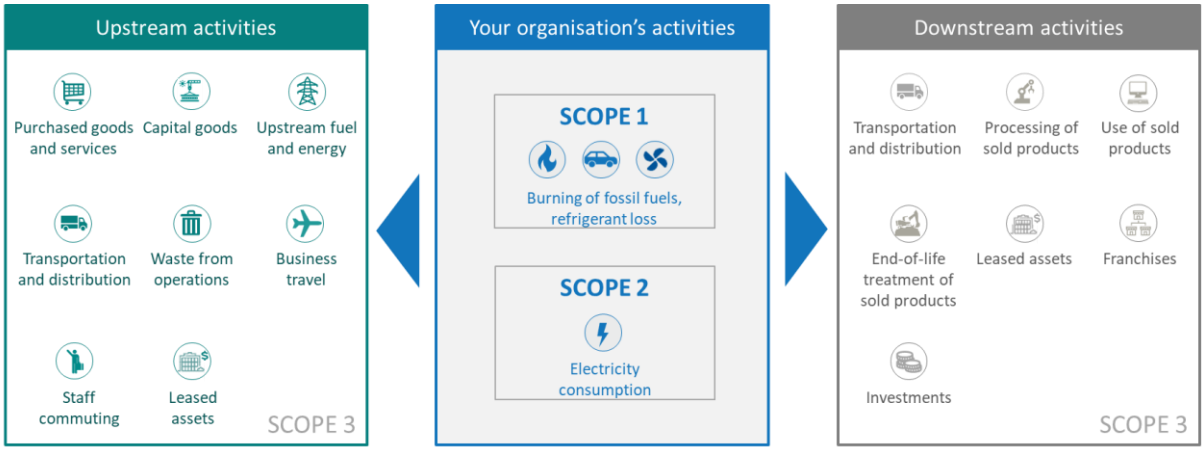


FIGURE 11: SCOPE 1, SCOPE 2, AND SCOPE 3 EMISSIONS (UPSTREAM AND DOWNSTREAM)

[5] https://ghgprotocol.org/

3.2 SCOPE OF BALLINA SHIRE COUNCIL'S CARBON FOOTPRINT

Council can have an immediate and meaningful influence on emissions reduction through the management of its own operational emissions because it can act directly on these emissions and account for them relatively easily. Council's key focus is on Scope 1 and 2 emissions - fuel and electricity consumption, with some indirect Scope 3 emissions as listed below:

Scope 1: Organisational fuel consumption and fugitive emissions from wastewater treatment processes.

Wastewater fugitive emissions are escaped gases from the collection and treatment systems. These emissions are accounted for in Council's footprint, however, opportunities to reduce these emissions and methods to measure any emissions reductions are limited and are therefore not reviewed for actions in this plan. Electricity usage from wastewater treatment processes are Scope 2 emissions and are addressed throughout this plan.

Scope 2: Organisational electricity consumption.

Scope 3: Indirect emissions related to energy usage and waste management. Landfill waste is an upstream Scope 3 source since Council transports waste to be managed outside of Ballina.

Other Scope 3 emissions in Council's value chain are currently excluded. This is because Scope 3 emissions have historically been more difficult to analyse. However, carbon accounting methods have improved, and global standards have been developed and it is now more common for councils to incorporate Scope 3 emissions into their carbon accounting and goals.

While all Scope 3 emissions have not been included in this plan, experience with other councils suggests that annual emissions could be uplifted by at least 40% on top of operational energy and waste emissions, and potentially much more if all capital works and investments were included.

Should Council seek to target being net zero for all its emissions sources these would include, for example:

- Scope 1 emissions from refrigerants used in Council's air conditioning and refrigeration systems.
- Scope 3 emissions in Council's supply chain, for example, organisations will typically include emissions in their purchased goods and services, at least for all operational expenditure, such as paper, business travel, services provided by other businesses to Council, leased assets and water consumption.
- Scope 3 emissions for staff commuting to work and net emissions for staff working from home.
- Other scope 3 emissions, such as those embedded in materials used for capital works, other capital works expenses, Council's investments, and the like could also be included.

To account for these additional emissions, Council should consider aligning emissions accounting and reporting methods with the ISO international standards and the GHG Protocol. This is discussed further in Section 6.8.

3.3 COUNCIL'S EMISSIONS REDUCTION PROGRESS 2012 - 2022

Over the past 10 years Council has put significant effort into implementing actions to reduce and transparently report on its emissions and the organisation's carbon footprint.

These actions have reduced operational emissions and protected Council from the full impact of price rises and increased costs due to organisational growth and general population growth. Key projects are summarised below and detailed in Table 2 and 3.

- Lighting in most Council buildings has been upgraded to LED technology, and this is the standard for all new installations. Many buildings' air conditioning systems have also been upgraded with more energy efficient heat pumps.
- Variable speed drives, SCADA upgrades and blower optimisation projects have been implemented across sewerage pumping and treatment works across Ballina since 2016.
- From 2017 to 2021 Council installed 11 solar farms at Council sites, across treatment plants, administration, and leisure / community buildings. In 2022 Council's portfolio of solar farms grew further to include solar shade structures at the Ballina Byron Gateway Airport carpark, and a combined 150kW of solar at the Alstonville and Wardell Wastewater Treatment Plants, using the innovative 5B Maverick solar solution.
- An LED streetlighting upgrade took place in 2018, including the replacement of 2,310 Category P (residential) lights with LED technology, with a second phase to upgrade main road lighting implemented in 2022/23.
- Council established the Energy Management Group (EMG) in 2019 to direct the Council's resources to sustainable energy usage across operational and community assets.
- Through its electricity agreements Council will begin to source more power from renewable energy sources in coming years.

The impact of these initiatives is illustrated in Figure 12. Emissions could have increased by as much as 55% in the 10 years from 2012 to 2022 if no emissions reduction action was taken.

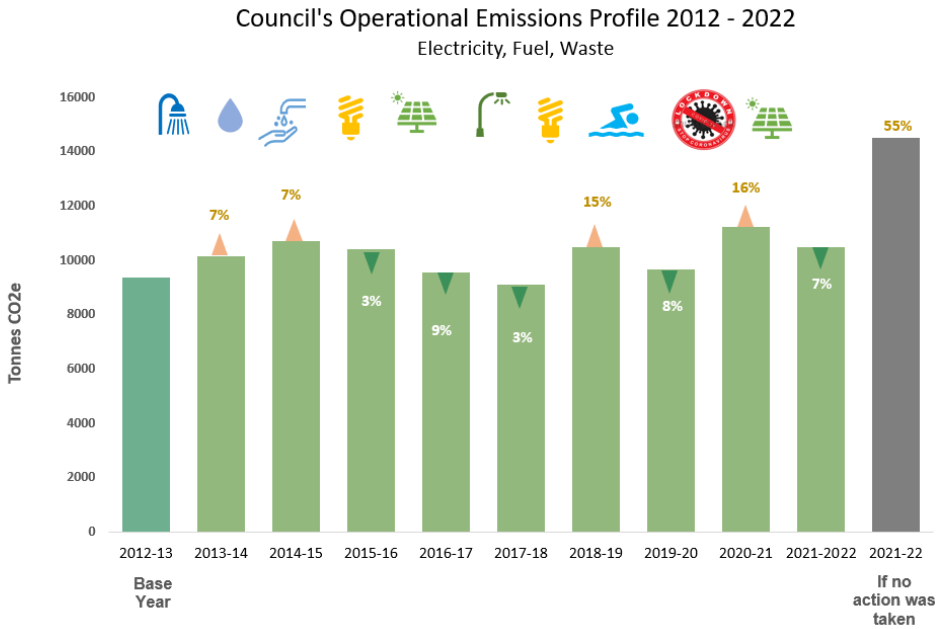


FIGURE 12: COUNCILS OPERATIONAL EMISSIONS PROFILE 2012-2022

TABLE 2: EXISTING SOLAR PV SYSTEMS AT COUNCIL SITES

Existing solar PV locations	Capacity, kW	Year Installed	Annual generation, kWh
Ballina Wastewater Treatment Plant	300	2017	438,000
Lennox Head Cultural Centre	80	Upgraded to 80 kW in 2020	116,800
Alstonville Cultural Centre	10	2018	14,600
Council Administration Centre	70	2020	102,200
Ballina War Memorial Pool	67	2018	97,820
Alstonville Aquatic Centre	67	2018	97,820
Ballina Indoor Sports Centre	66	2019	96,360
Waste Centre	50	2019	70,000
Kentwell Community Centre	20	Upgraded to 20kW in 2020	29,200
Ballina Library / Richmond Room	10	2020	14,600
Works Depot	90	2021-22	131,400
Ballina Airport	94	2022-23	131,600
Alstonville WWTP	100	2022-23	163,000
Wardell WWTP	48.6	2022-23	62,000
Existing Generation Capacity	**1,073**		**1,565,400**

The table below builds on information about energy efficiency initiatives already implemented and additional observations from site visits.

TABLE 3: ENERGY EFFICIENCY MEASURES IN PLACE

Site	Efficiency / Renewable Energy Measures implemented
Ballina WWTP	• Energy efficient / optimised membrane blowers in 2016 • Permeate pumps VSD • Transfer pumps VSD • Recycled water pumps VSD • Power factor correction
Lennox Head WWTP - Treatment Plant - Inlet & Treatment Process	• 9 x 37kW VSD drives, DO control *(since postponed, to be addressed under the LWWTP Masterplan)* • Power factor correction
Lennox Head WWTP - Recycled Water Pump Station & Treatment Plant - UV / Recycled Treatment	• 5 x 55kW VSD drives for low lift pumps
Alstonville WWTP	• Aeration blower drives with VSDs and upgraded DO • Power factor correction • SCADA upgrade
Wardell STP	• VSD controlled aeration blower drives VSDs with DO • Power factor correction
Streetlighting	• 2,310 Category P (residential) lights upgraded with LED technology in 2018. • Upgrade to 1,070 Category V (main road) lights with LED approved in July 2022 and substantially completed by 2023

Site	Efficiency / Renewable Energy Measures implemented
Ballina Airport	• All carpark lights are LED • Indoor lighting upgraded to LED • Some airside LED lights installed
Ballina War Memorial Pool	• 250kW & 150 kW heat pumps for pool heating (4.6/5.0 COP) • 3 x recirculating pumps with VSD, running at ~33 Hz • Pool covers / blankets (always applied indoor, wind permitting outdoor)
Alstonville Aquatic Centre	• 250kW & 150 kW heat pumps for pool heating (4.6/5.0 COP) • 3 x recirculating pumps with VSD, running at ~34 Hz • Pool covers / blankets
Swift St, Ballina Island SPS	• Upgraded pumps from 250 kW DOL to 150 kW VSD driven motors, operating at ~33 Hz
Montwood Drive SPS	• 2 x VSD controlled pumps
Angels Beach Drive SPS	• 3 x VSD controlled pumps
Council Administration Centre	• Lighting upgraded to LED • Air conditioning systems upgraded to Actron Air multi-unit splits – user controls per floor / zone • Locks on sensor switches (to stop accidental switching off of sensors) • Timer installations – all lights to go off at same time, except security.
Council Operations Depot	• Most lights upgraded to LED
Lennox Head Cultural Centre	• Most lighting upgraded to LED • New air conditioning system installed for the main theatre
Alstonville Cultural Centre	• Air-conditioning in library and theatre hall (energy recovery units)
Ballina Indoor Sports Centre	• LED lighting
LED facility lighting	• Implemented across most Ballina Shire Council sites including buildings, toilet blocks, etc, including a lighting audit at sites in 2020
VSD upgrades	• 15 x pumps stations upgraded from 2018, incl large sites noted here, and including Wollongbar Pump Station, Basalt Court Pump Station and East Ballina Pump Station

Outside of Council's operations and waste, Council also works with the Ballina community to support its efforts to reduce emissions, including:

- Promotion of government solar and energy efficiency initiatives and programs
- Transport initiatives including Bike Week, National Ride2School Week, National Walk Safely to School Day and Northern Rivers Carpool initiative
- Active transport infrastructure (shared pathway network)
- Open space and healthy living strategies
- Community education (transport, water, waste, energy)
- Organic waste education and diversion
- Urban forest and greening strategies
- Forward planning for electric vehicle infrastructure
- Smart water metering service
- Advocating State and Federal Governments for legislative changes and support

100% renewables

COUNCIL'S CARBON FOOTPRINT – BASE YEAR FY2019

4 COUNCIL'S CARBON FOOTPRINT BASE YEAR - FY2019

The financial year 2018-19 (FY2019) was selected as the base year for this emissions plan as it represents a typical operational year for the council before the impact of COVID-19.

Council's carbon footprint for FY2019 is estimated at 11,799 t CO_2-e as tabulated and graphed below.

Around 75% of Council's estimated greenhouse gas emissions were from electricity for facilities and streetlighting.

Fuel use for vehicles accounted for around 15% of emissions, while emissions from wastewater processes, transported landfill waste and LPG accounted for the remaining 10%. The emissions were calculated in accordance with the emission factors prescribed in the National Greenhouse Accounts Factors 2019.

