Shoalhaven City Council

Sustainable Energy Strategy

2020-2025

Solar photovoltaic (PV) panels installed on a disused part of the Berry Wastewater Treatment Plant helping to lower grid electricity costs and generate renewable energy to operate the plant.

Glossary

BTM – 'Behind the meter' – solar panels that generate electricity directly to the business without passing through an electricity meter or grid.

Carbon Emissions – Carbon dioxide (CO_2) is a gas formed by the combustion of fuel and is considered a greenhouse gas. Emissions means the release of greenhouse gases into the atmosphere.

Carbon Neutral – refers to achieving net zero carbon dioxide emissions by balancing carbon emissions with carbon removal (often through carbon offsets).

Carbon Offset – a credit that an organisation can purchase to negate a carbon footprint and become carbon neutral.

CPP – Cities Power Partnership Program (national)

EV – Electric Vehicle

GDs – Group Directors

Greenhouse Gas - A greenhouse gas (GHG) is a gas (e.g. carbon dioxide, methane etc.) that absorbs and emits radiant energy and causes the greenhouse effect.

GWh – A gigawatt hour is equal to 1000 Megawatt hours (MWh).

kWh – a kilowatt hour is a unit of energy equivalent to one kilowatt (1 kW) of power sustained for one hour.

LED – Light Emitting Diode (lighting technology)

LGA – Local Government Area

MWh – a megawatt hour is equal to 1000 Kilowatt hours (kWh).

Net zero emissions – means that the net greenhouse gas emissions associated with an organisation's activities are equal to zero.

PV – is short for 'Photovoltaic'. Solar PV systems mean solar panels which generate electricity.

Renewable Energy – energy from a source that is not depleted when used, such as wind or solar power.

t CO_2-e – tonnes of equivalent carbon dioxide used to measure amounts of greenhouse gas

Strategy prepared by Darren O'Connell and Andrew Truran for Shoalhaven City Council, June 2020
Final Strategy approved at Group Directors Meeting – 26 May 2020

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1 Executive Summary

Shoalhaven City Council adopted its Sustainable Energy Policy in May 2019 to improve operational energy efficiency and increase its use of renewable energy to reduce energy bills and minimise greenhouse gas emissions. Council will support this Policy by preparing and implementing a Sustainable Energy Strategy (***this document***) to identify priority initiatives to achieve the following objectives:

- *Cleaner Energy*: Transition to cleaner (lower emissions), more sustainable and more affordable energy sources.
- *Less Energy*: Reduce the energy requirement for Council by maximising energy efficiency in all aspects of Council's operations.
- *Measuring and Monitoring Energy:* Ensure systems, processes and expertise are in place to measure, monitor and manage energy consumption and renewable electricity generation effectively.
- *Demonstration of Leadership:* Council will 'lead by doing' to encourage the local community and businesses to also transition to a more resilient, reliable and renewable energy future.

This Sustainable Energy Strategy outlines a range of measures that Shoalhaven Council intends to implement to better manage its energy requirements over the next five years to 2025. The initiatives have been selected to ensure Council meets its vision, commitments and targets in the Sustainable Energy Policy. This Strategy incorporates comprehensive baseline energy and emissions data (including electricity, gas and vehicle fuel), Council's current corporate commitments, and identifies funding opportunities, such as Council's internal Revolving Energy Fund.

Some of the most effective and feasible initiatives recommended in the Strategy include completing the upgrade of all Shoalhaven LGA residential street lights to energy savings LEDs; LED lighting and energy efficiency upgrades at Council assets; installation of solar PV panels on Council assets for 'behind the meter' benefits; and entering into renewable Power Purchase Agreements, initially for Council's 'Small Sites' electricity contract. Recommendations are also made to implement, resource, manage, monitor and finance the energy and emissions reduction initiatives. It is envisaged that this Sustainable Energy Strategy will provide guidance and direction to Council to ensure access to affordable, reliable, sustainable and modern energy, for both its operations and that of the wider Shoalhaven community.

2 Introduction

Shoalhaven City Council ('Council') relies on energy every second of every day to operate its corporate and community assets across the region. Without power the region would be unable to function, and many essential services would fail to be delivered to the community. This was evident during the devastating 2019/2020 bushfires when power poles and wires burnt down, and some communities were without grid electricity for an extended period. The secure supply of resilient and sustainable energy for Council's facilities and assets is a critical factor in Council's operations.

