COUNCIL EMISSIONS REDUCTION PLAN

Wingecarribee
SHIRE COUNCIL

"Council is **committed** to both **adapting** our operational plans to the already changing climate and **continuing to reduce** emissions from Council operations and services."

Aerial view of Robertson.

Wingecarribee Shire Council acknowledges the Gundungurra and Tharawal people as the traditional custodians of this land we now call the Wingecarribee Shire. We pay our respect to Elders past, present and emerging.

EXECUTIVE SUMMARY

Setting Targets

- *100% renewable electricity purchased by 2025 through a power purchase agreement*
- *1 GWh per year of electricity efficiency improvement implemented by 2030*
- *100% Electric Vehicle (EV) use for council vehicles that are 5-8 passenger capacity by 2028 with the EV trial beginning in 2023*
- *100% of our hot water systems at all swimming pools switched from gas to a combination of heat pumps and solar by 2030*

REDUCTIONS TO DATE SUMMARY

Council's operational related emissions have been monitored since 2013. Moving towards our Net Zero goals so far Council has accomplished the following reductions:

- 377kW of solar panels installed on Council buildings resulting in 2.8% of Councils electricity coming from on-site renewables.
- 41% reduction in emissions from streetlights through upgrades to LED lights.
- Better energy and water efficiency through installed variable speed drives on water & sewer pumps.
- Implementation of Building Management System at Moss Vale Civic Centre to better manage energy consumption
- 1,331 tCO2e avoided resulting from $400,000 invested through the Renewable Energy Fund (REFund) project.

FUTURE ACTIONS AND RESOURCING

- Energy Efficiency Improvements
- Installation of renewable energy sources, Solar / PhotoVoltaics (PV) at Council sites
- Transition from gas at pools to more sustainable electric heat pumps
- Sewerage Treatment Plant (STP) improvements moving away from more harmful methane generation
- Transition of Council fleet to Electric & Hydrogen Vehicles
- Implement Sustainable Procurement practices across Council
- Power Purchasing Agreement (PPA) for 100% Renewable Energy


GAS
WATER & SEWER TREATMENT
TRANSPORT & FUEL
ELECTRICITY
EMBODIED EMISSIONS
We are committed to reducing the emissions from the top 5 sources.

Waratahs at Robertson Train Station

You are here!

CONTENTS

View across the
Yarrunga Valley,
Morton National Park

"The Plan outlines the key steps that will be taken to address greenhouse gas emission reduction goals in the Community Strategic Plan Wingecarribee 2031."

1 ABOUT THIS PLAN

Council is committed to both adapting to the already changing climate and continuing to reduce emissions from Council operations and services. Mitigation and adaptation actions are often complementary and provide ongoing benefits such as reduced costs and less disruption to services.

Community Strategic Plan Goals

4.4.1
Manage Council's resource consumption, with significant increases in efficiency and adoption of renewable energy

4.4.3
Plan for predicted impacts of climate change

4.4.4
Monitor and report on community progress to achieving net zero emissions and identify key steps to achieving a carbon neutral Council

The services, operations and infrastructure that Council provides are vulnerable to the impacts of climate change. For example, changes to rainfall may affect water supply arrangements, increased extreme weather events impact infrastructure and require resources for clean-up, higher temperatures will impact buildings performances and recreational facilities.

This Greenhouse Gas Reduction Plan is part of a suite of documents which outline Council's strategic approach to climate change adaptation, mitigation and supporting the community.

The Plan outlines the key steps to address the greenhouse gas emission reduction goals in the Community Strategic Plan Wingecarribee 2031.

Storm damage: Vandenburg Rd, Robertson.

Top right: Bushfire damage.

Committed to doing ALL WE CAN to avoid extreme weather events.

WHAT ARE GREENHOUSE GASES?

Greenhouse gases create what is known as the Greenhouse effect. They create a barrier a lot like a greenhouse where the sun warms inside through the glass but with the greenhouse effect the sun is warming the earth's atmosphere through a barrier of natural gases. Natural processes keep the incoming and outgoing energy balanced until the greenhouse gases (GHGs) prevent enough heat releasing into the atmosphere causing our planet to warm up. It is the anthropogenic (man-made) effects that are causing the GHGs to warm our planet, primarily carbon dioxide (C02), methane and nitrous oxide are the main GHGs we are worried about. These GHGs are produced mostly through the burning of fuels, landfill waste, agriculture practices and fluorinated gases, like those used in refrigerators. (UN)

ENVIRONMENT & CLIMATE CHANGE STRATEGY

Vision + Framework: Key concepts + targets

You are here!

- **Council Emissions Reduction Plan**
- Community Climate Action Plan
- Climate Change Adaptation Plan
- Sustainability Action Plan

Detailed actions, reviewed annually and integrated into business planning.

- Council Action Program & Reporting
- Community Engagement Program

Implementation and integration into systems.

YOUR ENVIRONMENT LEVY at WORK

Presync

A separate Climate Change Adaptation Plan details how Council can adapt its services and assets. These two documents sit under Council's Environment and Climate Change Strategy which identifies the key goals over the next ten years and the approach.

This Plan has been developed with input from the community, the former Climate Change Advisory Panel and Council staff. A "pathway to net zero" study was conducted. The study was undertaken with the support of the NSW Government, through its Sustainability Advantage program, and delivered by Presync. The development of the Plan was partially funded by the Wingecarribee Environment Levy.

NET ZERO EMISSIONS

Refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere. Getting to net zero means we can still produce some emissions, as long as they are offset by processes that reduce greenhouse gases already in the atmosphere. For example, these could be things like planting new forests, or drawdown technologies like direct air capture. The more emissions that are produced, the more carbon dioxide we need to remove from the atmosphere (this is called sequestration) to reach net zero (Climate Council).

2 BACKGROUND

Climate Emergency Declaration

On 12 February 2020, Council declared a climate emergency (MN10/20). This plan is part of Council's response to the declaration, addressing the role of Council's operations and provision of services to the community.

The concept of a climate emergency acknowledges that the Wingecarribee region is vulnerable to the impacts of climate change such as heatwaves, bushfires, severe storms and changes in rainfall. Declaring a climate emergency recognizes that the scope, pace and breadth of action to address climate change needs to increase if we are to avoid global warming of more than 2 degrees.

The scale and speed of actions required is challenging and requires meaningful actions from individuals, businesses and all levels of government.

THE NEXT 20 YEARS ARE CRITICAL - IPCC

The Intergovernmental Panel on Climate Change's (IPCC) Global Warming of 1.5°C Special Report (2018) and Assessment Report 6 Climate Change 2021: The Physical Science Basis (2021) identified the next decades as critical to maintaining a pathway below 2 degrees warming. Reducing that limit to 1.5 degrees warming is preferred in order to avoid the worst impacts of climate change. Both a 1.5°C and 2°C limit will be exceeded during the 21st century without deep reductions in greenhouse gas emissions in the coming decades. A 1.5 degree pathway requires more rapid and pronounced transformation over the next decade compared to a two degree global warming pathway.

WHAT OUR COMMUNITY SAYS

In 2020/21 over 500 residents provided input for the development of the Environment and Climate Change Strategy and this Plan.

The engagement highlighted the groundswell of local action from passionate residents, businesses and organisations that are already acting on the community's desire to see a more sustainable way of living in Wingecarribee Shire.

Our community is well informed and have a clear sense of urgency for Council and the community to increase our response to climate change. The community told us they are concerned about an increase of natural hazards such as fire and drought, and the impacts on biodiversity. The community feedback showed that setting emissions targets is a priority. Our community's vision is also ambitious with some big picture carbon positive ideas.

COMMUNICATING FEEDBACK

Climate Change Concerns

- Impact of natural hazards 87%
- Water security and drought 85%
- Risk to biodiversity 84%

Top Action Wanted of Council

- Set key Council climate change targets to drive local and regional change
- Promoting more sustainable building practices
- Wingecarribee Shire should aim to become "Carbon Positive", generating an economic benefit from selling excess energy back to the grid, and repurposing recycled waste into building, landscaping, or agricultural materials. (Youth Workshop Statement)

411 SURVEY RESPONSES

100+ POP-UP ATTENDEES

57 WORKSHOP ATTENDEES
INCLUDING A YOUTH WORKSHOP

COMMUNITY ESTIMATED EMISSIONS 2019, 1,123,000 tco2e

COMMUNITY CALCULATED EMISSIONS 2019, 20,214 tco2e

COUNCIL'S POSITION

Council has been monitoring and reducing emissions from our operations since 2013. Some of the key actions achieved to date include establishing a Revolving Energy Fund (REFund), 377kW of solar installed on Council buildings and the development of an organisation wide Climate Change Adaptation Plan.