TABLE 4: FY2019 CARBON FOOTPRINT BY SOURCE

Emission source		Activity data	Units	Scope 1 t CO_2-e	Scope 2 t CO_2-e	Scope 3 t CO_2-e	Total t CO_2-e	%
	Diesel	582	kL	1,585	-	81	1,666	14.1%
	Petrol	71	kL	164	-	9	172	1.5%
	LPG	15	kL	24	-	1	25	0.2%
	Electricity	8,456,035	kWh	-	6,680	761	7,610	64.5%
	Streetlighting	1,367,467	kWh	-	-	1,203	1,231	10.4%
	Wastewater	882	t CO_2-e	882	-	-	882	7.5%
	Landfill waste	212	t CO_2-e	-	-	212	212	1.8%
	Total			**2,655**	**6,680**	**2,267**	**11,799**	**100.0%**

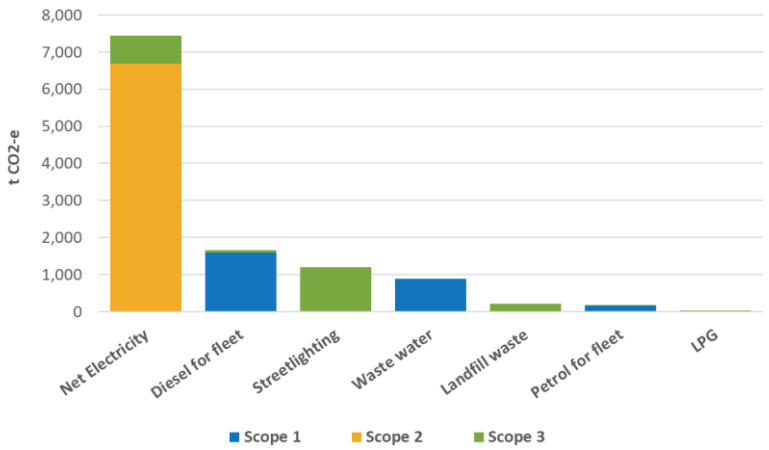


FIGURE 13: BALLINA SHIRE COUNCIL - FY2019 CARBON FOOTPRINT BY SOURCE

4.1 TREND IN CARBON FOOTPRINT SINCE THE BASE YEAR

The chart below shows the trend in Council's operational emissions since FY2019.

Emissions declined by around 7% in FY2020 due to the reduction in electricity usage from the first LED streetlighting upgrade, and COVID-19 lockdowns and facility closures. Emissions rebounded in FY2021 as the Council returned to normal operations with a 6% emissions increase compared to pre-COVID levels. As a direct result of continued energy efficiency initiatives, the Council was able to curb this rise, and emissions in FY2022 were slightly lower than their pre-COVID emissions in FY2019.

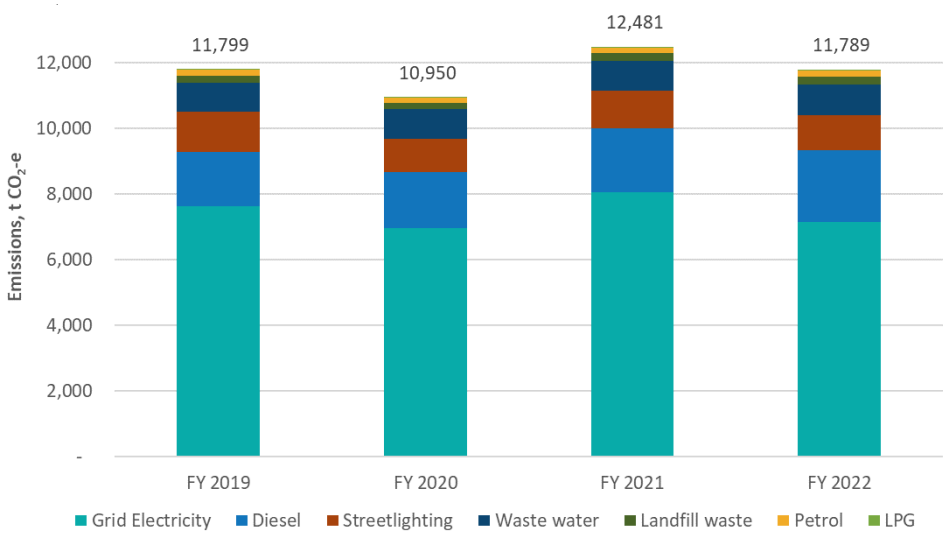


FIGURE 14: BALLINA SHIRE COUNCIL - LAST FOUR-YEAR TREND IN GHG EMISSIONS

The activity data for each emissions source over this 4-year period is tabulated below.

TABLE 5: FOUR-YEAR EMISSIONS DATA

Emission source		Units	FY 2019	FY 2020	FY 2021	FY 2022
	Diesel	L	582,436	598,126	675,726	764,485
	Petrol	L	70,178	64,030	72,434	82,289
	LPG	L	15,338	11,851	18,263	17,368
	Electricity	kWh	8,456,035	7,907,915	9,258,647	8,828,493
	Streetlighting	kWh	1,367,467	1,149,689	1,324,440	1,310,990
	Wastewater	t CO_2-e	882	894	906	922
	Landfill waste	t CO_2-e	212	199	231	236

4.2 LARGE EMISSIONS SOURCES: ELECTRICITY TREND

With electricity accounting for around 75% of included emissions, the chart below highlights the trend for this source over the past four years. The effect of the COVID-19 lockdowns can be seen in FY2020 with an obvious decrease in electricity consumption.

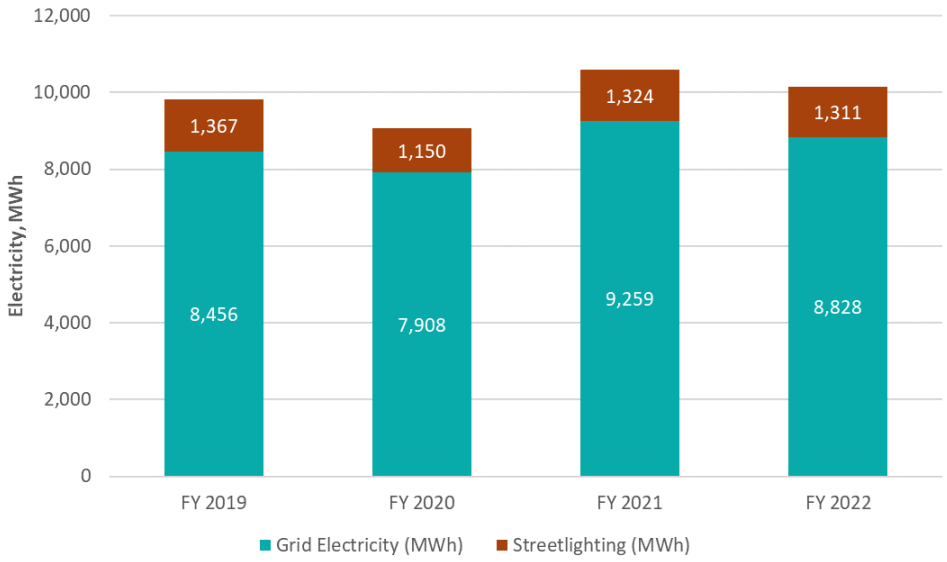


FIGURE 15: BALLINA SHIRE COUNCIL - LAST FOUR-YEAR TREND IN ELECTRICITY USAGE

4.3 LARGE EMISSION SOURCES : DIESEL TREND

With diesel accounting for 14% of total emissions, the chart below highlights the trend in data for this source over the past four years. There has been a steady increase in diesel usage.

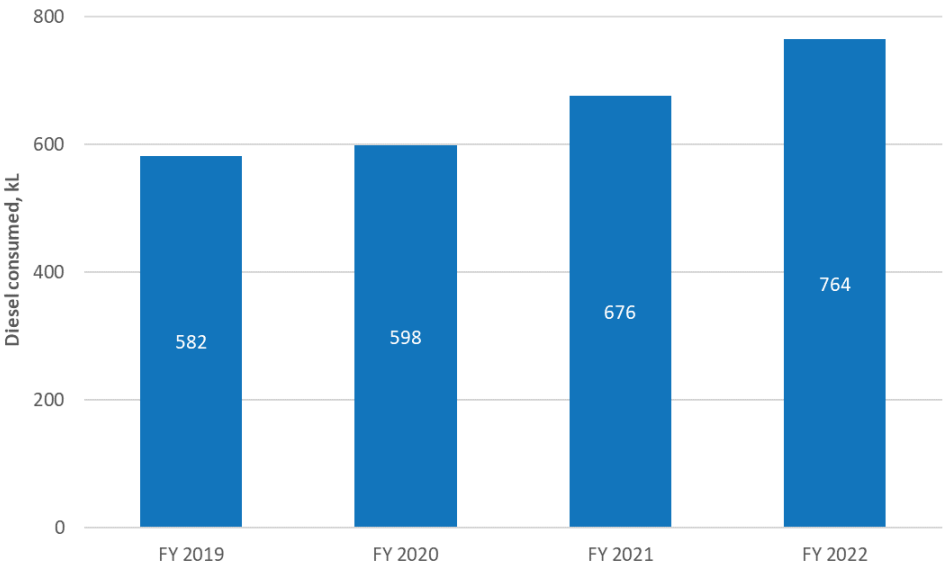


FIGURE 16: BALLINA SHIRE COUNCIL - LAST FOUR-YEAR TREND IN DIESEL USAGE

4.4 ELECTRICITY USE BY ASSET TYPE AND EQUIPMENT

Based on FY2019 data, it is estimated that just five asset types consume 94% of all power. Sewage treatment plants account for 40% of Council's power use, while buildings use 15%, unmetered street lighting uses 14%, swimming pools 13% and water and sewer pumping 12% (Figure 17).

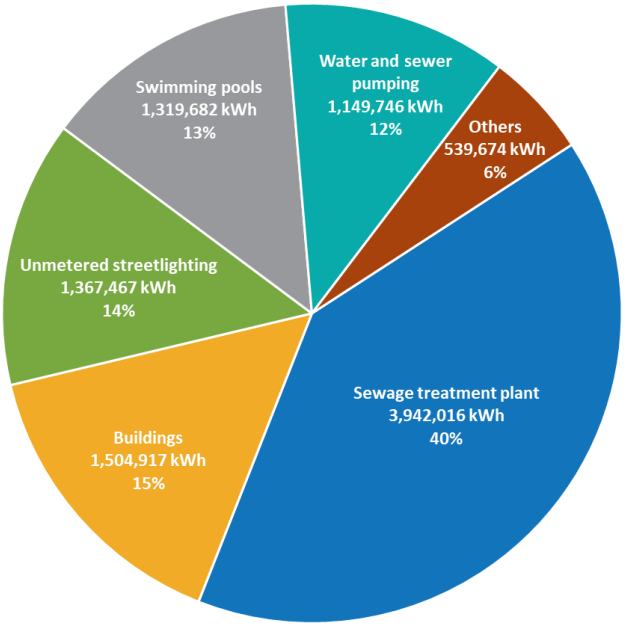


FIGURE 17: BALLINA SHIRE COUNCIL - TOP 5 ELECTRICITY CONSUMING ASSET TYPES

Almost 80% of power is consumed by just two equipment types - motor systems (mainly in sewer treatment, sewer pumps and pool pumps) and public lighting (mainly public streetlight), (Figure 18).

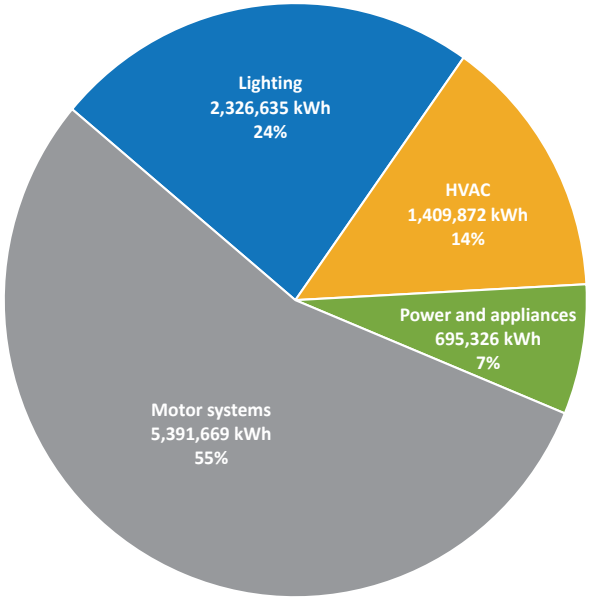
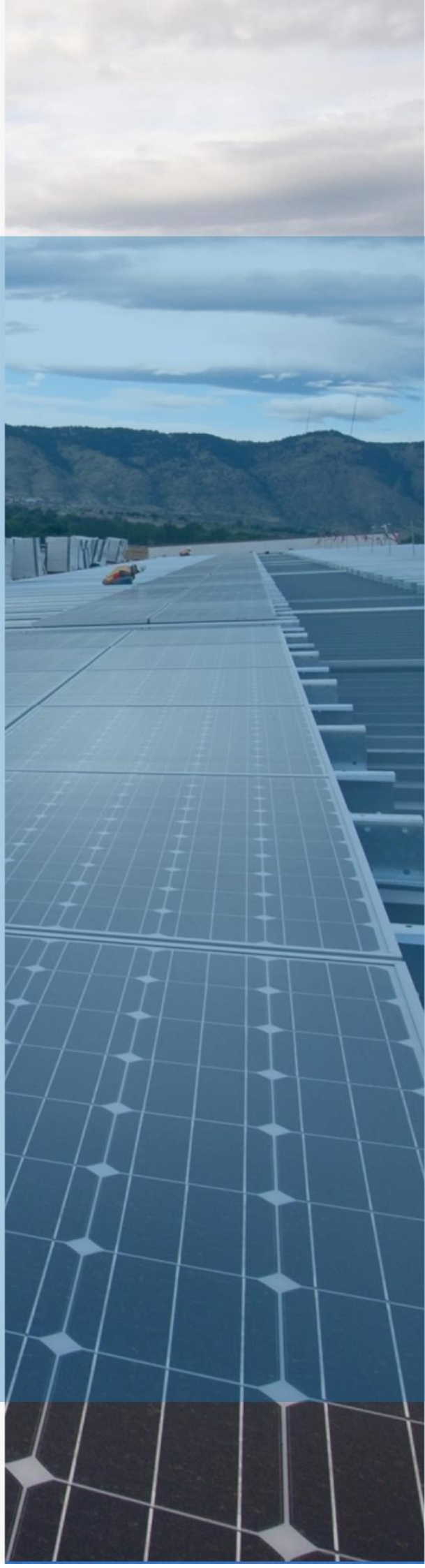


FIGURE 18: BALLINA SHIRE COUNCIL - ELECTRICITY CONSUMPTION BY EQUIPMENT

100% renewables

BUSINESS-AS-USUAL EMISSIONS FORECAST TO 2030



5 BUSINESS-AS-USUAL EMISSIONS FORECAST TO 2030

The Business as Usual (BaU) forecast is used to determine Council's emissions change from the base year FY2019 to the target year FY2030 if no further emissions reduction actions took place. Typically, the BaU forecast would result in emissions rising in line with population growth - around 1% per annum. However, as renewable energy inputs to the NSW grid increase the grid is expected to continue to rapidly decarbonise. This is discussed further in section 6.1.