Much of Council's current energy usage is derived from non-renewable fossil fuels, predominantly electricity sourced from coal or gas-fired power stations. This comes at increasingly higher costs every year and the emission of greenhouse gases to the atmosphere, causing irreversible climate change. Shoalhaven Council therefore has an obligation to curb energy costs and carbon emissions for a sustainable future. As the closest level of Government to the community, local Council also plays an important leadership role in modelling best practice energy management to the businesses and residents of the Shoalhaven. This Sustainable Energy Strategy outlines a range of measures that Shoalhaven Council intends to implement to better manage its energy requirements over the next five years to 2025. The initiatives have been selected to ensure Council meets its vision, commitments and targets as defined in its adopted Sustainable Energy Policy 2019.

3 Policy Context

Shoalhaven City Council adopted a Sustainable Energy Policy (POL18/44) on 28 May 2019. The Policy aims to ensure access to affordable, reliable, sustainable and modern energy for both its operations and that of the wider Shoalhaven community. This aim is derived from the United Nations Sustainable Development Goal 7, part of the 2030 Agenda for Sustainable Development, to which Australia is a signatory.

Climate change is a global problem that requires a global solution. A global 'Paris Agreement' for climate action was concluded at the Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015. Australia is one of 187 countries that have committed to keeping global temperature rises to well below 2°C under the Paris Agreement. Australia's response to the Paris Agreement has been to set a goal for greenhouse gas (GHG) emissions of 5% below 2000 levels by 2020, and to reduce emissions by 26 to 28 per cent below 2005 levels by 2030.

Australia's Renewable Energy Target (RET) is a Federal Government policy designed to ensure that at least 33,000 gigawatt-hours (GWh), equating to around 23 per cent, of Australia's electricity generation comes from renewable sources by 2020. The RET consists of two main schemes: Large-scale Renewable Energy Target (LRET) and Small-scale Renewable Energy Scheme (SRES). While the LRET's 33,000 GWh target was met in September 2019, the scheme will continue until 2030. So currently, the SRES provides a financial 'up-front' incentive (or 'point of sale' discount direct from the supplier) in the form of small-scale technology

certificates (STCs) for solar photovoltaic installations. The cost of Shoalhaven Council's future installations of solar PV systems in the form of solar farms and rooftop solar may be affected by the LRET and SRES, respectively.

The NSW Government has an aspirational goal of achieving net-zero emissions by 2050. This was established as a long-term objective in 2016 within the Climate Change Policy Framework for NSW. In early 2020, the NSW Government released the 'Net Zero Plan Stage 1: 2020-2030' as the foundation for NSW's action on climate change and goal to achieve net zero emissions by 2050. The Plan is forecast to deliver a 35% emissions reduction in NSW by 2030, compared to 2005 levels, which is now the interim objective over the next decade.

The NSW Energy Savings Scheme (ESS) was established in 2009 and provides financial incentives to invest in energy efficient equipment and appliances in NSW households and businesses. Shoalhaven Council is eligible to claim 'energy savings certificates' or 'escies' to help offset the cost of energy efficiency projects, such as LED lighting upgrades for interior and exterior lighting (including street lights). The ESS is legislated to run until 2025 so it would be prudent for Council to maximise this scheme whilst it is still available. LED lighting upgrade projects have been implemented by Shoalhaven Council in early 2020 at the Nowra Library and for some 4,000 residential street lights, with both projects utilising current NSW Government rebates under the ESS.

Theme 2 of Shoalhaven Council's Community Strategic Plan 2027 is for 'sustainable, liveable environments'. A broad range of issues were identified by the community for this Theme including 'mitigate and adapt to climate change' and 'sustainable and renewable energy'. Council's Delivery Program - Operational Plan 2019/20 has a Delivery Program Goal 2.3.02 to 'Develop strategies to help to reduce Shoalhaven's carbon footprint' (Responsible Group – Shoalhaven Water). The high priority initiatives contained within this Sustainable Energy Strategy should be put forward for inclusion into future Operational Plans and subsequently implemented, monitored and reported as part of the Integrated Planning & Reporting Framework.

Council's adopted Sustainable Energy Policy is consistent, and aligns with, energy and climate policy at all levels of government, as well as addressing the concerns of the local community and Councillors. Council will support this Policy by preparing and implementing a Sustainable Energy Strategy (***this document***) to identify priority initiatives for improved energy efficiency, sustainable fleet transport, carbon emissions reduction, and renewable energy generation with battery storage opportunities.