Responding to a climate emergency requires planned, proportionate and meaningful actions to adapt to the already changing climate and reduce the level of impact.

Mapping out Council's largest emission sources, undertaking a review of Council systems, processes and resourcing, a set of strategic options were developed to create a Net Zero Emissions Council in the most effective way possible.

Moss Vale War Memorial Aquatic Centre

To address the climate emergency, the council's response and actions will be:

PLANNED

- We will use the Revolving Energy Fund (REFund) to deliver projects where budget constraints mean the projects are unlikely to go ahead otherwise or as a catalyst to trial new types of actions.
- Put in a planned item to highlight embedding resource efficiency measures in Council Strategic documents.
- We will also build the capacity of staff across Council so that we can make the most of opportunities as they arise.

PROPORTIONATE

- We will set targets to guide the extent of action required in line with keeping global warming below 2 degrees, with an ambition of keeping below 1.5C.
- As the pace of actions needs to increase, changes to resourcing will need to be considered to match the scale of action required.
- We will allocate time and resources to achieve the actions in this Plan and we will also seek out grant and partnership opportunities.

MEANINGFUL

- Our program of actions will focus on driving systemic change that goes beyond the life of a single project.
- We will focus on developing systems and standards that establish climate change considerations in business processes, such as procurement and project management.
- We will take opportunities to work in partnership with other councils, government agencies and research institutions to get the benefit of collaboration and others experience, as well as to share our own expertise.

"The climate emergency movement seeks to accelerate and broaden the scope of societal responses. Local governments declaring a climate emergency are accelerating their own level of response to climate change as well as encouraging others, in particular other levels of government, to do likewise" (Australian Parliament House, 2022).

Challenges

There are some key challenges for adequately addressing the rate of response required.

Accelerating Change

Council has been successful to date in reducing corporate emissions however, we know we need to continue and even increase the speed of action to have the best chance of keeping global warming below 2 degrees. Undertaking more actions at a faster pace is a challenge.

Resourcing

The second key consideration in responding to the climate emergency is to establish adequate resourcing to support the actions over the near future.

The Revolving Energy Fund (REFund) has to date served as a catalyst to fund energy projects that have a strong return on investment. The Revolving Energy Fund (REFund) is however relatively small and additional actions also need to be undertaken as part of BAV capital works and asset management projects. Grants are also utilised where possible to extend resourcing.

Increasing the rate of actions is likely to require

- Additional resourcing and financing
- Climate change adaptation and emission reduction integrated into staff roles
- corporate leadership
- Efficiency measures built into asset management and projects
- Integration of mitigation
- Increasing the amount of funding allocated to support the community for adaptation and to assist in emission reduction which is a priority for the next 5 years.

More information on supporting the community is found in the Community Climate Action Plan.

3 PATHWAY TO NET ZERO

Where We Are Going Next...

Council has undertaken an emissions pathway study with Presync to determine the priority actions to reduce emissions, identify market influences, and to establish emissions reduction goals.

Council has adopted a target of net zero emissions from Council operations by 2030.

This timeframe is more ambitious than the current targets set by NSW Gov (2050) and recognises that some of the actions currently underway will significantly reduce Council's emissions.

Therefore, we are in a good position to achieve this timeframe if we continue on our pathway. In addition, the faster we reduce our emissions the more likely we are to maintain global warming below 1.5 degrees and avoid the worst of the climate change impacts. Many other councils across Australia have put in place similar targets and timeframe (find out more here).

There are several key intermediate goals on the pathway to net zero emissions.

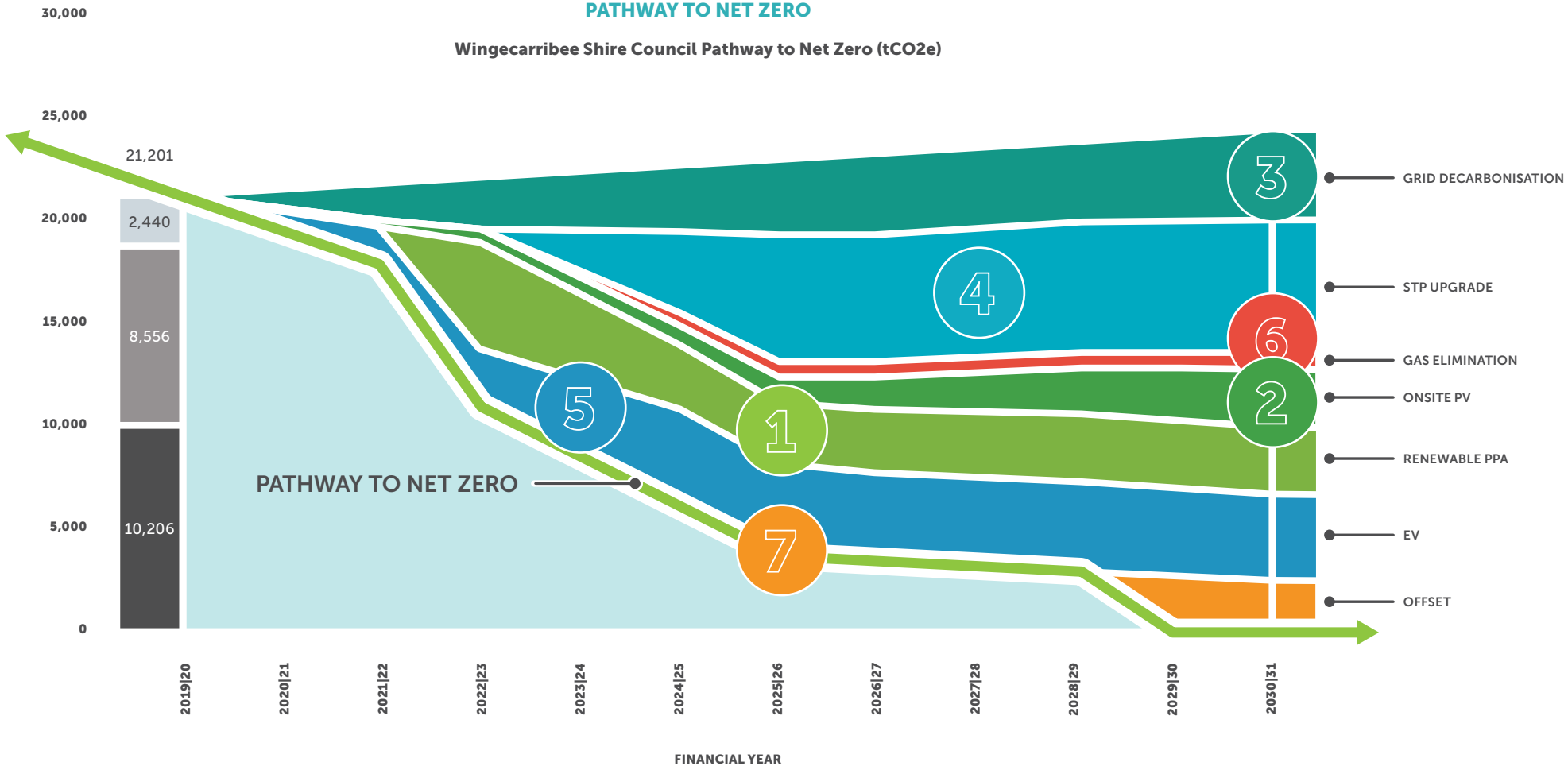
KEY GOALS REQUIRED TO REACH THE 2030 NET ZERO TARGET

1. 100% electricity from renewable sources used by 2025 (Renewable PPA)
2. Produce up to 15% of our electricity from renewables on site by 2030 (Onsite PV)
3. 1 GWh per year of electricity efficiency improvement implemented by 2030
4. Upgrade Sewage Treatment plants. Due to be completed 2027 (STP Upgrade)
5. Begin EV fleet trial by 2023: 6-8 passenger vehicles 100% electrical passenger vehicles by 2028 (EV)
6. Gas switch - small hot water systems 100% by 2025 and all pools water heating switched from gas to electricity by 2030 (Gas Elimination)
7. Offsets. Offset investigation begins 2025 (Offsets)

WHAT DOES tCO2-e MEAN

"There are six main GHGs, so it's helpful to count them with a single unit: tCO2e. tCO2e stands for tonnes (t) of carbon dioxide (CO2) equivalent (e). "Tonne" is a fancy way of writing metric ton, or 2,200 pounds. "Carbon dioxide equivalent" is a standard unit for counting greenhouse gas (GHG) emissions regardless of whether they're from carbon dioxide or another gas, such as methane" (Climate Neutral, 2022).