With grid decarbonisation factored into the BaU forecast it is estimated that emissions will be around 30% less in 2030 than in FY2019 as illustrated by the grey section in Figure 19 below. The 2030 net zero pathway is modelled compared to this BaU baseline.

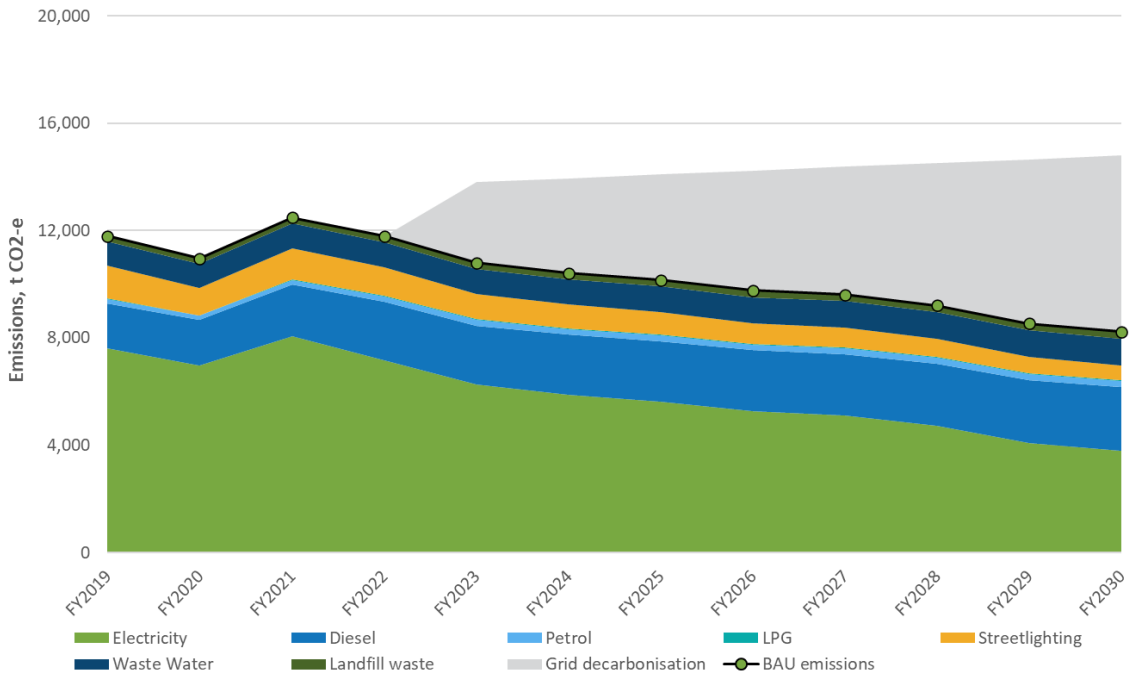


FIGURE 19: BALLINA SHIRE COUNCIL - FORECAST BUSINESS-AS-USUAL EMISSIONS TO 2030

Note that current and past grid emissions factors for electricity are based on market-based emissions factors for the National Electricity Market (NEM) (published annually), whereas forward estimates use grid emissions intensity factors modelled by the Commonwealth Government (DISER, 2021, DCCEEW since 2022), modified to address differences between location-based and market-based emissions factors. Differences will continue to exist between forecast and actual emission factors. However, the overall trend to a decarbonised grid means that electricity emissions by the end of the period to 2030 are likely to be close to the actual.

Similarly, Scope 3 emissions for fuels are reported in NGA Factors 2022 to be higher than was the case in previous years, and these and other factors may change further over time.

5.1 WHAT IS MISSING FROM COUNCIL'S CARBON FOOTPRINT?

Council's current footprint does not include Scope 3 emissions, which are discussed in more detail in Section 3.2. While all Scope 3 emissions are not accounted for in this plan experience with other councils suggests that annual emissions could increase by at least 40% and potentially much more if all capital works and investments were included.

If this 'rule-of-thumb' is applied to Council's emissions projection to 2030, the BaU scenario could look like the chart shown below, with the brown coloured section illustrating the 40% increase in operational emissions due to the addition of Scope 3 emissions. Section 6.8 recommends broadening the organisational net zero target to include these emissions in the medium term.

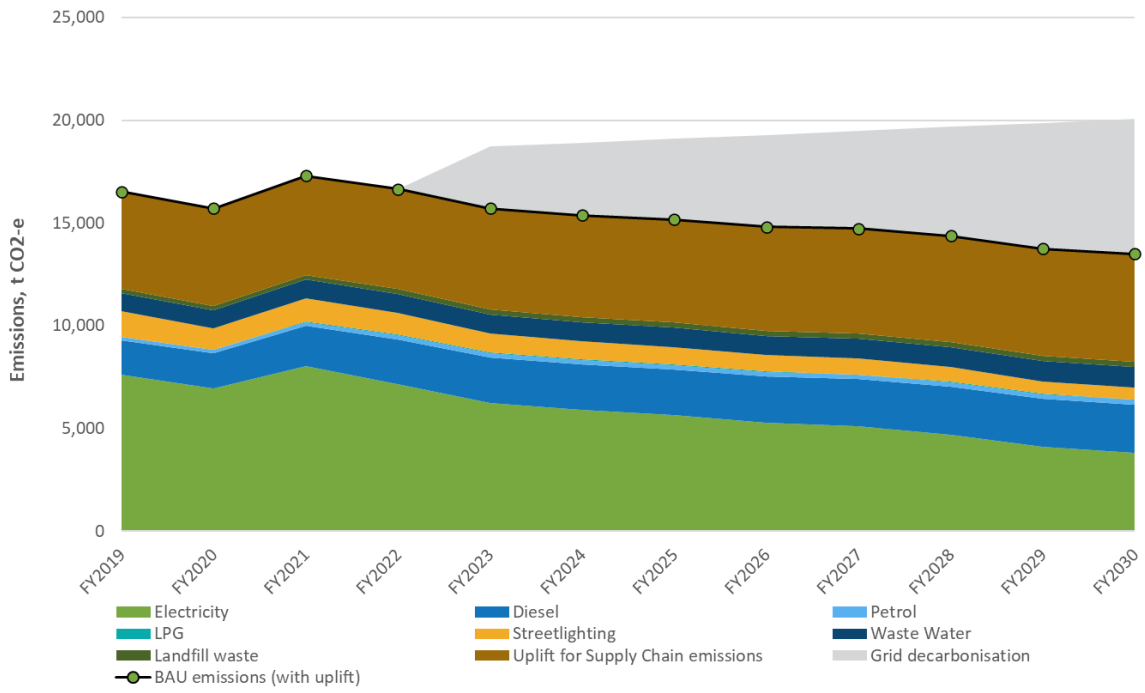


FIGURE 20: BALLINA SHIRE COUNCIL - POSSIBLE BAU WITH 40% UPLIFT APPLIED FOR SCOPE 3 EMISSIONS

6 OPPORTUNITIES TO REDUCE GREENHOUSE GAS EMISSIONS

Section 3.3 highlights the range of actions already implemented by Council to reduce emissions including energy efficiency, onsite solar, renewable energy purchasing, and electric fleet and charging infrastructure. The actions implemented to date have served to reduce emissions well below what they could have been and emissions in FY2022 are now slightly lower than they were in FY2019.

Section 2.1 lists the nine opportunities for emissions reduction and depicts them in Figure 7. These opportunity categories are replicated in Figure 21 below for ease of reference. The opportunities are used to model the Net Zero Pathway and provide the framework for the Action Plan in Section 10.

FIGURE 21: CATEGORIES OF OPPORTUNITY FOR EMISSIONS REDUCTION

6.1 GRID DECARBONISATION

Coal-fired power stations in NSW and across Australia will close in coming years and will be replaced with renewable energy generation technologies like solar, wind, pumped hydro and grid-scale batteries. These will be mostly developed in the NSW Government designated Renewable Energy Zones (REZ).

The Australian Energy Market Operator's (AEMO) Integrated System Plan 2022[6] (ISP2022) models scenarios with differing assumptions for key influencing factors including demand drivers, Distributed Energy Resources (DER) uptake, emissions, large-scale renewable build cost trajectories, investment and retirement considerations, gas market settings and coal price settings, together with assumptions regarding policy settings and transmission infrastructure development.

The resultant scenario outcomes for penetration of renewable energy in the National Electricity Market (NEM) is illustrated below in Figure 22, highlighting the increasing likelihood of a rapid transition to renewables. The NSW *Electricity Infrastructure Investment Act 2020* will facilitate the rapid transition to renewables in NSW, and ISP2022 forecasts reflect this.

[6] AEMO: *https://aemo.com.au/consultations/current-and-closed-consultations/2022-draft-isp-consultation*

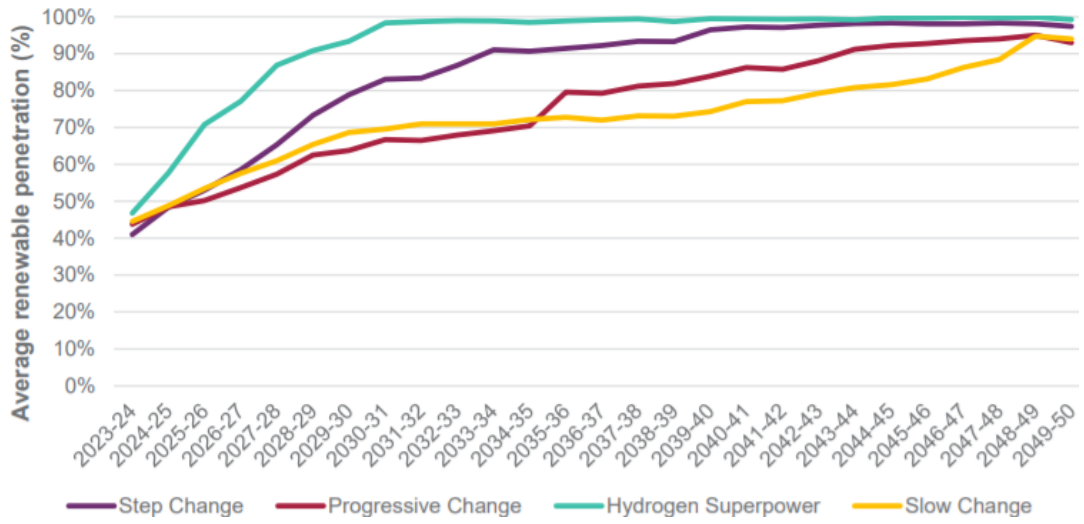


FIGURE 22: AEMO MODEL OF RENEWABLE ENERGY PENETRATION IN ISP2022 SCENARIOS[7]

The change to a renewable energy grid will have a significant impact on electricity emissions for Ballina Shire Council's operations as power is increasingly provided from clean energy sources in the grid.

In addition to AEMO's projections the Federal Department of Industry Science Energy and Resources (DISER) has developed its projections of grid electricity carbon intensity to 2035, showing a projected significant decline in the short to medium term. Table 39 from DISER's 2022 projections[8] is below.

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Australia, all grid connected	0.77	0.71	0.65	0.56	0.51	0.47	0.41	0.35	0.29	0.27	0.25	0.24	0.21	0.20
NEM	0.62	0.57	0.52	0.44	0.40	0.37	0.32	0.27	0.23	0.21	0.19	0.18	0.16	0.15
NSW/ACT	0.78	0.75	0.64	0.53	0.42	0.36	0.25	0.22	0.13	0.12	0.11	0.13	0.02	0.02
QLD	0.88	0.81	0.77	0.61	0.58	0.54	0.54	0.50	0.46	0.42	0.36	0.29	0.26	0.24
SA	0.33	0.31	0.26	0.23	0.15	0.16	0.11	0.08	0.02	0.02	0.02	0.02	0.10	0.11
VIC	0.92	0.82	0.78	0.72	0.72	0.67	0.59	0.44	0.40	0.38	0.35	0.37	0.41	0.39
TAS	0.18	0.03	0.06	0.02	0.06	0.05	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02
SWIS	0.55	0.52	0.50	0.44	0.41	0.38	0.34	0.31	0.26	0.25	0.24	0.24	0.23	0.22
NWIS	0.62	0.59	0.57	0.55	0.51	0.50	0.48	0.47	0.46	0.45	0.44	0.42	0.41	0.40
DKIS	0.61	0.57	0.53	0.50	0.48	0.47	0.45	0.42	0.38	0.38	0.36	0.35	0.32	0.23

FIGURE 23: TABLE 39 FROM DISER'S PROJECTIONS OF GRID ELECTRICITY CARBON INTENSITY

Grid decarbonation has been factored into development of Council's emissions reduction pathway.