4 Past Energy Savings Measures

Opportunities for energy efficiency and renewable energy generation in Council's operations are continually being assessed and implemented for economic, social and environmental benefits. Implementation of Council's Sustainable Energy Policy has already commenced with numerous energy projects recently completed or commenced, including:

- Installation of a 25 kW and 22.5 kW solar PV system at Bamarang Water Treatment Plant and Berry Wastewater Treatment Plant, respectively. A 20 kWh storage battery was also installed at the Berry plant to trial how batteries can be integrated into existing wastewater treatment control systems;
- Installation of an 81 kW solar PV system on the rooftop of the Shoalhaven Entertainment Centre in 2019. Council currently has over 300 kW of solar PV capacity on its assets with more than 400 kW of additional solar PV in the planning stages for installation in 2020;
- Adoption of the 'Electric Vehicle (EV) Charging Stations on Public Land' policy;
- Inclusion of three (3) fully electric Hyundai Kona cars in Council's fleet as part of a trial of EVs and charging infrastructure;
- Creation of an internal Revolving Energy Fund (REFund) with seed funding of $230,000 to finance energy efficiency and renewable energy projects into the future. The savings in energy charges as a result of the funded projects will be deposited into the REFund to replenish it for future project funding;
- Replacement of 4,231 residential street lights with energy savings LED lamps. This project was part-funded by the NSW Department of Planning, Industry and Environment (DPIE), allowing Council to achieve a feasible payback period of <5 years;
- Partnering with a range of stakeholders, including Repower Shoalhaven (a local community renewable energy group), on the Social Access Solar Garden feasibility study. This project is now being further progressed by Repower Shoalhaven to establish a 4 MW community-owned solar farm in the Shoalhaven;
- Membership in the national Cities Power Partnership (CPP) program (around 120 member Councils in total) to implement five climate change pledges made by Council. Shoalhaven Council received a 'Highly Commended' for its 'Charging Ahead with Renewables' project entered into the 2019 CPP national awards in the Renewable Energy Achievement category;
- Membership in the NSW Government's Sustainability Advantage Program.

In 2012, a detailed Ecologically Sustainable Development (ESD) Asset Project was completed that audited 412 of Council's facilities for energy and water savings opportunities. Level 2 energy audits have also been conducted for many Council assets to identify priority energy savings initiatives. An Energy Management Plan was prepared in 2014 and some of the recommendations implemented since then. This background information has been synthesised and utilised in the preparation of this Sustainable Energy Strategy.

5 Our Energy Profile

The supply of electricity to Council is currently delivered through three main contract agreements:

Supply Type	Site Consumption	Number of Sites	FY2019 Consumption (MWh)	FY2019 Total Electricity Spend
Small Sites	<100MWh per Year	~540	5,243	$1.122M
Large Sites	>100MWh per year	44	24,910	$3.268M
Street Lighting	Unmetered	Aggregated	5,407	$820k*
TOTAL			**35,560**	**$5.21M**

**Not including Street Light Use of System (SLUOS) charges (approx. $1.2M)*

These contracts can have different energy retailers but have the same Distribution Network Service Provider (DNSP) in Endeavour Energy (the company that owns the majority of 'poles and wires' in the Shoalhaven LGA).

Council's electricity costs can be split into three main categories:

Category	Description	Typical Bill %
Energy Costs	Costs associated with electricity generation and reselling, usually contracted through a retailer.	39%
Network Costs	The costs associated with getting electricity from the generators to the customers (the poles and wires) through the network operator i.e. Endeavour Energy	50%
Other	All the other costs associated with environmental, billing, regulator and metering charges.	11%

Figure 1 shows the typical bill breakdown for Shoalhaven Council's electricity accounts. Only the energy costs are negotiable (contestable) through retailer agreements.