PATHWAY TO NET ZERO



Graph note pathway: assumes 1.24% population growth and existing electricity grid decarbonisation.

PATHWAY TO REACHING THESE GOALS

To achieve the Net Zero target and the stepping-stone goals, a mix of initiatives will be pursued following the principles below.

"The methodology used to prioritise actions has been to focus on the biggest emission sources first."

1.

Electricity is our largest emissions source and therefore the assets with the highest electricity use are prioritised.

2.

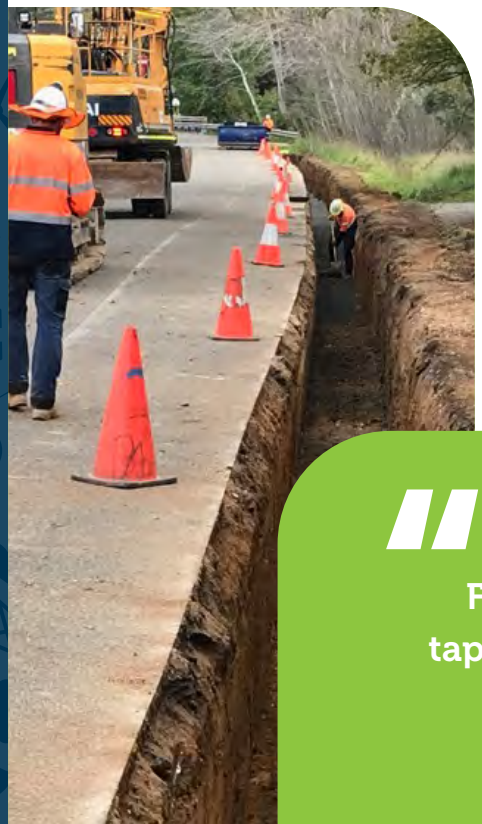
Secondly the cost of abatement, that is the cost of the emission reduction, for different projects has been compared.

For example, energy efficiency actions, are often cost effective for the emission reduction achieved.

3.

Driving systemic change is another priority and therefore actions which create new ways of doing things or are embedded into business practices are also prioritised to make the most of the resources available.

4 COUNCIL GREENHOUSE GAS EMISSION SOURCES

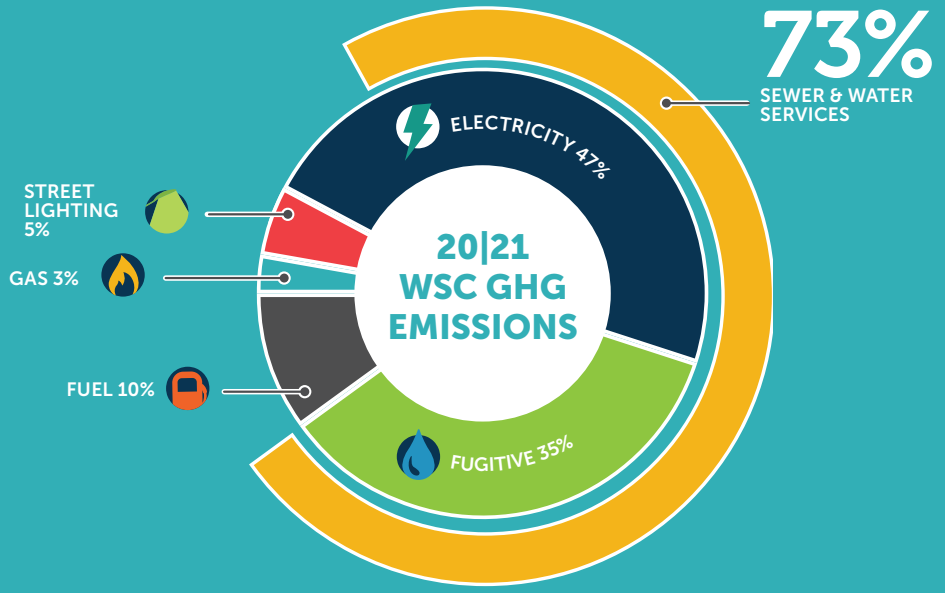


GLOBAL WARMING POTENTIAL

The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO2).

"WASTEWATER = Flushing toilet, showers, taps and run off from streets as stormwater."

Sewer and Water Services is our Largest Emission Source



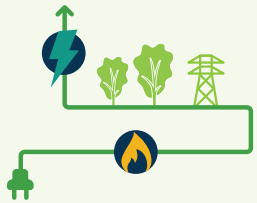
Direct emissions from sewage (Methane CH_4 and Nitrous Oxide N_2O) that is, providing water and sewer services are the most greenhouse gas intensive due to direct emissions from sewer and electricity services. These emissions are highly influenced during heatwaves as more electricity is used for supplying additional water. Years that have high rainfall events create more emissions from additional sewage pumping and treatment.

For example, the key factor in 2020/21 emissions being higher than 2019/20 was the increase in electricity use from a sewer services due to the above average rainfall.

This variability, especially in emissions from sewage treatment, makes it difficult to compare overall emission trends accurately year on year. Excluding sewage treatment emissions, Council's remaining emissions have decreased nine per cent in 2020/21 compared to 2015/16.

UNDERSTANDING GREENHOUSE GAS EMISSIONS

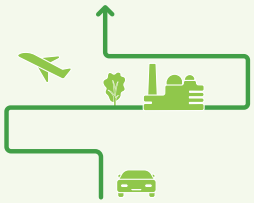
SCOPE 2 INDIRECT



UPSTREAM

- Line Loss
- Liquefied Natural Gas (LNG) use of electricity
- Facilities' use of electricity

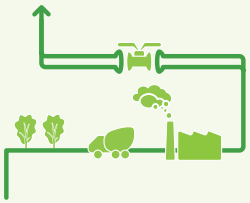
SCOPE 3 INDIRECT



UPSTREAM

- Purchased goods and services
- Business travel (small)
- Employee commuting (small)
- Sold electric - use by customers
- Waste Management (small)

SCOPE 1 DIRECT



OUR OPERATIONS

- Leaks and venting emissions from gas network
- Liquefied Natural Gas (LNG) venting and fuel
- Leaks from electric equipment of Sulfur Hexafluoride (SF_6) which is an extremely potent and persistent GHG
- Fleet fuel use
- Wastewater treatment

SCOPE 3 INDIRECT

DOWNSTREAM

- Sold gas - use by customers

Scopes 1 & 2

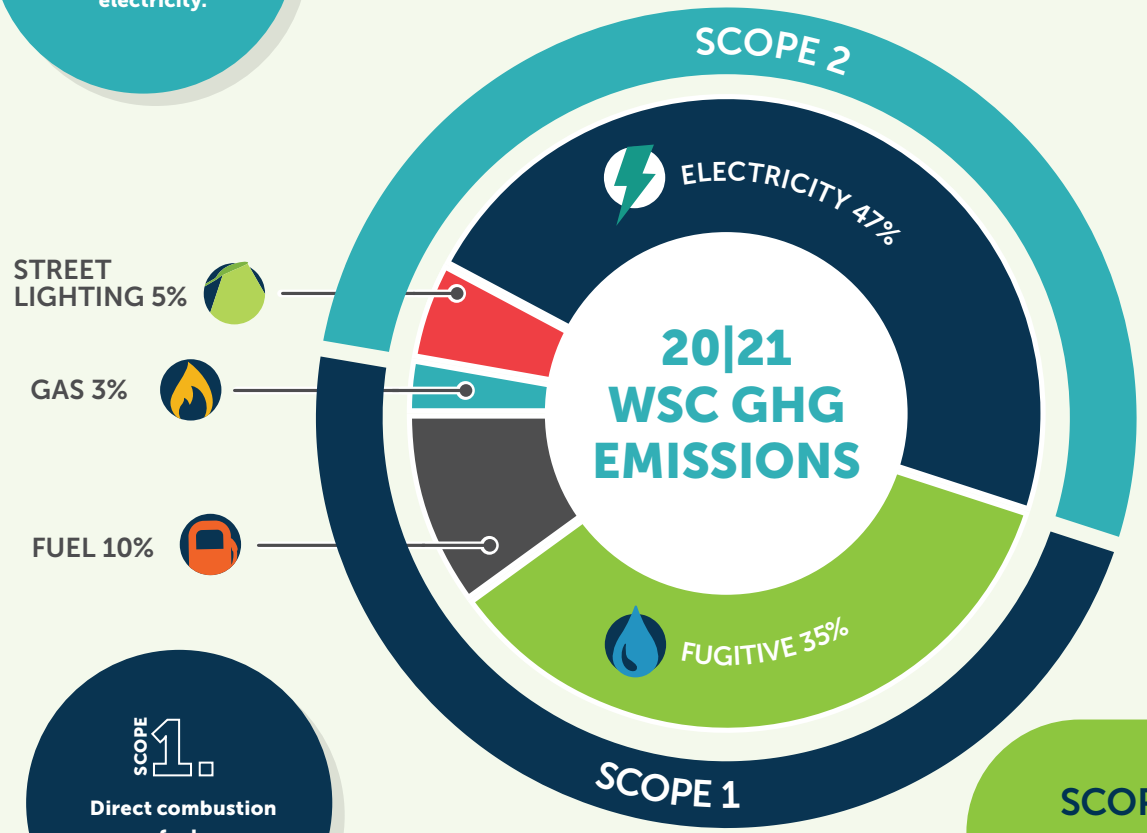
Emissions that are owned or controlled by a company.