Note: The assumed rate of change in the grid carbon intensity is based on Department of Industry Science Energy and Resources (DISER) estimates, adapted and applied to the emissions intensity of the grid as determined using market-based electricity accounting rules.

TABLE 6: GRID DECARBONISATION ACTIONS

Grid decarbonisation Actions		
Action	**Details**	**Timing**
Grid decarbonisation	This effect should be reviewed annually and factored into the emissions pathway as required.	Annually

[7] AEMO: https://aemo.com.au/consultations/current-and-closed-consultations/2022-draft-isp-consultation

[8] DCCEEW 2022, Australia's emissions projections 2022, Department of Climate Change, Energy, the Environment and Water, Canberra, December. CC BY 4.0 (projections were previously developed by DISER)

6.2 BUYING CLEAN ENERGY

Council has entered into a new electricity agreement from 1 January 2023 that will see it progressively buy more renewable energy in coming years. Key outcomes in terms of renewable energy purchasing include:

- Council has 12 'Large Market' sites that use over 100MWh per annum of electricity. Sites include the airport, wastewater treatment plants, streetlighting and other large facilities. These sites account for over 8,300 MWh of electricity use per annum (based on FY2022). These sites will use 100% renewable electricity from January 2025 based on Large Generation Certificate (LGC) retirements associated with the Collector wind farm.
- All other sites are 'Small Market' sites, and they account for over 1,800 MWh of electricity use per annum (based on FY2022). Small market sites use 50% accredited GreenPower® from January 2023, and Council can choose a higher percentage annually or buy additional LGC's to offset the balance of emissions from this electricity supply as needed.

Based on Council's electricity demand, it is possible that further sites could be considered 'Large Market' sites, with five 'Small Market' sites having electricity demand in excess of 100 MWh pa. These include the Lennox Head Community Centre and four pump stations. The change of sites between Large and Small Market accounts, if possible, may make a minor difference to the timing and manner of achieving 100% renewable electricity supply, but is not included in any scenario analysis here.

TABLE 7: SMALL MARKET SITES WITH ELECTRICITY USE OVER 100 MWH

NMI	Site name
4001236074	Lennox Head Community Centre
4001259153	Lennox Head WWTP - Recycled Water Pump Station
NFFFAA0800	SP3110 Pacific Pines (Montwood Drive) - Lennox Head - Pump Station
NFFFNRKV96	SP2001 Swift Street - Ballina Island - Pump Station
NFFFNRKV98	SP2301 Angels Beach Drive - East Ballina - Pump Station

Note: Large market sites' energy use is taken to increase at Business as Usual (BaU) rates and may decrease with new solar PV installations and efficiency. Following these changes power is taken to be supplied 50% from renewables in 2024/25, and to be 100% renewables thereafter. It is assumed that all small market sites' energy use also increases at BaU rates and may decrease with onsite solar and efficiency. Beyond these changes power is taken to be 25% renewables in 2022/23, 50% renewables in 2023/24 and 2024/25, and 100% renewables through GreenPower® and potentially large-scale generation certificates (LGC's) purchases thereafter.

TABLE 8: BUYING CLEAN ENERGY ACTIONS

Buying Clean Energy Actions		
Action	**Details**	**Timing**

Clean energy contracts	• Determine the timeline to increase to 100% Greenpower for small sites.
	• Assess opportunities for change of sites between Large and Small Market accounts:
	  ○ Lennox Head Community Centre
	  ○ Lennox Head WWTP – Recycled Pump Station
	  ○ Pacific Pines Lennox Head - Pump Station
	  ○ Swift Street Ballina - Pump Station
	  ○ Angels Beach Drive East Ballina - Pump Station
		Annually

6.3 ONSITE SOLAR PV AND STORAGE

Council has installed numerous solar PV systems that are offsetting more than 11% of grid power, as detailed in Section 3, Table 2. Council also has potential to change or expand some existing systems and to develop additional solar PV systems with and without battery energy storage systems (BESS). Based on site visits and discussions with Council stakeholders short to longer-term opportunities for solar are tabulated below. Indicative costs, savings and simple payback period analyses for these projects is included in the Action Plan in Section 10.

TABLE 9: PLANNED AND POSSIBLE FUTURE SOLAR PV SYSTEMS

Onsite Solar PV and Storage Opportunities			
Proposed solar PV locations	**Capacity kW**	**Annual kWh generation**	**Potential constraints**
Alstonville Cultural Centre	60	87,600	
Swift Street PS	65	83,000	
Community Gallery	TBC	TBC	
Visitor Information Centre (VIC) & precinct	TBC	TBC	Space may be the main potential constraint.
Paradise FM	TBC	TBC	
Ballina WWTP – evaluate upgrade of existing panels with 450W panels (higher output) or with 5B or equivalent	250	400,000	A water-based model to expand the current system or upgrading the current system can be considered. The current system payback will only recently have been achieved, so this may be a constraint to a short-term upgrade.
Ballina WWTP – develop 420 kW water-based array	420	684,000	
Lennox Head WWTP – develop ~250 kW water-based array	250	407,000	A smaller 250 kW water-based system could serve the main electricity account, whereas a larger system to serve all three meters could require council to become a HV customer to consolidate accounts.
Lennox Head WWTP – link 3 x meters (HV) and install 420 kW water-based array	420	683,000	
Alstonville WWTP – expand solar (current biosolid bag area), and install BESS for Peak period operation	100 (+100 kWh BESS)	160,000	Expansion may require changes to the location and onsite management of biosolids, as well as monitoring of the performance of the new 5B system to determine the role of storage in load management.

Onsite Solar PV and Storage Opportunities			
Proposed solar PV locations	**Capacity kW**	**Annual kWh generation**	**Potential constraints**
Ballina Airport – additional solar on the terminal roof and/or added carports	200	320,000	The size of future additional capacity depends on the site's demand as well as future EV charging, such as for rental car bays.
Ballina War Memorial Pool – add 40kW solar on the south end of the roof	40	64,000	This space could be used for solar PV or solar matting to assist with pool heating. Both business cases will be evaluated.
Alstonville Aquatic Centre – solar carport on north-east (32) and north (~20) sides with BESS	>50 (+100 kWh BESS)	80,000	There is tree shading in the main car park which may be a constraint. Consideration of battery needs will be assessed with reference to the yield and utilisation of the current PV system and future EV charging if implemented.
Angels Beach Drive SPS - solar PV + BESS on land adjacent to the SPS	50 (+100 kWh BESS)	80,000	A secure boundary would have to be included as part of the project scope, adding to the implementation cost. Storage may be needed due to the 'peaky' nature of SPS demand.
Council Administration Centre - expand solar on N-E roof + BESS, install carport solar in rear staff carpark	50 (+100 kWh BESS)	80,000	Expansion would be subject to planned local re-development work. Due to the low energy demand of the Council building and expansion PV array would likely require a battery.
Council Operations Depot - expanded solar array and BESS	50 (+100 kWh BESS)	80,000	Load may expand due to EV charging and planned new building.
Lennox Head Cultural Centre – expand solar + BESS on community rooms, install solar carport	50 (+100 kWh BESS)	80,000	Expansion has maximised solar on the main building, and there is limited added roof space. The carpark may offer good scope for more solar and EV charging.
Ballina Indoor Sports Centre – expand solar array with BESS for night demand	25 (+50 kWh BESS)	40,000	There is space to double the size of the current system, optimal size can be selected taking current export into account.
Potential Generation Capacity	**1,240-1,580 (+650 kWh BESS)**	**1,961,600-2,251,600**	**This is an approximate total range. Feasibility assessments and optimum sizing will determine the final potential**

Note: For this work the four projects implemented in FY2023-24 are taken to have zero impact in that year, and to achieve 100% of the indicated grid reduction from FY2024-25 onwards. The lower estimate of additional potential is modelled to be implemented over 5 years from FY2024-25 to FY2027-28.

TABLE 10: ONSITE SOLAR PV AND STORAGE ACTIONS

Onsite Solar PV and Storage Actions		
Action	**Details**	**Timing**
Increase the number of new solar PV systems installed and expand some existing systems, in conjunction with installation of battery energy storage systems, where appropriate.	• Plan and budget for proposed locations identified based on quotes/feasibility assessments. • Review annually and align with technology developments.	Annually

6.4 ENERGY EFFICIENCY

Energy efficiency of Council operations is an integral part of asset and facilities management. Electricity usage is Council's highest source of emissions, so this is a key area of focus.

As Council has already implemented the key projects to improve energy efficiency and reduce electricity usage there isn't much room for additional significant actions. However, by continuing to invest in efficient energy technology, implementing better controls and monitoring systems, and maintaining the measures already in place, incremental savings can still be achieved through continuous improvement. Potential short, medium and long term opportunities are detailed in Table 11.

TABLE 11: ENERGY EFFICIENCY OPPORTUNITIES

Energy Efficiency Opportunities		
Site	**Potential opportunities – short / med term**	**Potential opportunities – long term**
Ballina, Lennox, Alstonville, Wardell WWTPs		• Monitor developments in UV-LED disinfection and trial as this becomes more commercially viable
Alstonville WWTP	• Align low lift pump operation with solar • Optimise VSD / DO control	• VSD on low lift pump
Streetlighting	• Confirm if any non-standard or decorative lights were omitted from the LED upgrade and plan for upgrading to LED (Council owned). • Essential Energy LED upgrade of main roads lights (July 2022 to 2023).	• Ongoing Essential Energy bulk replacement programs with more efficient technology. • Implementation of smart controls with future LED upgrades (Essential Energy), and Council owned streetlighting.
Ballina Airport	• Airside lighting upgrade to LED for remainder of lights	
Montwood Drive SPS	• Upgrade to a smart meter to get ToU data for the account (evaluate solar and BESS potential with this data)	
Lennox Head Cultural Centre	• Finish replacement of remaining T5 and CFL lights to LED	
Byron St SPS		• Implement VSD controlled pumps (long term, likely well after 2030)
VSD upgrades	• Continue to sustain VSD performance with preventative / proactive maintenance and optimisation services	
All solar sites	• Upgrade to a smart meter/solar monitoring platform to get ToU data for the account (evaluate solar and BESS potential with this data)	

Note: For this work a 1% year-on-year improvement in energy efficiency (electricity) is assumed compared with BaU forecast consumption, reflecting past achievements and the relatively low scope for larger energy efficiency projects.

TABLE 12: ENERGY EFFICIENCY ACTIONS

Energy Efficiency Actions		
Action	**Details**	**Timing**
Continue to invest in energy efficient technologies.	• Plan and budget for site specific opportunities • Review and identify opportunities annually.	Annually
Implement controls and monitoring systems	• Azility subscription/solar monitoring platform. • Smart Building technologies including Building Management Systems for automated control and monitoring of HVAC, lighting, security, pumps etc.	Short/Medium Term
Track and report on the progress and impacts of energy efficiency initiatives	• Work with Azility and solar monitoring platform to monitor and report on electricity consumption and project savings.	Short term

6.5 GAS TRANSITION PLAN

Liquefied petroleum gas (LPG) represents well under 1% of Council's total emissions based on four sites – two pools at Alstonville and Ballina, a campground, and tourist information centre. It is understood that LPG is used for water heating at these facilities and the main suggested abatement action is to replace these with electric heat pumps at the end of their life.

Some sporting field hot water amenities may also be supplied with gas in bottled LPG form, and LPG purchases have not been included in the carbon footprint at this time. Replacement of these systems with heat pumps and solar-boosted electric units can also be considered at end of life, taking relevant security, space, and connection aspects into account.

TABLE 13: ENERGY EFFICIENCY ACTIONS

Gas transition Actions		
Action	**Details**	**Timing**
Replace all gas devices with equivalent electric device by 2030.	• Alstonville Aquatic Centre • Ballina War Memorial Pool • Flat Rock Campground • Tourist Information Office • Amenities hot water systems	End of life

6.6 SUSTAINABLE TRANSPORT / EV FLEET TRANSITION

Transport emissions represent around 15% of Council's carbon footprint excluding non-energy Scope 3 emissions and is the largest source following electricity consumption. Diesel fuel use for trucks, plant and utility vehicles dominates total fuel usage, with petrol a small component of use and emissions.

Council's fleet mix and fuel use by fleet category for FY2021 included:

TABLE 14: BALLINA SHIRE COUNCIL - FLEET CATEGORIES AND ASSOCIATED FUEL USE FY2021

Fuel type	Category	Fuel, Litres	Number of Fleet
Diesel	Truck	225,655	37
	Heavy plant	174,023	32
	Garbage truck	125,145	6
	Ute	121,402	65
	Mowers	15,546	12
	Van	9,126	4
	Passenger	3,094	2
	Generator	1,736	3
Petrol unleaded	Passenger	62,888	35
	Ute	4,310	6
	Mowers	3,920	6
	Van	1,273	1
	Truck	43	1
Diesel subtotal		**675,726**	**161**
Petrol unleaded subtotal		**72,434**	**49**
Grand total		**748,161**	**210**

In the long term it is most likely that fleets like this will become electrified, and while hydrogen may play a role in powering larger trucks the assumption here is that electric battery-driven vehicles and plant will be the way forward.

This is underpinned by the increasing support by governments to deliver this result. Policies to incentivise the purchase of electric vehicles for consumers have been developed by several state and territory governments. Upfront subsidies, interest-free loans, reduced registration, and stamp duty exemptions are methods for the government to increase the uptake of EVs in the consumer market.