Scope 3

Emissions that are a consequence of the activities of the company but occur from sources not owned or controlled by the company.

COUNCIL GREENHOUSE GAS EMISSIONS

SCOPE 2.
Grid electricity.



SCOPE 1.
Direct combustion e.g. fuel, gas, waste, fugitive emissions.

GREENHOUSE GAS EMISSIONS COMPARED TO 2015/16 BASE YEAR (TCO2-E)

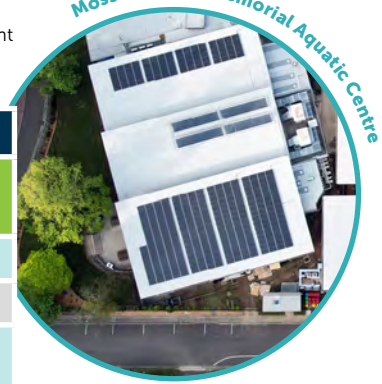
	Base Year			
Scope	**2015/16**	**2018/19**	**2019/20**	**2020/21**
Council Operations (excluding wastewater)				
1	*2,810*	*2,836*	*2,624*	*2,629*
2	*9,039*	*8,394*	*8,556*	*8,992*
3	*3,485*	*2,519*	*2,422*	*2,474*
Sub Total	**15,334**	**13,749**	**13,602**	**14,095**
Wastewater treatment fugitive emissions				
1	*7,761*	*6,465*	*7,399*	*10,644*
TOTAL	**23,095**	**20,214**	**21,001**	**24,740**

SCOPE 3.
Indirect sources of emissions

SCOPE 3

EMISSIONS ENCOMPASS ON AVERAGE 10% SPREAD ACROSS ALL SOURCES (EXCLUDING FUGITIVE) WHICH ARE VISUALLY SEPARATED IN THIS GRAPH.

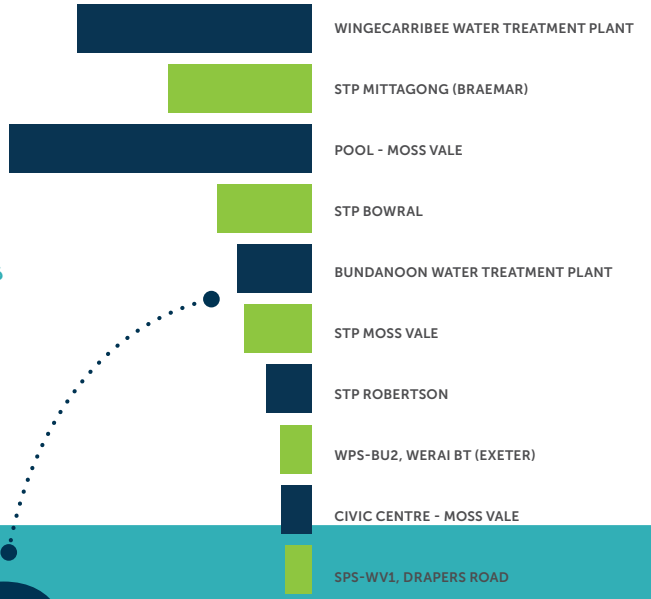
Use of solar has increased significantly since 2015/16, however it still represents a small amount of Council's total electricity use (2.8%).



SOLAR LOCATIONS AND VOLUME USED

WSC Solar Sites	Sum of Total Electricity Used on Site from Grid period (kwH) 20-21	Sum of Total Solar kwH generated used on site (kWh) 20-21	Sum of Percentage of sites electricity is from Solar
Bowral Library	*68794.132*	*29325.32*	*29.9%*
Resource Recovery Centre	*72794.7474*	*28751.63*	*28.3%*
Southern Region Livestock Exchange	*58834.20214*	*21611*	*26.9%*
Moss Vale Depot	*124295.3564*	*35139.7*	*22.0%*
Mittagong Welcome Centre	*40875.83349*	*9583.3*	*19.0%*
Moss Vale War Memorial Aquatic Centre	*615598.08*	*135962.48*	*18.1%*
Robertson Sewage Treatment Plant	*455389.7911*	*49440.45*	*8.4%*
GRAND TOTAL 2020/21	**1436582.142**	**309813.88**	

Council's annual Greenhouse Gas Report provides additional information including which sources we currently do not report on and why.



10 BIGGEST EMITTERS

Did you know?

31.98% of Council direct emissions come from our top 10 facilities. Our swimming pool facilities and Sewage Treatment Plant (STP) use the most energy. Facilities such as water and sewer pump stations are in their dozens which make it harder to represent their energy usage. We have however added Variable Speed Drive's (VSD) where possible to reduce their energy usage when water flow is low.

A Snapshot of Council's Emissions

Council's emissions come from:

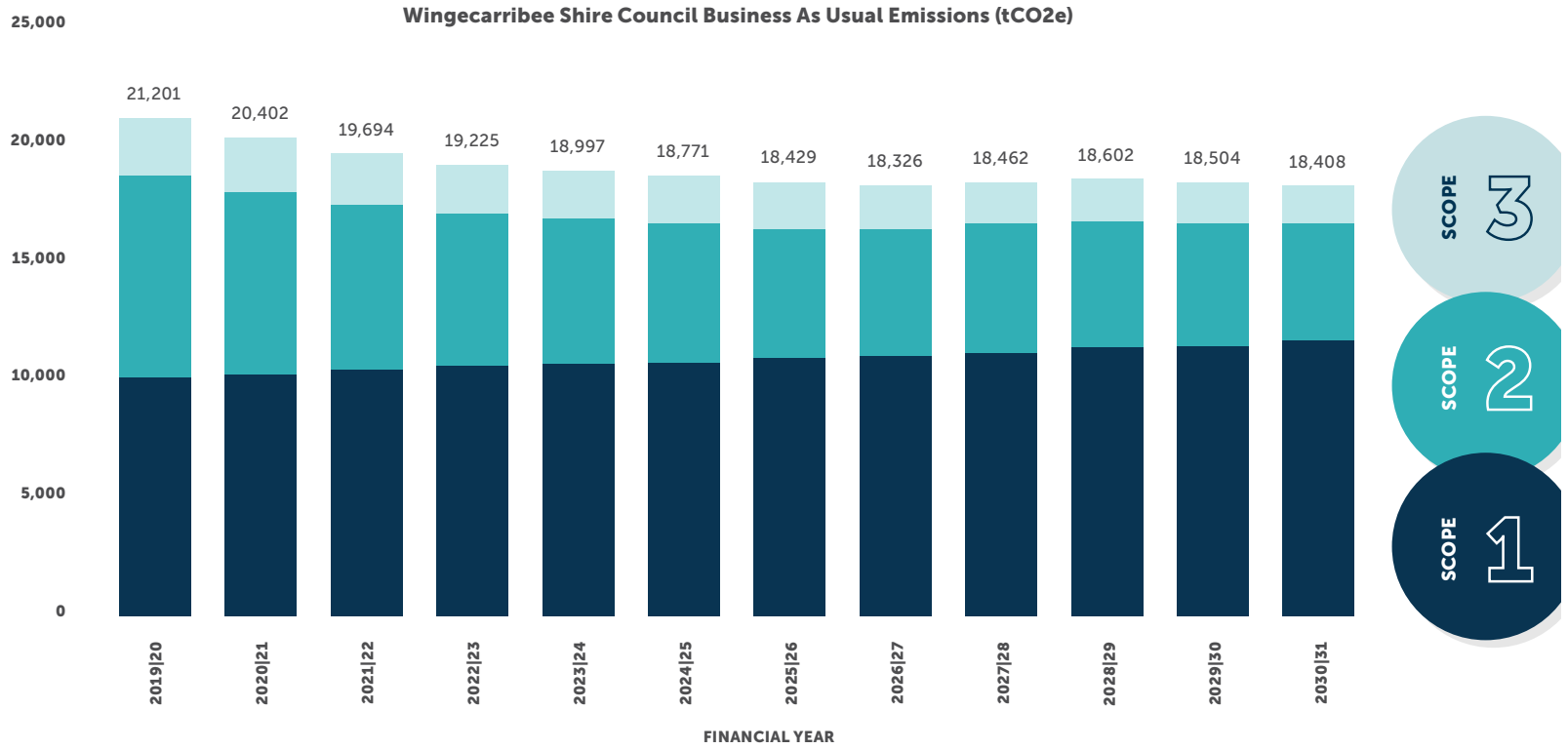
- *Providing services such as water, waste water treatment and streetlighting*
- *Facilities such as pools, ovals, libraries and the Civic Centre*
- *Assets such as road making equipment and fleet vehicles.*

BUSINESS AS USUAL (BAU) EMISSIONS GOING FORWARD

Business as usual emissions to 2030 have been estimated to show what would occur if no further emission reduction actions were undertaken and population continued to grow.

Emissions from providing water and sewer services are related to population growth. A growth rate of 1.24 per cent (the average of the past 10 years) was used to estimate emissions at 2030. Other types of growth, such as streetlighting for new developments, will also impact Council's emissions.

The business as usual emissions model considers ongoing decarbonisation of the national electricity grid as more renewable energy enters the grid. While grid decarbonisation creates a downward trend, additional actions are required to accelerate change and respond to net zero targets.



GRID DECARBONISATION

Refers to increasing the efficiency of electricity used (doing more with less) and also replacing the use of fossil fuels to generate electricity with renewable energy sources.

5 PLANNED ACTIONS

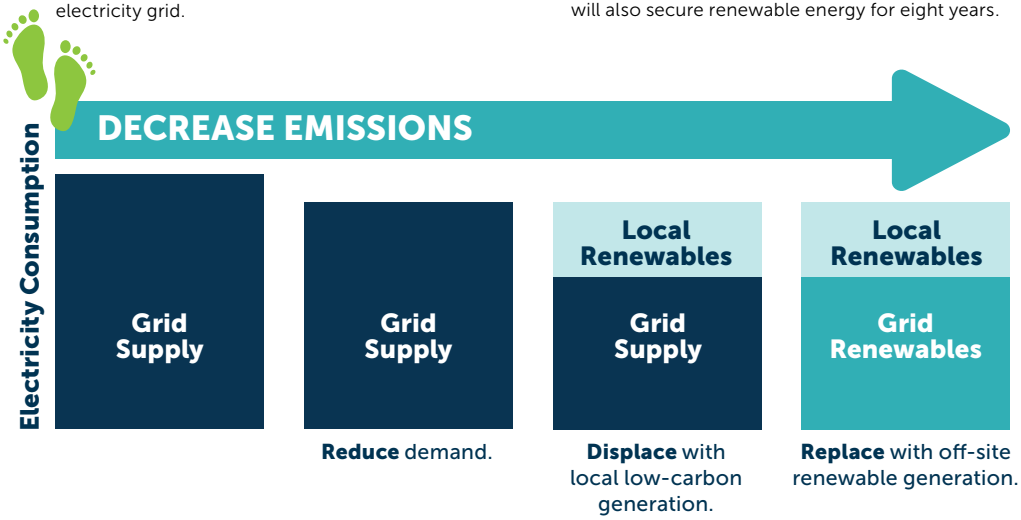
Electricity & Renewable Energy

Electricity is the largest greenhouse gas emissions source for Council operations and therefore reducing emissions from electricity is a priority. There are opportunities to increase energy efficiency, implement additional solar projects and purchase renewable energy generated offsite. We will need to do all three to achieve the best result. Decarbonisation of the electricity grid will also play a role in reducing electricity emissions as more renewable energy is incorporated into the electricity grid.

PROCURE

Entering into a Renewable Energy Power Purchase Agreement

Council is acting early on purchasing renewable energy. This ensures that action on climate change is fast tracked while we continue to undertake energy efficiency and solar projects as the opportunities arise. At the next electricity contract beginning in 2023, Council will join with Albury, Bega Valley, Queanbeyan Palerang, Penrith and Wollongong councils to purchase 100 per cent renewable electricity for the majority of Council's facilities. Council expects that the Power Purchase Agreement will save money compared to the current contract. The contract will also secure renewable energy for eight years.



Electricity makes up 47% of Council's total Emissions

REDUCE

Investing in energy efficiency measures

Energy efficiency is particularly important as it reduces not only the overall electricity use but also can reduce load stress on the electrical system and maintenance costs. Efficiency actions also compensate for increases in energy use due to growth, such as streetlighting for new development areas or sewerage pumping stations. Council's goal of reducing overall energy use by 10 per cent by 2030 is ambitious as our electricity use will increase with population growth and also as we switch from gas to electricity.

There are three strategies Council will use to increase energy efficiency:

- Integrate energy efficiency opportunities, such as LED lighting, into existing projects as part of routine works.
- Setting higher standards for common equipment and asset components.
- Keeping up to date on new technology that reduces energy use.

PRODUCE

Investing in onsite power generation at Council facilities

Council has set a goal of generating 15 per cent of the electricity we use from onsite renewable energy, such as solar systems. To reach the renewable energy production goal, Council has assessed which sites are the most likely to be suitable for solar.

New technology over the coming years is likely to provide additional opportunities for renewable energy production. This may be through increased efficiency of solar infrastructure, development of electricity sharing or decentralised grid arrangements. As new technology emerges council will investigate further options for increasing renewable energy production.

***Batteries** are currently not cost effective; however this is likely to change over the coming years. Council will continue to monitor developments in the market and identify sites with suitable energy use pattern to match batteries. Batteries will also be considered as part of future power purchase agreement strategies in the future.*

What does Council's Renewable Power Purchase Agreement Cover?

There are several different ways a power purchase agreement can be structured. Council's renewable electricity power purchase agreement is a contract between an electricity retailer and Council to supply a volume of electricity from a renewable source. The retailer purchases the renewable electricity from the generator, such as a solar or wind farm, on Council's behalf. The amount of renewable electricity purchased is equal to the amount of what Council uses. To ensure that the use of the renewable electricity can only be claimed once, Council also purchases and retires the large scale generation certificates (LGCs) associated with the renewable electricity.

The benefits of choosing a renewable electricity power purchase agreement over an ordinary retail agreement include:

- *Avoiding the volatility of the price of electricity as the price is agreed up front and there is a longer contract period. This means that there is certainty on the budget required to pay for electricity over a number of years.*
- *Emissions reduction targets are met earlier than would otherwise be possible if we constructed our own renewable energy sources to meet the same amount of electricity.*
- *Participating in a bulk purchase with other organisations can result in a more competitive price for electricity overall.*
- *Greenhouse gas emissions reductions and financial savings can be achieved in one project*

Why Not More Than 15%?

A goal of 15% for on-site power generation is a realistic target for Council, considering the available roof space, suitability of energy use patterns and suitable land. Council does not have land available for a solar farm to generate all the electricity we use, however there are several larger systems being planned to suit our large energy user sites. Onsite solar does create electricity cost savings, however savings also need to be assessed against the cost of the project including life cycle costs.

What is a LGC?

"An LGC, or large-scale generation certificate, is a tradable certificate for renewable energy. One LGC represents one megawatt hour (MWh) of accredited renewable electricity generated. There are more than 15 types of accredited renewable energy sources including wind, solar, hydro and landfill gas" (Renewable Energy Hub).