For example, the NSW Electric Vehicle Strategy is the NSW Government's plan to accelerate the State's vehicle fleet of the future. It outlines the government's commitments to increasing the uptake of electric vehicles (EVs) to ensure NSW shares in the benefits. The NSW Government will invest $209 million to ensure widespread, world-class EV charging coverage to future proof the EV network. This includes $149 million being invested into EV fast charging grants, which will co-fund charge point operators to install and operate ultra-fast charging stations at 100 km intervals across the state, and every 5 km in metropolitan areas.

Incentives and grants schemes have been available through NSW Government's EV strategy since 2021. These schemes could be valuable to Council in planning a fleet transition. Typically, the funding changes from year to year therefore it is recommended to routinely monitor the offers available.

The feasibility of switching plant and vehicles to electric is not the same for all fleet categories, so the timing and costs associated with the transition will be different for each category. There will also be constraints relating to the age and hours/kilometres before vehicles and plant are upgraded, so a

transition will occur over a number of years for each type of asset. The table below outlines some of the key assumptions made at this time that guide an indicative emissions reduction pathway for Council.

TABLE 15: INDICATIVE PATHWAY FOR TRANSITION OF FLEET TO EV

Category	Number of Fleet	Main constraints / other factors	Likely period to transition to electric
Truck	37 diesel, 1 petrol	Technical and commercial viability and availability across large truck and plant items	Post 2030 it is assumed that these items can be progressively transitioned to electric trucks and plant that are fit-for-purpose by 2040
Heavy plant	32 diesel		
Garbage truck	*Collection services contracted out from November 2023*		*Not applicable for Council directly, although as scope 3 emissions are considered further this can be revisited with waste contractors*
Ute	65 diesel, 6 petrol	Full electric utes and diesel-electric hybrids are available commercially and cost and suitability for the range of tasks they are used for across an organisation are issues to be assessed.	It is assumed that a transition to electric utes may occur after 2025 and could occur over a 5-15 year period depending on suitability for all tasks and vehicle age / distance travelled. While an EV pathway is modelled for this work a transition to hybrids may be more suitable in the short to medium term.
Mowers	12 diesel, 6 petrol	Electric ride-on mowers are commercially available and a number of councils are beginning to purchase these.	Council has started to purchase EV mowers (2) and it is assumed that this transition can happen over the next 5 to 6 years for all mowers.
Van	4 diesel, 1 petrol	Electric vans are commercially available, cost and suitability for Council needs would have to be assessed	Assumed to transition to EV towards the latter part of this decade
Passenger	35 petrol, 2 diesel	Most cars are also personal vehicles so staff will switch to EV based on their own considerations	Cars are assumed to switch to EV by 2030 with low initial adoption, increasing later
Generator	3 diesel	Duration of back up requirement would be needed to determine if battery storage could meet needs	Omitted from the electric transition plan

It is noted that Council does have two hybrid passenger vehicles and has used a range of battery-powered small plant for several years.

For a transition to an electric fleet to progress in coming years there are actions Council can take which will help to put some reasoned timeframes around a transition. These options can be reviewed in revisions to Council's fleet strategy. Actions are listed below in Table 16.

TABLE 16: SUSTAINABLE/EV FLEET TRANSITION ACTIONS

Sustainable / EV Fleet Transition Actions		
Action	**Activities**	**Timing**
Develop a fleet transition strategy	Evaluate and scope the indicative pathway for transition to low/no emissions fleet - timing, cost, charging, fitness-for-purpose and whole of life costing – for commercially feasible categories i.e. passenger vehicles, utes, and vans	Short term
Goals	Evaluate and scope aligning with or aspiring to meet the goal of the NSW Electric Vehicle Strategy to electrify government fleet by 50% by 2026, and 100% by 2030.	Medium term
Trials	Trial electric passenger vehicles and utes to test their suitability for various Council actions or tasks and help normalise discussion and consideration of EVs.	Short term
Monitor for developments	EV incentives, policy, and other support ie funding and incorporate these in Council's planning process and evaluation of electric fleet opportunities.	Short term
Participate on investigations/projects to increase EV charging infrastructure in the Shire.	• Assess all Council locations for potential location of EV charging infrastructure for Council and public vehicles. • Assess the potential future electrical capacity and charging infrastructure needs for Council's depot with the potential switch of utes, trucks and plant to electric over time. • Seek grant funding from NSW Government and other sources for charging infrastructure.	Short term
Provide training and accreditation to workshop staff for servicing of EV's	Invest in upskilling Council staff to maintain and service electric fleet.	Short to medium term

Note: For this project, an indicative EV transition pathway is assumed as outlined above. In the short term, mowers and passenger vehicles have commercially feasible and available electric alternatives and a transition in the period to 2030 may be feasible. Utes and vans are assumed to be feasible to switch after 2025 but may take several years before completion, and diesel-electric utes may be an initial step in this process. Trucks and heavy plant items are assumed to be feasible in the period after 2030 to 2040. As fuel use is dominated by larger trucks, plant and utes this pathway results in a modest emissions reduction to 2030, accelerating after this time.

6.7 WASTE MANAGEMENT

Corporate landfill waste generated 212 t CO2-e based on data provided for FY2019, which accounts for 1.8% of Council's total GHG emissions. Council's corporate efforts to reduce its waste can focus on in office waste separation, lifting recycling rates, and reducing overall waste. It is recommended that Council align corporate waste reduction with NSW Waste and Sustainable Materials Strategy 2041 - 10% waste reduction, 80% recycling and 50% reduction in organics to landfill (e.g. by food composting, FOGO collection, etc).

TABLE 17: WASTE MANAGEMENT ACTIONS

Waste Management Actions		
Action	**Targets**	**Timing**
Align corporate waste reduction with NSW Waste and Sustainable Materials Strategy 2041	10% waste reduction, 80% recycling and 50% reduction in organics to landfill (e.g. by food composting, FOGO collection, etc).	Medium-term

6.8 VALUE CHAIN EMISSIONS AND SUSTAINABLE PROCUREMENT

The value chain is the full range of activities which are required to provide a product or service.

Typical examples are:

- Purchased goods and services, at least for all operational expenditure such as paper, business travel, air travel, services provided by other businesses to Council, leased assets and water consumption, staff commuting to work, and net emissions for staff working from home.
- Emissions embedded in materials used for capital works, other capital works expenses, contractor emissions, or leased assets, Council's investments.

It is increasingly common for organisations – particularly larger ones – to measure and assess the risks and opportunities in reducing value chain emissions through sustainable procurement.

Emissions from the value chain are mostly Scope 3 indirect emissions as they happen upstream and downstream of the business. Scope 3 emissions have typically been difficult to analyse, however as carbon accounting methods improve, and the definition of 'net zero' has been clarified to include Scope 3 emissions, many organisations are now moving to align their emissions accounting methods with the ISO Net Zero Guidelines and the framework of the GHG Protocol to ensure a standardised approach.

Programs such as Climate Active[9] provide a framework for robust carbon accounting based on the GHG Protocol. Climate Active is a carbon neutral program run by the Federal Government. Climate Active certification is awarded to organisations that have credibly reached carbon neutrality through the development of a robust carbon footprint aligned with the Climate Active standard and have purchased eligible carbon offsets equivalent to their carbon footprint inclusive of Scope 1, 2 and 3 emissions. Climate Active certifies organisations, products, services, events, buildings and precincts.

A sustainable procurement policy can set out Council's intent to procure goods and services with consideration of Council's emissions reduction and broader sustainability goals. Sustainable procurement processes can reduce Council's broader value chain emissions over time through multiple small purchasing decisions, such as for building materials, appliances, and information and communication technology (ICT) equipment, etc. Council could develop an internal sustainable procurement guide drawing on appropriate frameworks such as the 2017 Local Government NSW

[9] Climate Active (https://www.climateactive.org.au/)

(LGNSW) Sustainable Procurement Guide [10], which aims to help Councils develop and embed sustainable procurement practices in their organisation.

The guide presents information on key concepts, certifications, standards, and processes and is designed for all council staff involved in any purchasing and is applicable from major tenders through to one-off equipment purchases.

Council should examine the guide to identify key areas within its procurement processes where this can add value and lead to more informed and better procurement decisions. It is anticipated that the guide will be updated to incorporate NSW Governments Net Zero commitments, therefore monitoring for updates is advised.

6.8.1 ENGAGEMENT & TRAINING

A program of continuing engagement, education, and training of staff who procure services and products should be implemented to ensure that procurement decisions deliver best practice emissions reduction outcomes. Some examples include:

- Roads and pavement construction and repair / maintenance teams who specify the types of materials to be used, where there may be opportunities to use more sustainable materials,
- Fleet procurement staff who assess vehicle needs and specify new purchases and leases that will impact fuel use and other environmental performance measures,
- Capital works staff involved in the design of new projects such as new community facilities, or new parks & reserves, where energy and water efficiency and onsite renewables and battery storage could be specified,
- Sourcing of professional and other services for Ballina Shire Council,
- Operational staff who may repair or replace equipment as it fails, such as appliances, air conditioners, lights, where there are opportunities to ensure that replacements are fit for purpose and energy efficient.

6.8.2 DESIGN, EQUIPMENT AND SERVICES SPECIFICATIONS

Policy, procurement frameworks, and training should ultimately lead to specifications for services and works to include Council's requirements for low or net zero emissions. In addition, the evaluation criteria of tenders and quotes should be periodically revised to evaluate responses against updated emission requirements, while achieving the other key goals of Council's procurement policy. Goods and services where Council could update specifications include:

- **Road and pavement construction**: source low embodied emissions materials and encourage potential suppliers to reduce emissions in their materials.
- **Building design policies:** go further than code requirements, by requiring new buildings to be 6-Star Green Star and having a pathway for ongoing improvement in design requirements.
- **Business Services**: by requiring that suppliers of services to Council lower their own emissions (e.g., by being certified carbon neutral), scope 3 emissions can be reduced.
- **Building, sports field and public lighting:** design and replacement with LED and smart controls together with passive measures to reduce demand for lighting.

[10] Sustainable Procurement Guide for Local Governments in NSW, 2017: https://www.lgnsw.org.au/files/imce-uploads/127/esstam-sustainable-procurement-guide-30.05.17.pdf

- **HVAC:** specify efficient fit-for-purpose technologies and smart controls and specify low and zero-emissions refrigerant gases.
- **Power & appliances:** efficient appliances and 'green IT' options are available, and specifications can be developed that ensures equipment is energy efficient when purchased.
- **Wastewater pumps** are upgraded or rebuilt from time to time. Upgrades offer opportunities to assess system design, evaluate variable speed drive (VSD) opportunities and improve control systems.

The scope for reducing emissions from sustainable procurement can be sizeable and can result in incremental gains over the long-term. Council also has the capacity to influence emissions reduction by its suppliers and contractors through its procurement process decision making. This will be increasingly important in future years in the context of reducing value chain emissions to reach net zero emissions. Value Chain and Sustainable Procurement actions are listed below in Table 18.

TABLE 18: VALUE CHAIN AND SUSTAINABLE PROCUREMENT ACTIONS

Value Chain and Sustainable Procurement actions		
Action	**Activities**	**Timing**
Include Scope 3 emissions in Council's carbon footprint calculations.	Broaden the scope of Council's carbon footprint to include value chain and upstream and downstream emissions.	Medium term
Accounting and reporting (Scope 3 emissions)	Investigate the implications of aligning carbon accounting and reporting in line with global standards - the ISO Net Zero Guidelines and GHG Protocol.	Medium term
Identify Sustainable Procurement processes	Identify key areas within procurement processes where consideration of Council's emissions reduction and broader sustainability goals guidance can be included to lead to more informed and better procurement decisions.	Short term
Staff engagement and training.	Regular staff engagement and training in sustainable procurement processes and reduction of value chain emissions.	Ongoing
Design, Equipment and Services specifications	Continual review of equipment and services specifications to identify opportunities to incorporate the sustainable procurement framework into procurement and use of equipment and services.	Ongoing
Regular review of procurement policy, frameworks and processes to include requirements for low or net zero emissions.	Include requirements for low or net zero emissions in specifications, evaluation criteria.	Ongoing

6.9 EMISSIONS OFFSETTING AND/OR SEQUESTRATION

Carbon offsets are usually represented by a credit that has been retired or cancelled in a registry by an organisation that is seeking to counterbalance residual emissions. To achieve net zero emissions by or before 2030, Council will likely have to consider the role of carbon offsets, whether through purchasing offsets or by creating its own offsets through sequestration. Aside from Council's own emissions, there may be opportunities for Council to utilise land to sequester carbon that other entities may wish to

purchase. This could potentially be done by Council, or in collaboration at a regional level and with agriculture businesses.

Buying carbon offsets is a common strategy for organisations that wish to be net zero or carbon neutral now, and who then seek to reduce emissions over time so that their offset liability reduces. High quality offsets from both local and international abatement activities can include those that are eligible under the Climate Active carbon neutral program:

- Australian Carbon Credit Units (ACCUs) issued by the Clean Energy Regulator in accordance with the framework established by the Carbon Credits (Carbon Farming Initiative) Act 2011 which has now been amended to establish the Emissions Reduction Fund (ERF).
- Certified Emissions Reductions (CERs) issued as per the rules of the Kyoto Protocol from Clean Development Mechanism (CDM) projects, with some exceptions.
- Removal Units (RMUs) issued by a Kyoto Protocol country on the basis of land use, land-use change and forestry activities under article 3.3 or 3.4 of the Kyoto Protocol.
- Voluntary Emissions Reductions (VERs) issued by the Gold Standard.
- Verified Carbon Units (VCUs) issued by the Verified Carbon Standard (VCS).