A TOTAL OF

4856 STREET LIGHTS already upgraded

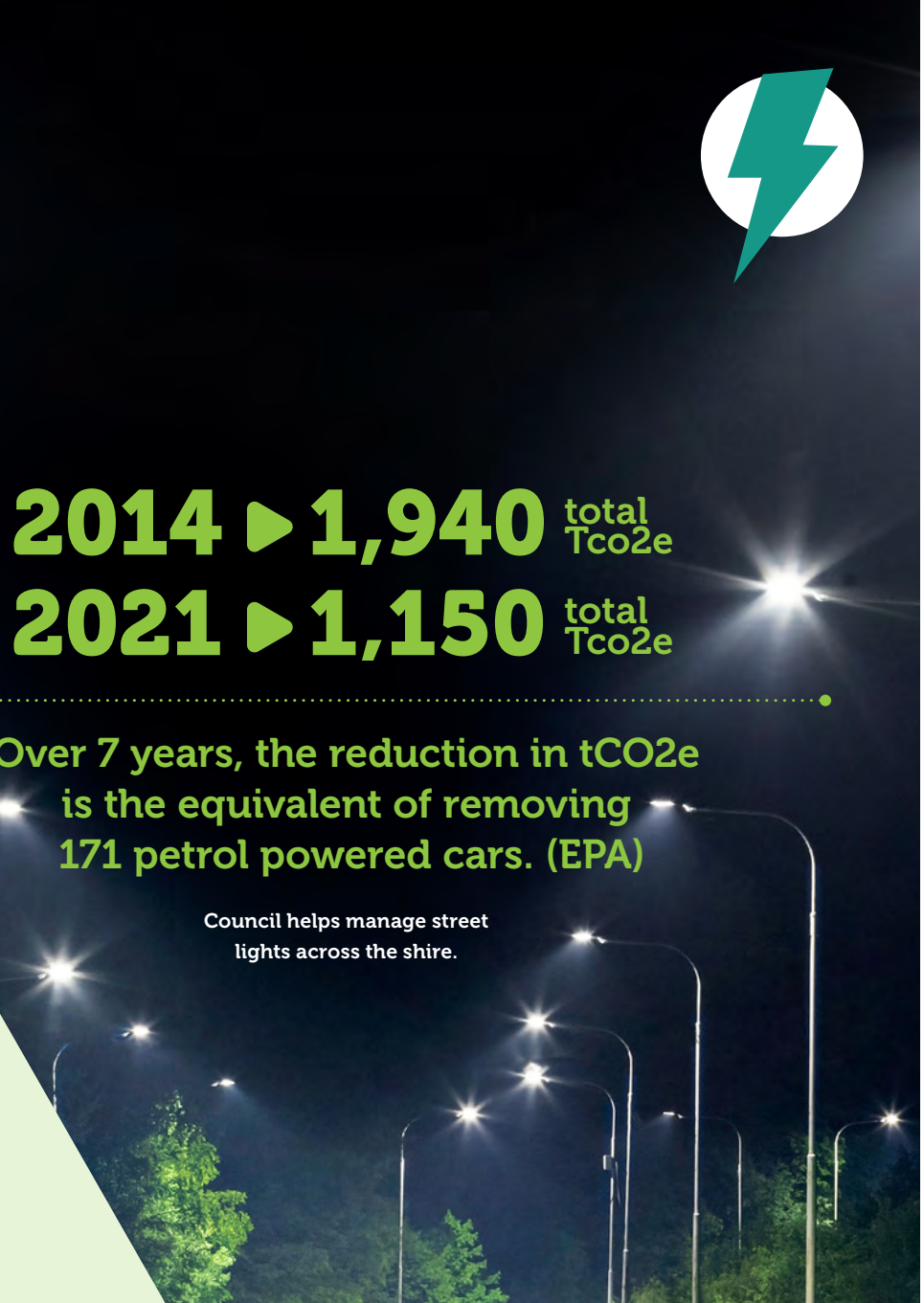
2014 ▶ 1,940 total Tco2e

2021 ▶ 1,150 total Tco2e

Over 7 years, the reduction in tCO2e is the equivalent of removing 171 petrol powered cars. (EPA)

Our past energy efficiency projects have shown great results. For example, between 2017 and 2019 Council partnered with Endeavour Energy to swap two thirds of streetlights to LED lights. This resulted in a 41 per cent reduction of emissions from streetlighting over just two years and over 300,000kWh each year.

Council is currently discussing with Endeavour switching the remaining lights and considering integration of smart lighting. This next round of LED lights will combat the increases in streetlighting emissions we are starting to see again since 2021 due to new streetlights.



Council helps manage street lights across the shire.

WHAT WE HAVE DONE ALREADY

Council has been undertaking projects to reduce its emissions since 2012. Some of the key projects are shown below.

REVOLVING ENERGY FUND

- In 2012 Council was an early adopter of a Revolving Energy Fund (REFund) to implement projects that reduce electricity use. The cost savings are returned into the fund to continue funding additional projects.
- Council has invested over $400,000 in REFund projects resulting on 1,331 TCO2e avoided to 2020/21 with further emission savings increasing each year.
- 9 projects have been completed through the fund.
- Projects include solar and energy efficiency lighting upgrades.

RENEWABLE ENERGY

- Council has installed solar at the Civic Centre, Bowral Library, Welcome Centre, Moss Vale Depot, Robertson Sewage Treatment Plant, Resource Recovery Centre, Southern Region Livestock Exchange, Moss Vale War Memorial Aquatic Centre and the Rural Fire Services headquarters.
- We've also installed solar lighting at sites that are hard to reach such as Mittagong Creek Walk.
- Our next electricity contract will be a 100% renewable power purchase agreement and this will cover the majority of our electricity use.

RESOURCE EFFICIENCY

- We have upgraded two thirds of the streetlights to LEDs, saving $100k per year.
- We have installed efficient LED lighting at ovals, libraries and other buildings. As lights need replacing, they will be switched to LED lighting.
- Water and sewer pumps have been fitted with variable speed drives where suitable to reduce energy use.
- Civic centre renovations included new insulation, more efficient air conditioning and a Building Management System (BMS) that switches off equipment after hours.
- Centralised irrigation systems are used at ovals to save both water and energy used for pumping.

SUPPORTING OUR COMMUNITY

- Through the Environment Levy we deliver workshops to inspire and support the community to reduce emissions and adapt to climate change. We also assist with audits of facilities leased by community groups.
- In partnerships with the Southern Highlands Botanic Garden, Earth hour has become an inspiring annual community event.
- The Community Assistance Grants and Business Awards provide funding and recognition to community groups to underdertake environmental projects.
- In 2015 Council installed a public electric vehicle charging station at the Welcome Centre in Mittagong to encourage low emissions tourism.

PARTNERSHIPS

- In 2017 council joined the Cities Power Partnership. Council pledged to roll out energy efficient lighting projects, install renewable energy on Council buildings, Support the local community to develop capacity and skills to tackle climate change, work with other councils on tackling climate change and support community facilities to access renewable energy through incentives, support or grants.
- Council is a member of the Canberra Region Joint Organisation and we participate in projects including the regional blueprint project.
- In 2020, Council declared a climate emergency and joined other councils in highlighting the need for increased action to reduce the severity of climate change.

ADAPTING

- We need to both reduce our greenhouse gas emissions and adapt to the changing climate at the same time.
- Council's Climate Change Adaptation Plan identifies actions Council can take to adapt the way we deliver services.
- Each year council manages the planting of over 5000 new trees in public places.
- We have received a number of grants Koala Karoke - climate impacts, IRCC grants looking at emergency water treatment facilities and Resilient seniors program.

ELECTRICITY REDUCTION ROADMAP

2011
SOUTHERN REGION STOCK EXCHANGE 30KW

2012
RENEWABLE ENERGY FUND BEGINS

MITTAGONG LIBRARY LED LIGHTING UPGRADE

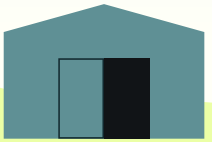
BOWRAL LIBRARY LED LIGHTING UPGRADE

2013
VISITORS INFORMATION CENTRE SOLAR 10KW

2014
BOWRAL LIBRARY SOLAR 30KW

2015
RESOURCE RECOVERY CENTRE SOLAR 25KW

RURAL FIRE SERVICE MITTAGONG SOLAR 20KW



2016
CIVIC CENTRE LED LIGHTING UPGRADE

2017
MOSS VALE AQUATIC CENTRE SOLAR 99KW

2017/18
STREET LIGHTING LED UPGRADE

2018
ROBERTSON SEWERAGE TREATMENT PLANT SOLAR 30KW

MOSS VALE DEPOT SOLAR 25KW

2021
CIVIC CENTRE SOLAR 99KW

2022
CIVIC CENTRE AIR CON UPGRADE AND NEW BUILDING MANAGEMENT SYSTEM

MOSS VALE MEMORIAL AQUATIC CENTRE LED LIGHTING UPGRADE

Fugitive Emissions From Wastewater Treatment

The second largest source of greenhouse gas emissions from Council operations comes from the fugitive greenhouse gases given off during the treatment of sewage at the six sewage treatment plants.

Four of the sewage treatment plants currently use anaerobic treatment systems, a process which results in methane and nitrous oxide being produced, both of which are potent greenhouse gases.

The Bowral, Moss Vale and Mittagong treatment plants are scheduled to be upgraded which will include switching to aerobic treatment systems which will significantly reduce methane emissions.

The upgrades are due for completion by 2027, reducing the fugitive emissions from these treatment plants by approximately 75 per cent.

As the upgraded treatment plants will use aerobic treatment, the capture and use of methane for energy is not a suitable option.

The large volume of fugitive emissions is also affected by the calculation method used. The current calculation method is a default modelled approach provided by NSW Government. Improvements to the data available and monitoring processes would result in a more accurate assessment of actual fugitive emissions. The infrastructure changes that are required to provide the more detailed data are being investigated. Improvements to the accuracy of calculation methods would reduce the fugitive emissions compared to the current estimates due to increased accuracy and data collection.

Fugitive makes up 35% of Council's total Emissions

Bundanoon Dam

Transport & Machinery Fuel

TRANSPORT AND MACHINERY FUEL

Our fleet is made up of passenger vehicles, operational vehicles and various heavy machinery for management of roads, public places, and the water and sewer networks. There is significant scope to reduce emissions from transport and equipment through increasing efficiency standards, changes to policies and systems, and switching to electric or renewable energy vehicles.

OPERATIONAL
1669km/month
over 65 vehicles

WATER LEASE
2869km/month
over 10 vehicles

Council's Operational fleet drive on average 2.85million km/year

SEWER LEASE
3015km/month
over 5 vehicles

Fuel makes up 10% of Council's total Emissions

HEAVY PLANT
40km/month
over 39 vehicles

BUS
1553km/month
over 2 vehicles

TRUCKS
1592km/month
over 53 vehicles

LEASE BACK
2801km/month
over 73 vehicles

There are currently two publicly available charging stations in the shire; one at the Council's Southern Highlands Welcome Centre (22kWh Slow Charge) and one at Mittagong RSL Club (Fast Charge), managed by the NRMA.

Charging Station; Southern Highlands Welcome Centre

Growth of Electric Vehicles

The electric vehicle market and supporting infrastructure is developing rapidly. The NSW Government is providing a range of strategies to accelerate the uptake of electric vehicles. Their Electric Vehicle Strategy published June 2021 identifies a target of electrifying their passenger vehicle fleet by 2030. An Electric Vehicle Fast Charging Master Plan also supports the effective distribution of charging infrastructure.

In the past few years electric vehicle sales have been increasing - from 1369 national sales in 2016 to almost 7000 in 2020, with predicted sales in 2021 to be between 13800-16800 nationally due to better affordability and technology (Electric Vehicle Council). NSW sales account for an estimated 30 per cent of total electric vehicle sales in Australia. With the current expansion of the electric vehicle market, the upfront costs of electric vehicles are likely to reduce rapidly.

Benefits

Electric vehicles have additional benefits of reducing fuel and maintenance cost by up to approximately 80 per cent. At the same time greenhouse gas emissions are also reduced. Data collected by Australian Government suggests that an electric vehicle will produce 50 per cent less greenhouse gas emissions than a traditional combustion vehicle. This would be reduced further if renewable energy was used to recharge an electric vehicle (reference Dept industry doc?).

Continue developing new systems and processes now

By 2025, running electric vehicles is expected to be cost neutral compared to petrol vehicles. Over the term of this plan, savings are expected from converting light vehicles to electric vehicles. This means Council needs to begin the process of switching to electric vehicles straight away as it will take time to set up our systems, processes and charging infrastructure.

Detailed analysis of our existing fleet and systems is underway to identify the earliest and best opportunities to begin the transition to alternative vehicles and machinery. This includes; identifying charging infrastructure needs, understanding maintenance arrangements, reviewing related human resources policies. Funding models for charging infrastructure is also being investigated including partnering with companies to invest in public and private charging infrastructure.

For vehicles or equipment that cannot be transitioned in the short term, for example where there is currently no suitable model available, a review of efficiency standards will be conducted so that procurement contracts support high efficiency vehicles and equipment.

By committing to a renewable electricity power purchase agreement from 2023, all our future electric operational vehicles could be charged with renewable energy wherever possible.

Charging of council FLEET Powered by RENEWABLE ENERGY

Transition fleet vehicles over the next six years

A gradual roll-in of electric passenger vehicles to replace vehicles at the end of lease will be undertaken, starting 2023. This approach allows Council to begin transitioning vehicles quickly rather than waiting until more information is known or more models available for the entire fleet. This will be followed by an accelerated transition as the types of vehicles available improves and capital cost reduces. This approach also reflects broader state and federal government incentives and targets.

Investigate best opportunities for Heavy vehicles and Equipment

For heavy vehicles and equipment there are emission reduction opportunities for switching from diesel to electric or hydrogen for heavy vehicles. For example, several councils have begun piloting electric waste vehicles. In addition, there are some heavy electric trucks becoming available along with retrofitting options for existing heavy truck frames. However, the market is still developing with only a few electric models available and the widespread use of hydrogen technology still to be seen. Therefore, transitioning heavy vehicles and equipment may take longer to ensure alternatives are fit for purpose across the full asset management cycle.

Alternative Fuels

In addition to heavy vehicles, smaller equipment such as park maintenance equipment, portable generators and other tools also use fuel. Alternatives will be investigated in the short term to identify alternatives that are robust and meet user needs.

Heavy vehicle

Gas

MOVING AWAY FROM GAS

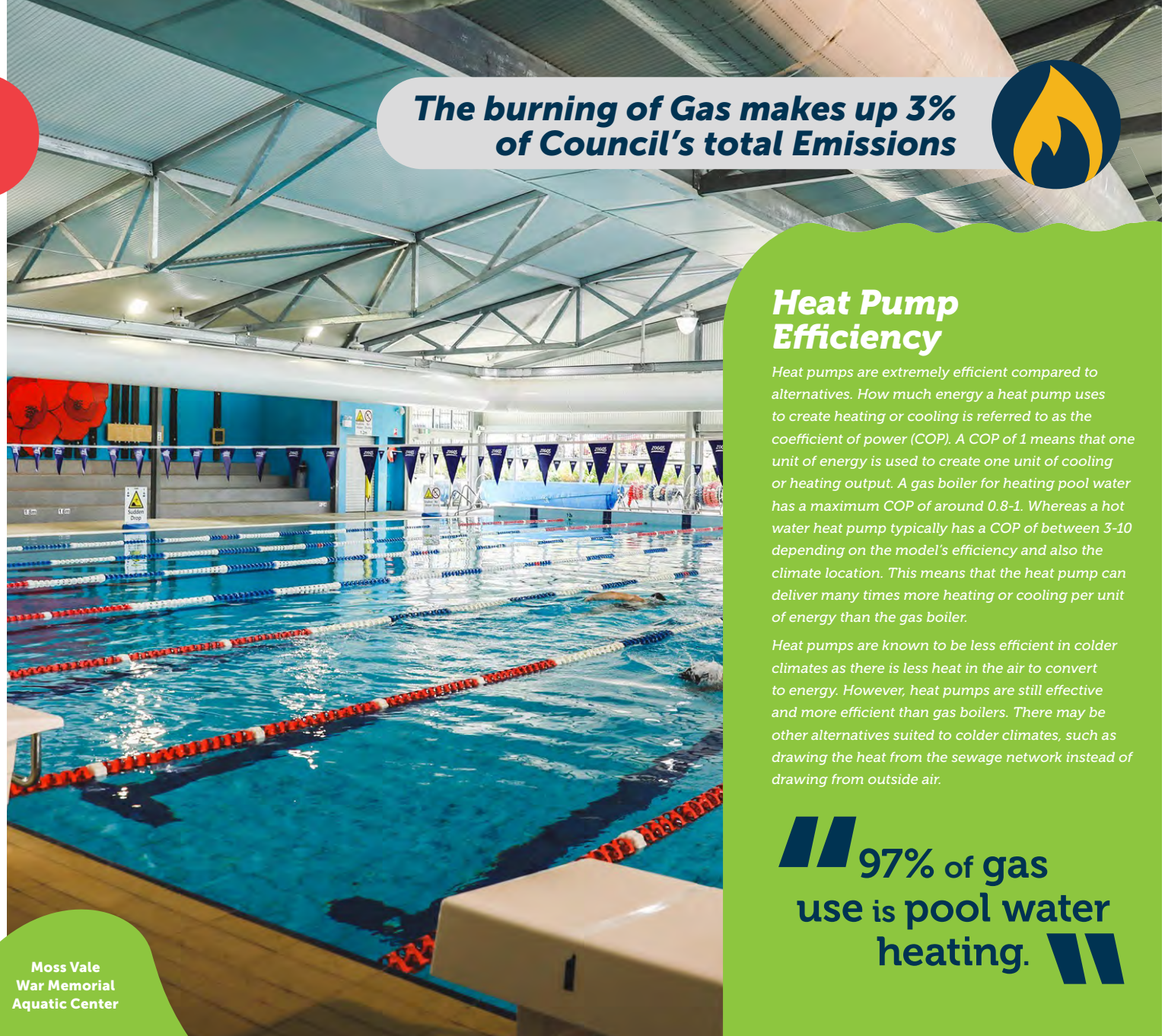
Switching away from gas is our fourth priority as there is no renewable alternative to gas unlike electricity. There are alternatives to gas for both space heating and hot water. Alternatives such as electric heat pumps are significantly more efficient than gas equipment. Hot water heat pumps can also complement solar by providing thermal storage.