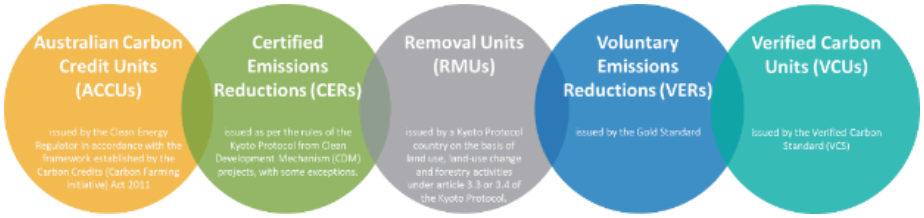


FIGURE 24: ELIGIBLE CARBON OFFSETS UNDER THE CLIMATE ACTIVE CARBON NEUTRAL PROGRAM

The ISO net zero Guidelines provide clarity around 'net zero' and carbon offsetting and highlight that organisations should prioritise removing emissions through methods such as afforestation, habitat restoration, and soil carbon capture rather than simply buying carbon offsets or credits.

If Council considers purchasing carbon offsets, it should conduct due diligence of the carbon offsets to determine their additionality, integrity and alignment to Council's values and global standards.

Another option for compensating for remaining carbon emissions is by creating Council's own offsets through sequestration. The Emissions Reduction Fund (ERF) is Australia's current mechanism to reduce greenhouse gas emissions through a reverse auction scheme. Examples of eligible carbon farming methods under the ERF are planting trees, storing carbon through restoring mangroves and tidal marshes, storing carbon in soil, capturing landfill gas and the implementation of Food Organics and Garden Organics (FOGO).

If Council has large parcels of land and/or develops FOGO solutions for example, it may be able to participate in the carbon farming market, generate carbon offsets under the Emissions Reduction Fund (ERF) or international carbon offset standards, and then sell them to generate income. Offsets could be sold to the ERF, to the secondary market in Australia or overseas. Offsets created could be used to reduce Council's own emissions, as well as sell to others depending on the amount of land available.

For Council's operations the amount of offsets required would ideally correspond to any shortfall between actual emissions and a zero emissions position, with mitigation measures ideally reducing emissions by at least 90% in the long term. To determine the scope for abatement of emissions

through offsetting / sequestration Council will need to implement a more rigorous greenhouse gas emissions accounting and reporting method and develop an offsetting and sequestration strategy.

Given these factors, it is recommended that Council investigate the implications of aligning with the global standards and commence development of a carbon sequestration and offset strategy. Carbon offsetting/sequestration actions are listed below in Table 19.

TABLE 19: CARBON OFFSETTING/SEQUESTRATION ACTIONS

Carbon offsetting/sequestration		
Action	**Activities**	**Timing**
Accounting and Reporting	Investigate the implications of aligning carbon offsetting and reporting in line with global standards - the ISO Net Zero Guidelines and GHG Protocol, and programs such as the Climate Active program.	Short term
Sequestration and offsetting	Develop a carbon sequestration and offset strategy to ensure plans can be put in place as the 2030 target year nears.	Medium term

7 EMISSIONS REDUCTION PATHWAY TO MEET THE FY2030 TARGETS

An emissions reduction pathway was developed based on a combination of the BAU assumptions in Section 4.5, known initiatives such as renewable energy power purchasing, the identified short-, medium- and long-term actions in Section 6, and continuous improvements. The model inputs are listed below in Table 20. Section 6 identifies value chain and sustainable procurement as a new opportunity to reduce emissions. This will require broadening Council's carbon footprint to include Scope 3 emissions which is listed as a medium-term action in this plan, however it has not been included in the emissions reduction pathway at this time.

TABLE 20: MODEL INPUTS TO AN INDICATIVE EMISSIONS REDUCTION PATHWAY

Emissions source	Scenario to reduce emissions
Grid electricity	The assumed rate of change in the grid carbon intensity is based on Commonwealth Government estimates, applied to the emissions intensity of the grid as determined using market-based electricity accounting rules.
Purchased electricity	Large market sites' energy use is taken to increase at BaU rates and may decrease with new solar PV installations and efficiency. Following these changes power is taken to be supplied 50% from renewables in 2024/25, and to be 100% renewables thereafter. It is assumed that all small market sites' energy use also increases at BaU rates and may decrease with onsite solar and efficiency. Beyond these changes power is taken to be 25% renewables in 2022/23, 50% renewables in 2023/24 and 2024/25, and 100% renewables through GreenPower® and potentially LGC purchases thereafter.
Electricity – on site solar PV and batteries	The four projects implemented in FY2022-23 are taken to have zero impact in that year, and to achieve 100% of the indicated grid emissions reduction from FY2023-24 onwards. The lower estimate of additional potential solar PV and BESS capacity is modelled to be implemented over 5 years from FY2023-24 to FY2027-28.
Electricity – energy efficiency	For this work a 1% year-on-year improvement in energy efficiency (electricity) is assumed compared with BaU forecast consumption, reflecting past achievements and the relatively low scope for significant further improvement.
LP gas	It is assumed that all gas devices are replaced with an equivalent electric device in 2030
Transport fuel	An indicative EV transition pathway is modelled. In the short-term mowers, and passenger vehicles have commercially feasible and available electric alternatives and a transition in the period to 2030 is implemented. Utes and vans are assumed to be feasible to switch after 2025 but may take several years before completion, and diesel-electric utes may be an initial step in this process. Trucks and heavy plant items are assumed to be feasible in the period after 2030 to 2040.
Landfill waste	Emissions from waste from Council's corporate operations are taken to be reduced aligned with the NSW Waste and Sustainable Materials Strategy 2041 of 10% waste reduction, 80% recycling and 50% reduction in organics to landfill (e.g. by food composting, FOGO collection, etc).
Value chain scope 3 emissions	Reducing value chain scope 3 emissions is not included in an emissions reduction pathway as it is not included in the carbon footprint at this time.
Carbon offsets	Offsets are included in the modelled pathway to highlight that this may be a consideration to bridge any gap between reduced emissions and Council's targets.

Modelling of these measures results in the following indicative pathway for Council to move towards its 2030 targets of 100% renewable electricity and net zero emissions.

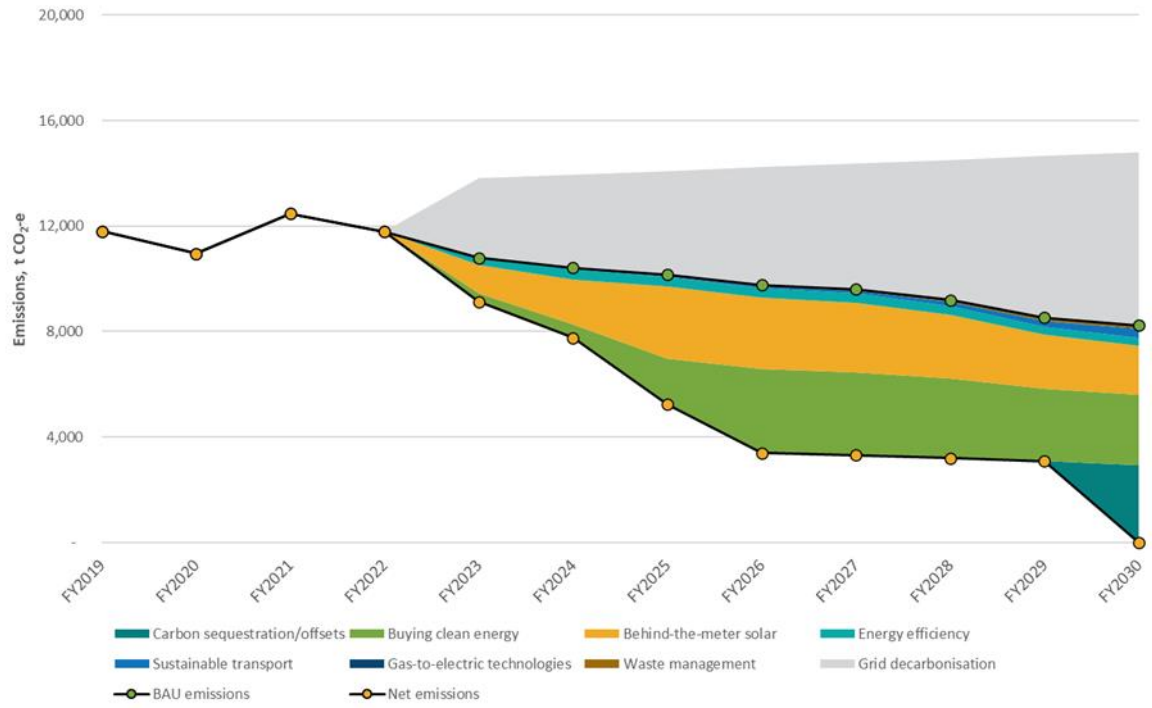


FIGURE 25: INDICATIVE EMISSIONS REDUCTION PATHWAY TO 2030

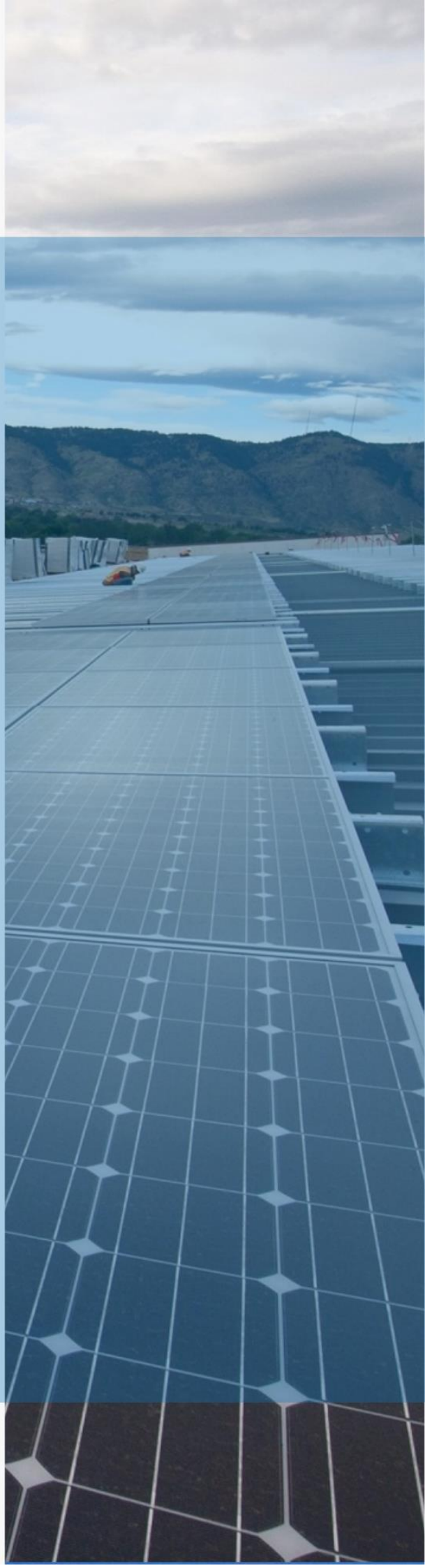
Achieving **100% renewable electricity by 2030** is well within reach through further installations of solar, battery storage, and the purchase of renewable energy through the current Power Purchase Agreement (PPA) and GreenPower.

To achieve the **net zero target by 2030** there will be challenges. It is likely to be feasible to switch to electric passenger vehicles by 2030, however there is uncertainty about the timing of electric options for heavy plant and trucks. As the chart shows the emissions reduction from a fleet transition by 2030 is likely to be very small (Figure 25).

The identified actions and pathway to achieve the Climate Change Policy targets provides a basis for continued action and can be used to inform Council's 4-year Delivery Program and related annual Operational Plans. The timing and scale of any of the measures may well change over time.

100% renewables

FUNDING AND IMPLEMENTATION



8 FUNDING EMISSIONS REDUCTION MEASURES

Other than operational funding to deliver projects that reduce emissions, grant and sustainable funding opportunities may also be available.

8.1 GRANT FUNDING

Funding from State and Federal grants is often key to securing funds and approval to develop emissions reduction projects in local Government. The scope, funding and timing of grant funding changes frequently as new initiatives are introduced. In the current environment there are numerous opportunities for funding for regional communities and grants that are focused on energy resilience/security, distributed energy, electric vehicle charging, community batteries, as well as incentives that reduce the upfront cost of electric and fuel cell vehicles.

Key starting points for the identification of grants that can support emissions reduction initiatives, increase resilience, and lower the cost of energy include:

- Commonwealth Government grants portal at https://www.energy.gov.au/business/grants-and-funding links through to grants at Commonwealth and State levels, including to Australian Government financing via https://business.gov.au/grants-and-programs
- NSW State Government funds via https://www.nsw.gov.au/grants-and-funding and https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes,
- Funding linked to the NSW Sustainable Waste and Materials Strategy via https://www.dpie.nsw.gov.au/our-work/environment-energy-and-science/waste-and-sustainable-materials-strategy

The Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC) are also potential sources of funding for Council initiatives.

8.2 REVOLVING ENERGY FUNDS

Council can consider the establishment of a Revolving Energy Fund to assist with the sustainable funding of initiatives that help to drive emissions down and increase renewable energy.

A Revolving Energy Fund (REF) is a sustainable funding mechanism, whereby savings from sustainability projects are tracked and used to replenish the fund for the next round of investments. In this way, funds used for energy efficiency, renewable energy, and potentially other sustainability projects can be spent multiple times to drive emissions reduction, energy, and cost savings. REFs allow a monetary investment to be spent a number of times (through reinvesting energy cost savings) without reducing its value. Several options exist in terms of how a REF would operate:

- It could start with seed funds that do not need to be repaid, such as a one-off internal grant or seed fund, a % of funds from an environmental levy or similar. Savings from efficiency and renewable energy measures are returned to the REF and used to fund future initiatives.
- Savings are largely returned to project owners so that they see the savings on their bottom line, with some savings retained in the REF to fund new measures.
- The REF operates as a loan fund with savings repaid into the fund before project owners have access to the savings. This way, the initial fund level is maintained and can be added to over time.