The main use of gas is at Council's swimming pools to heat water. Several large pools, such as North Sydney Pool and Bega Memorial Pool have transitioned from using gas as a primary water heating source with the support of the NSW government. While gas may continue to be required as a back up system to provide redundancy, a combination of heating systems, such as solar and heat pumps can be used as primary water heating.

Switching from gas for pools requires detailed investigation into the infrastructure required and will therefore take time. In addition, the costs of changing infrastructure is high and grant funding is likely to be required.

This means that changes to infrastructure will be planned into the lifecycle of pool equipment rather than switched immediately (as the cost of abatement is high). As equipment needs to be replaced better alternatives can be implemented.

In addition to pool heating, there are also several small gas hot water systems at various buildings. These will be replaced at the end of life. No new gas hot water systems will be installed unless there is no other suitable alternative.



Moss Vale War Memorial Aquatic Center

The burning of Gas makes up 3% of Council's total Emissions

Heat Pump Efficiency

Heat pumps are extremely efficient compared to alternatives. How much energy a heat pump uses to create heating or cooling is referred to as the coefficient of power (COP). A COP of 1 means that one unit of energy is used to create one unit of cooling or heating output. A gas boiler for heating pool water has a maximum COP of around 0.8-1. Whereas a hot water heat pump typically has a COP of between 3-10 depending on the model's efficiency and also the climate location. This means that the heat pump can deliver many times more heating or cooling per unit of energy than the gas boiler.

Heat pumps are known to be less efficient in colder climates as there is less heat in the air to convert to energy. However, heat pumps are still effective and more efficient than gas boilers. There may be other alternatives suited to colder climates, such as drawing the heat from the sewage network instead of drawing from outside air.

"97% of gas use is pool water heating."

Embodied Emissions

Calculated Embodied Emissions makes up less than 1% of Council's total Emissions

WHAT ARE EMBODIED EMISSIONS

"Embodied emissions are all greenhouse gas emissions that are released as part of making a product or service ready for your consumption or use.

Imagine buying a car. Let's take two key components of a vehicle, metals and plastics. The raw minerals have to be mined and processed to form the metal and transported to the factory where the car is produced. Similarly, plastic is made from oil, which has to be extracted, refined, processed into plastic and transported to the factory for assembly".
(100 percent renewables).

Carbon Neutral Paper

A key part to managing our embodied emissions is by adding in sustainable procurement processes.

CARBON NEUTRAL PAPER 2020/21 7TCO2E		
	Sum of Total t Paper used (incl avoided)	Sum of T paper avoided through Choosing Carbon Neutral
2016-17	12.43	7.8
2017-18	12.77	8.4
2018-19	13.491825	8.5625
2019-20	11.83	6.82
2020-21	8.8151	7.3326

Sustainable procurement in Australia

Australia has the opportunity to make best use of our waste resources by recycling them to create new products. Recycling creates jobs, keeps waste out of landfill, reduces our use of raw resources and helps protect the environment for future generations. We can help close the loop on recycling through buying products which include recycled content.

(Department of Agriculture, Water and Environment)

IMPROVED APPROACH TO PROCUREMENT – REDUCING OUR EMBODIED EMISSIONS

With the help of Presync we are putting in place these guidelines:

- Environment/sustainability as evaluation criteria for products and services but also for supplier organisation to demonstrate commitment to environmental performance
- Standards (with regards energy efficiency, environmental management)
- The GECA eco-label
- Embodied Carbon breakdown in procurement
- MECLA – Collaboration of organizations to drive reduction in embodied carbon in the building and construction industry

OTHER EMISSION SOURCES

Waste, paper and flights are additional sources of greenhouse gas emissions from council operations, however they are very small, contributing less than one percent of Council's emissions.

Did you know?

The current greenhouse gas account does not include road making materials, which are likely to be a significant source of emissions. Reliable data to include this source is not currently available, however is still being investigated.

Systems and Enabling Actions Across Business Units

This Plan establishes Council's commitment to emission reductions. Embedding consideration of climate change into Council's business practices will enable us to reach the goals in this Plan. Four key areas are important

1

Including emissions reduction and climate adaptation objectives in decision-making systems and the Integrated Planning and Reporting cycle will improve the link between climate change impact and decisions across a range of areas. Opportunities include adding climate change impacts to Council reports and establishing a system to consider actions from this Plan in the annual budget cycle and the development of the delivery program and capital works programs.

2

Making the most of sustainable procurement opportunities will increase Council's awareness of low carbon options across a wide range of procurement decisions. Sustainable procurement systems can address embodied emissions that are not identified in Council's greenhouse gas account. This is a piece of work that will need to be undertaken over several years and will build on the Sustainable Choice procurement benchmark survey completed in 2021. Opportunities include developing standard technical specifications that support low carbon options and including sustainability criteria in procurement criteria to support suppliers already focusing on sustainability.

3

Setting minimum energy and resource efficiency standards across a range of equipment, assets and facility management will enable business as usual practices to increase in efficiency over time. This could be achieved through a resource efficiency policy supported by tools for project design and maintenance activities.

4

To achieve the goals in this Plan, both staffing and budgets will need to be considered. Achieving the goals requires all areas of operations to address climate change impacts and opportunities. Clear roles and responsibilities for achieving the actions in the Plan are required. The speed of action required is also a challenge for budgets. The Revolving Energy Fund (REFund) is a dedicated fund for energy projects that have an acceptable pay back. However other actions will need to be included in asset management or renewal budgets. Ways to address roles and responsibilities, and secure budget will need to be developed over the next few years.

Offsets

APPROACH TO OFFSETTING

Offsetting is a last resort, reduction of actual emissions is the most important, wherever possible.

However, even at the end of the roadmap process, a small level of emissions will remain, particularly:

- Waste
- Wastewater fugitives
- Electricity scope 3 (losses getting the electricity to your sites)
- Outsourced transport

This small volume (~3000tCO2e) of offsets could be offset with credits:

- Compliant with the federal Climate Active program
- Council could become Climate Active certified at any point in the roadmap
- Some organisations choose to support local projects that improve, say, biodiversity or reforestation
- Each offset has a price set by the market; we believe there will be upward pressure on prices over the decade

Planting trees is an example of offsets

It has been projected that safeguarding and restoring carbon over the coming decades in our forests, peatlands and agricultural areas may reduce well over 50 gigatonnes (50,000,000,000 tonnes) of carbon emissions that would otherwise enter the atmosphere. Maintaining our forests and restoring our natural landscape will make a real difference in reducing climate change.

(Carbon Positive Australia)

STEPS TO BECOMING CARBON NEUTRAL

1. Inclusion of additional sources – asphalt, electricity location method reporting, fugitive method improvements.
2. Verification of carbon account to the Climate Active standard by an accredited consultant.
3. Establish an offset investment policy – what type of offsets and budget required, co-benefits.
4. Establish funding for offsets and verification/ certification.
5. Undertake carbon account annually.
6. Verification/audit every 3 years.
7. Purchasing offsets annually – upfront (at the start of the year) with true-up (at the end of the year).
8. Apply for certification - initial audit, and ongoing annual certification and verification fees.

6 APPENDIX (ACTION TABLES)

Wingecarribee
SHIRE COUNCIL