- The REF could be set up to be a contestable funding source. Projects would need to meet and be scored against agreed criteria to be eligible to apply for funding. Projects with the highest scores could receive funding from the REF.

The diagram below illustrates how a REF could operate.

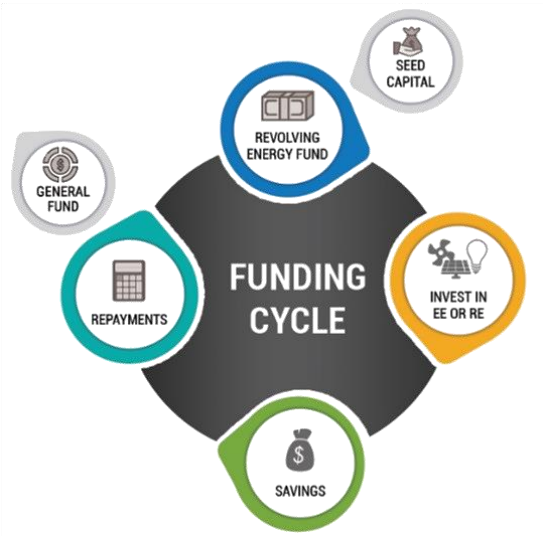


FIGURE 26: REVOLVING ENERGY FUND - TYPICAL FUNDING CYCLE

Key to a successful REF is that it is sustainable and can fund projects that meet an organisation's goals, while achieving a balance between seed and top-up funds from the budget, returned savings from implementation of projects, and grant funds. The development of an implementation plan, plus an auditable project and savings cashflow model for a REF is a good idea that can help with the design of the fund to ensure this outcome. An example of a REF cashflow model is shown below.

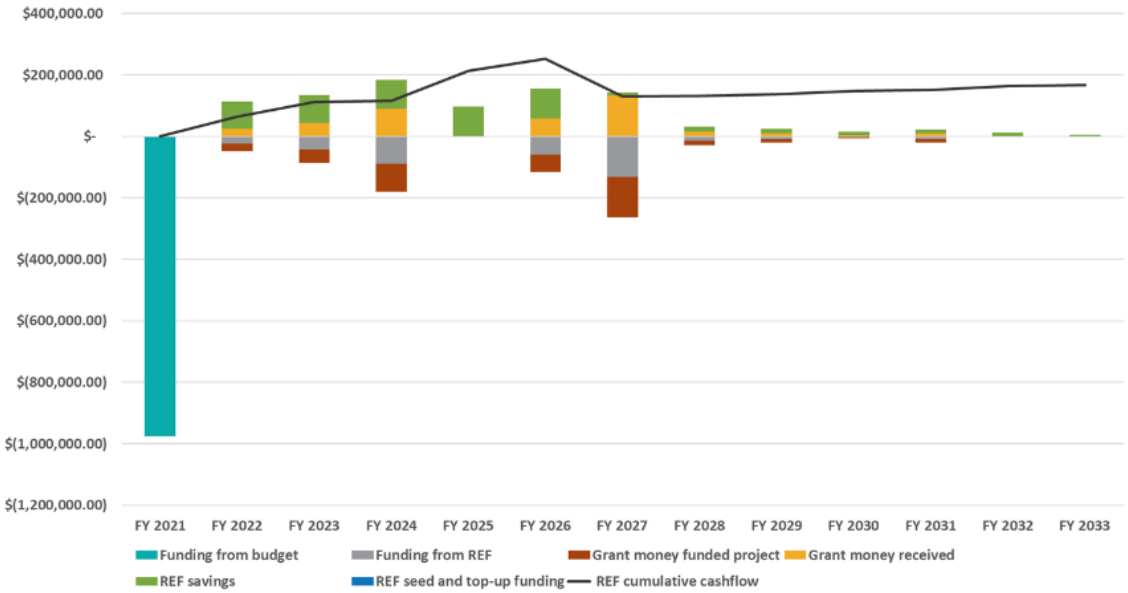


FIGURE 27: MODELLED CASHFLOW OF A REVOLVING ENERGY FUND

8.3 COUNCIL FUNDING

The main ongoing cost will be the allocation of staff resources and time to plan and implement the CERP and agreed funding approaches, including management and engagement with internal and external stakeholders, grant administration, and if applicable establishing and managing a Revolving Energy Fund (REF). A key to successful development and implementation of a REF over time is resourcing management and governance.

Proposed actions outside of Council's routine maintenance programs are subject to Council's procurement and decision-making processes, and annual delivery and operational planning processes including budget cycles.

A planned and structured approach to the identification of projects to be implemented, and to the securing of budget or external funds to implement projects should be developed to minimise the risk that opportunities are missed, and Council does not achieve its goals within its target timeframe. The Energy Management Group will play a key role in overseeing the implementation of the CERP.

TABLE 21: FUNDING EMISSION REDUCTION MEASURES

Funding emissions reduction measures		
Action	**Activities**	**Timing**
Funding	Implement a structured and pro-active approach to the identification of projects to be implemented, and to the securing of budget or external funds – allied to having 'shovel-ready' projects will help Council successfully attract funds.	Ongoing

9 IMPLEMENTATION

The Emissions Reduction Plan provides a basis for continued action and can be used to inform Council's annual Operational Plans and 4-year Delivery Program.

The Strategic Planning section and the Energy Management Group is responsible for coordinating implementation of the plan.

Proposed actions within this plan will be reviewed on a regular basis to take account of changing circumstances and assumptions. The plan review process consists of the following elements:

- Reporting actions to the Council on a quarterly basis through the Delivery Program/Operational Plan.
- Actions review prior to each budget and DPOP cycle, so that funding and resources for each financial year are determined and responsibilities for implementation are known.
- Regular analysis of actions to ensure individual actions and the plan remain relevant and responsive to Council's Climate Change policy and Community Strategic Plan framework. Circumstances may arise where minor administrative changes to the document are required. (Where an update does not significantly alter this document, such a change may be made administratively).

10 ACTION PLAN

For ease of reference this section sets out all the identified actions throughout this plan based on the nine categories of emissions reduction opportunities. Recommended timing and resources are identified if applicable. Costs, savings, and resourcing estimates within this plan are indicative.

GRID DECARBONISATION
As more renewables feed into the grid, carbon emissions for electricity will decline

BUYING CLEAN ENERGY
Buy clean energy (e.g. via a renewable energy PPA and/or mid-scale generation

BEHIND-THE-METER SOLAR
Generate renewable energy and battery storage locally – e.g. via solar panels

ENERGY EFFICIENCY
Adopt energy efficient technologies and practices to reduce emissions

SUSTAINABLE PROCUREMENT
Make purchasing decisions based on the entire life cycle of costs and environmental impacts.

SUSTAINABLE TRANSPORT
Buy efficient, low and zero emissions vehicles and implement EV infrastructure

WASTE MANAGEMENT
Reduce emissions from waste through lower consumption, less waste and effective resource recovery and treatment

GAS TO ELECTRIC TECHNOLOGIES
Replace gas boilers with heat pumps for more efficient heating and cooling

CARBON SEQUESTRATION / OFFSETS
Remove carbon from atmosphere by planting trees

Timing Definitions		
Short Term	**Medium Term**	**Long Term**
Within 1-3 years of adoption of the Plan	Within 5 years of adoption of the Plan	By the target year 2030
Resource Intensity		
Low	**Medium**	**High**
Low complexity, relatively low volume of hours required/nil to minor capital works	Moderate complexity, moderate volume of hours required/moderate level of capital works	Significant complexity, high volume of hours/significant capital works

10.1 GRID DECARBONISATION

No.	Action	Details	Timing	Resources
GD 1	Review the effects of grid decarbonisation on Council's emissions and adjust emissions pathway as required	This effect should be reviewed annually and factored into the emissions pathway as required.	Annually	Low to Medium

10.2 BUYING CLEAN ENERGY

No.	Action	Details	Timing	Resources
CE 1	Determine timeline to increase to 100% Greenpower for small sites	• 50% accredited Greenpower purchased for 'Small Market' sites from January 2023.	Short term	Low
CE 2	Assess opportunities for change of sites between 'Large' and 'Small Market' accounts	• Lennox Head Community Centre • Lennox Head WWTP – Recycled Pump Station • Pacific Pines Lennox Head - Pump Station • Swift Street Ballina - Pump Station • Angels Beach Drive East Ballina - Pump Station	Short term	Low

10.3 BEHIND-THE-METER-SOLAR AND BATTERY STORAGE

No.	Action	Details	Timing	Resources
BTM 1	Increase the number of new solar PV systems installed and expand some existing systems, in conjunction with installation of battery energy storage systems, where appropriate	• Plan and budget for proposed locations identified in Table 22 below based on quotes/feasibility assessments. • Review annually and align with technology developments.	Short/Long term	Medium to High

TABLE 22: COST, SAVINGS AND PAYBACK PERIODS FOR SHORT TO MEDIUM TERM SOLAR PV AND BATTERY STORAGE SYSTEMS

Short to Medium term Cost, savings, and Payback periods						
Proposed solar PV locations	**Capacity kW**	**Annual generation, kWh**	**Potential constraints**	**Indicative cost**	**Savings**	**Payback period**
Alstonville Cultural Centre	60	87,600		$66,000	$18,943	3.5 years
Swift Street PS	65	83,000		$84,500	$11,839	7.1 years
Community Gallery	TBC	TBC				
Visitor Information Centre (VIC) & precinct	TBC	TBC	Space may be the main potential constraint.			
Paradise FM	TBC	TBC				
Ballina WWTP – evaluate upgrade with 450W panels or with 5B or equivalent	250	400,000	A water-based model to expand the current system OR upgrading the current system can be considered. The current system payback will only recently have been achieved, so this may be a constraint to a short-term upgrade.	$450,000	$47,052	9.6 years
Ballina WWTP – develop 420 kW water-based array	420	684,000		$1,470,000	$80,459	18.3 years
Lennox Head WWTP – develop ~250 kW water-based array	250	407,000	A smaller 250 kW water-based system could serve the main electricity account, whereas a larger system to serve all three meters could require council to become a HV customer to consolidate accounts.	$875,000	$42,544	20.6 years
Lennox Head WWTP – link 3 x meters (HV) and install 420 kW water-based array	420	683,000		$1,470,000	$71,395	20.6 years

Short to Medium term Cost, savings, and Payback periods						
Proposed solar PV locations	**Capacity kW**	**Annual generation, kWh**	**Potential constraints**	**Indicative cost**	**Savings**	**Payback period**
Alstonville WWTP – expand solar (current biosolid bag area), and install BESS for Peak period operation	100 (+100 kWh BESS)	160,000	Expansion may require changes to the location and onsite management of biosolids, as well as monitoring of the performance of the new 5B system to determine the role of storage in load management.	$270,000	$22,757	11.9 years
Ballina Airport – additional solar on the terminal roof and/or added carports	200	320,000	The size of future additional capacity depends on the site's demand as well as future EV charging, such as for rental car bays.	$490,000	$38,384	12.8 years
Ballina War Memorial Pool – add 40kW solar on the south end of the roof	40	64,000	This space could be used for solar PV or solar matting to assist with pool heating. Both business cases will be evaluated.	$64,000	$7,832	8.2 years
Alstonville Aquatic Centre – solar carport on north-east (32) and north (~20) sides with BESS	>50 (+100 kWh BESS)	80,000	There is tree shading in the main car park which may be a constraint. Consideration of battery needs will be assessed with reference to the yield and utilisation of the current PV system and future EV charging if implemented.	$165,000	$10,404	15.9 years
Angels Beach Drive SPS - solar PV + BESS on land adjacent to the SPS	50 (+100 kWh BESS)	80,000	A secure fence / boundary would have to be included as part of the project scope, adding to the implementation cost. Storage may be needed due to the 'peaky' nature of SPS demand.	$155,000	$11,370	13.6 years
Council Admin - expand solar on N-E roof + BESS, install carport solar in rear staff carpark	50 (+100 kWh BESS)	80,000	Expansion would be subject to planned local re-development work. Due to the low energy demand of the Council building and expansion PV array would likely require a battery.	$212,500	$11,739	18.1 years
Depot - expanded solar array and BESS	50 (+100 kWh BESS)	80,000	Load may expand due to EV charging and planned new building.	$170,000	$13,609	12.5 years

Short to Medium term Cost, savings, and Payback periods						
Proposed solar PV locations	**Capacity kW**	**Annual generation, kWh**	**Potential constraints**	**Indicative cost**	**Savings**	**Payback period**
Lennox Head Cultural Centre – expand solar + BESS on community rooms, install solar carport	50 (+100 kWh BESS)	80,000	Expansion has maximised solar on the main building, and there is limited added roof space. The carpark may offer good scope for more solar and EV charging.	$212,500	$11,031	19.3 years
BISC – expand solar array with BESS for night demand	25 (+50 kWh BESS)	40,000	There is space to double the size of the current system, optimal size can be selected taking current export into account.	$72,500	$6,055	12.0 years
Potential Generation Capacity	**1,240-1,580 (+650 kWh BESS)**	**1,961,600-2,251,600**	**This is an approximate total range. Feasibility assessments and optimum sizing will determine the final potential**			

The high-level analysis of solar opportunities was performed with the following inputs and parameters:

- *Council's energy billing data was used to estimate the applicable rate for calculation of cost savings, which for simplicity was taken to be 80% of the simple average rate and allows that savings in peak demand charges may be small or may not result for some sites. Rates for 2022/23 were used.*
- *Benchmark pricing for solar PV systems (flush roof-mount, tilted roof-mount and ground-mount systems) and inverters has been used.*
    - *Flush and fixed roof-mount systems - $1.1/W STC scale and $1.6/W LGC scale*
    - *Ground-mount systems - $1.3/W STC scale and $1.8/W LGC scale*
    - *Floating solar systems - $3/W STC scale and $3.5/W LGC scale*
    - *Carport solar systems - $2.8/W STC scale and $3.3/W LGC scale*
    - *Batteries $900/kWh*
- *80% self-consumption of solar is assumed in all cases and $0.05/kWh is assumed to apply for export solar*
- *Simple payback is calculated based on first year savings and a whole-life costing is not performed*

Continuing changes to energy charges, cost reductions in solar technology and in batteries, allied to the potential for grant funding to support implementation, will alter the costs and benefits for future solar and storage projects. More detailed site-specific analysis will also help to refine solar and battery sizing, self-consumption v export, optimise designs and perform whole-of-life economic analysis that will inform Council's decisions.

10.4 ENERGY EFFICIENCY

No.	Action	Details	Timing	Resources
EE 1	Continue to invest in energy efficient technologies	• Plan and budget for site specific opportunities identified in Table 23 below. • Review and identify opportunities annually.	Short to Long Term	Low to Medium
EE 2	Implement controls and monitoring systems	• Azility subscription. • Smart Building technologies including Building Management Systems for automated control and monitoring of HVAC, lighting, security, pumps etc.	Short term	Medium to High
EE 3	Track and report on the progress and impacts of energy efficiency initiatives	• Work with Azility platform to monitor and report on project savings.	Short term	Low to Medium

TABLE 23: IDENTIFIED ENERGY EFFICIENCY ACTIONS BY COUNCIL SITE

Action	Site	Timing	Resources
Upgrade to a smart meter/solar monitoring platforms to get ToU data for the account (evaluate solar and BESS potential with this data).	All sites	Short term	Medium
Use data monitoring services to monitor and report on electricity usage.	All sites	Short term	Low
Align low lift pump operation with solar	Alstonville WWTP	Short term	Medium to High
Optimise VSD/DO control	Alstonville WWTP	Short Term	Medium
Airside lighting upgrade to LED for remainder of lights.	Ballina Airport	Short/Medium term	Medium
Upgrade to a smart meter to get ToU data for the account (evaluate solar and BESS potential with this data).	Montwood Drive SPS	Short/Medium term	Low to Medium
Confirm if any non-standard or decorative lights were omitted from the LED upgrade and plan for upgrading to LED (Council owend).	Streetlighting	Short/Medium term	Low
Finish replacement of remaining T5 and CFL lights to LED.	Lennox Head Cultural Centre	Short/Medium term	Low
VSD on low lift pump.	Alstonville WWTP	Long term	Low to Medium

Action	Site	Timing	Resources
Replace LPG heating with small heat pumps.	Ballina War Memorial Pool	Long term	Medium
Monitor developments in UV-LED disinfection and trial as this becomes more commercially viable.	Ballina, Lennox, Alstonville, Wardell WWTPs	Long term	High
Implement VSD controlled pumps (long term, likely well after 2030).	Byron St SPS	Long term	High
Ongoing Essential Energy bulk replacement programs with more efficient technology.	Streetlighting	Long term	Low
Implement smart controls with future LED upgrades (Essential Energy), and Council owned streetlighting.	Streetlighting	Long term	Low to Medium
Continue to sustain VSD performance with preventative / proactive maintenance and optimisation services.	VSD upgrades	ongoing	Low to Medium

10.5 GAS TO ELECTRIC TECHNOLOGIES

No.	Action	Details	Timing	Resources
GET 1	Replace all gas devices with equivalent electric device by 2030	• Alstonville Aquatic Centre • Ballina War Memorial Pool • Flat Rock Campground • Tourist Information Office • Amenities hot water systems	Medium to long	Low to Medium

10.6 SUSTAINABLE TRANSPORT

No.	Action	Details	Timing	Resources
ST 1	Develop a fleet transition strategy	Evaluate and scope the indicative pathway for transition to low/no emissions fleet - timing, cost, charging, fitness-for-purpose and whole of life costing - for commercially feasible categories ie passenger vehicles, utes and vans.	Short	Medium to High
ST 2	Electric Vehicle Goals	Evaluate and scope aligning with or aspiring to meet the goal of NSW Government's *Electric Vehicle Strategy* to electrify government fleet by 50% by 2026, and 100% by 2030.	Medium	Medium
ST 3	Electric Vehicle Trials	Trial electric passenger vehicles and utes to test their suitability for various Council functions / tasks.	Short term	Low
ST 4	Monitor for developments in electric vehicle and emissions reducing transport technologies	• Monitor for EV incentives, policy, and other support ie funding. • Incorporate contemporary developments into Council's planning process and evaluation of electric fleet opportunities.	Short term	Low
ST 5	Participate in investigations/projects to increase EV Charging Infrastructure in the shire	• Assess all Council locations for potential location of EV charging infrastructure for Council and public vehicles. • Assess the potential future electrical capacity and charging infrastructure needs for Council's depot with the potential switch of utes, trucks and plant to electric over time. • Seek grant funding from NSW Government and other sources for charging infrastructure.	Short term	Low to Medium
ST 6	Provide training and accreditation to workshop staff for servicing of electric vehicle fleet	Invest in upskilling Council staff to maintain and service electric fleet.	Short to medium	Low to Medium

TABLE 24: FLEET TRANSITION ASSUMPTIONS USED TO DETERMINE INDICATIVE PATHWAY TO ELECTRIC

Category	Number of Fleet	Main constraints / other factors	Likely period to transition to electric	Timing
Mowers	12 diesel, 6 petrol	Electric ride-on mowers are commercially available and a number of councils are beginning to purchase these.	Council has started to purchase EV mowers and it is assumed that this transition can happen over the next 5 to 6 years for all mowers.	Medium/Long term
Passenger	35 petrol, 2 diesel	Most cars are also personal vehicles so staff will switch to EV based on their own considerations	Cars are assumed to switch to EV by 2030 with low initial adoption, increasing later	Medium/Long term
Ute	65 diesel, 6 petrol	Full electric utes and diesel-electric hybrids are available commercially and cost and suitability for the range of tasks they are used for across an organisation are issues to be assessed.	It is assumed that a transition to electric utes may occur after 2025 and could occur over a 5-15 year period depending on suitability for all tasks and vehicle age / distance travelled. While an EV pathway is modelled for this work a transition to hybrids may be more suitable in the short to medium term.	Medium/Long term
Van	4 diesel, 1 petrol	Electric vans are commercially available, cost and suitability for Council needs would have to be assessed	Assumed to transition to EV towards the latter part of this decade	Medium/Long term
Truck	37 diesel, 1 petrol	Technical and commercial viability and availability across large truck and plant items	Post 2030 it is assumed that these items can be progressively transitioned to electric trucks and plant that are fit-for-purpose by 2040	Medium/Long term
Heavy plant	32 diesel			Medium/Long term

10.7 WASTE MANAGEMENT

No.	Action	Details	Timing	Resources
WM 1	Align corporate waste reduction with NSW Waste and Sustainable Materials Strategy 2041	10% waste reduction, 80% recycling and 50% reduction in organics to landfill (e.g. by food composting, FOGO collection, etc).	Medium term	Low to Medium

10.8 VALUE CHAIN AND SUSTAINABLE PROCUREMENT

No.	Action	Details	Timing	Resources
VC 1	Include scope 3 emissions in Council's carbon footprint calculations	Broaden the scope of Council's carbon footprint to include scope 3 emissions – value chain and upstream and downstream emissions.	Medium term	Medium to High
VC 2	Accounting and reporting (scope 3 emissions)	Investigate the implications of aligning carbon offsetting and reporting in line with global standards - the ISO Net Zero Guidelines and GHG Protocol, and programs such as the Climate Active program.	Medium term	Medium to high
VC 3	Identify Sustainable Procurement processes	Identify key areas within procurement processes where consideration of Council's emissions reduction and broader sustainability goals guidance can be included to lead to more informed and better procurement decisions.	Medium term	Low to Medium
VC 4	Staff engagement and training	Regular staff engagement and training in sustainable procurement processes and reduction of value chain emissions.	Ongoing	Low to Medium
VC 5	Review Design, Equipment and Services specifications	Continual review of equipment and services specifications to identify opportunities to incorporate the sustainable procurement framework into procurement and use of equipment and services.	Ongoing	Low to Medium

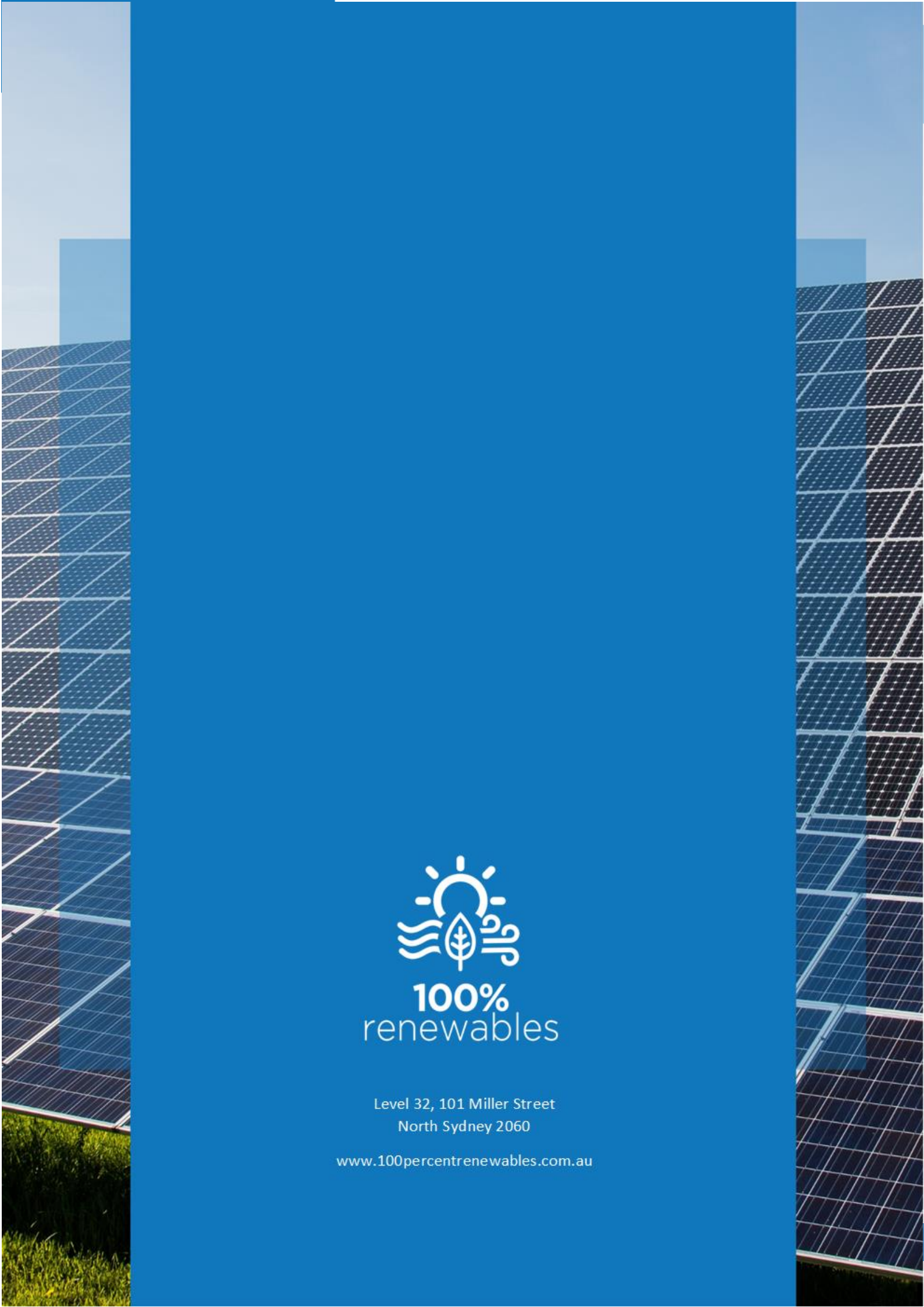
No.	Action	Details	Timing	Resources
VC 6	Regular review of procurement policy, frameworks and processes to include requirements for low or net zero emissions.	Include requirements for low or net zero emissions in specifications, evaluation criteria.	Ongoing	Low to Medium

10.9 CARBON OFFSETTING AND/OR SEQUESTRATION

No.	Action	Details	Timing	Resources
COS 1	Investigate Accounting and Reporting (offsetting and sequestration) in line with global standards	Investigate the implications of aligning carbon offsetting and reporting in line with global standards - the ISO Net Zero Guidelines and GHG Protocol, and programs such as the Climate Active program.	Short Term	Low to Medium
COS 2	Develop a carbon sequestration and offset strategy	Develop a carbon sequestration and offset strategy to ensure plans can be put in place as the 2030 target year nears.	Medium term	Medium to High

10.10 FUNDING EMISSIONS REDUCTION MEASURES

No.	Action	Details	Timing	Resources
F 1	Implement an approach to funding emissions reduction actions	Implement a structured and pro-active approach to the identification of projects to be implemented, and to the securing of budget or external funds – allied to having 'shovel-ready' projects will help Council successfully attract funds.	Ongoing	Low to Medium



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