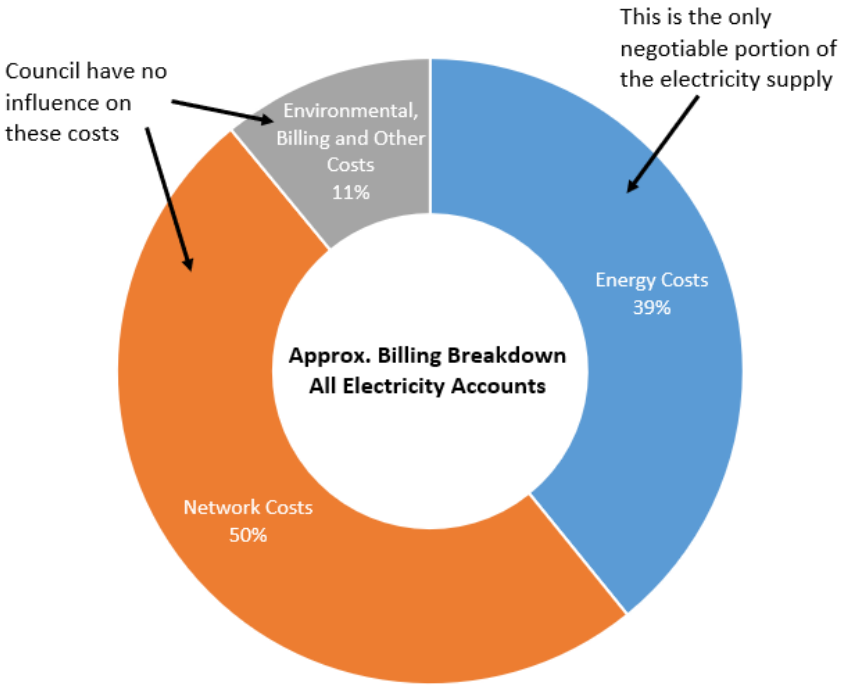


Figure 1. Shoalhaven City Council's typical electricity bill breakdown

5.1 Electricity Consumption 2018/19

In 2018/19, almost half of Shoalhaven Council's electricity was consumed by its water (27%) and sewerage (22%) operations (Figure 2). In terms of the overall cost, wastewater processing (~$1.40M) was more costly than water supply (~$1.15M), with water supply pumps typically operating during 'Off Peak' periods when electricity pricing is cheaper (Figure 3). The next largest consumer of electricity in terms of cost was street lighting across the Shoalhaven LGA. Although the majority of Shoalhaven's street lights are owned and operated by Endeavour Energy, Council pays for the power that the lights consume (around $800,000/pa, Figure 3). A Street Light Use of System (SLUOS) charge of approx. $1.2M per year is also paid by Council to Endeavour Energy, but this comprises costs mainly arising from the operation, maintenance and capital costs of the street lighting network rather than electricity consumption. Council's Aquatic Centres and Holiday Haven tourist parks then follow street lighting in terms of annual electricity costs, approximately $668,000 and $600,000, respectively. These are then followed by community facilities and civic buildings, making up $349,000 and $313,000 of electricity costs, respectively (Figure 3). The annual electricity cost breakdown for all of Shoalhaven Council's Large Sites (i.e. electricity consumption >100MWh/pa) for 2018/19 is shown in Figure 4.

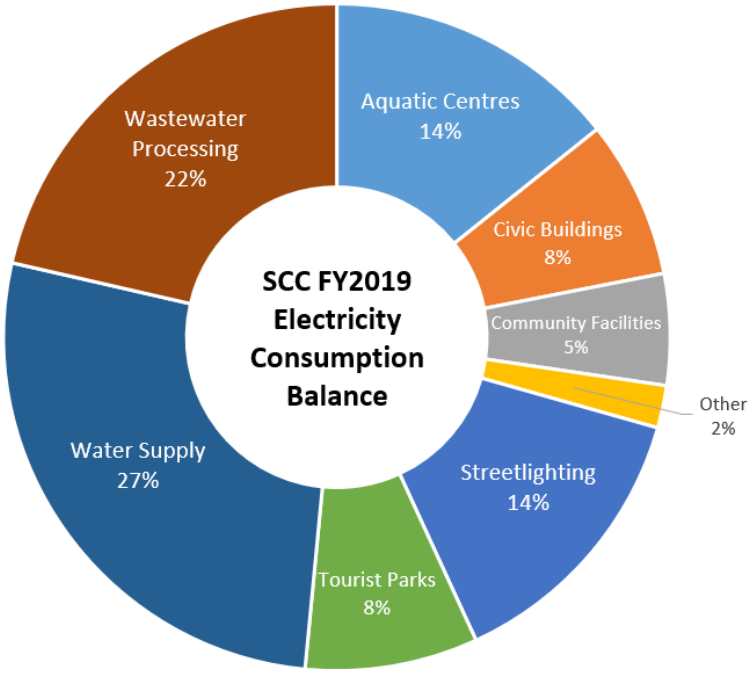


Figure 2. Shoalhaven City Council's 2018-2019 electricity consumption % by functional areas

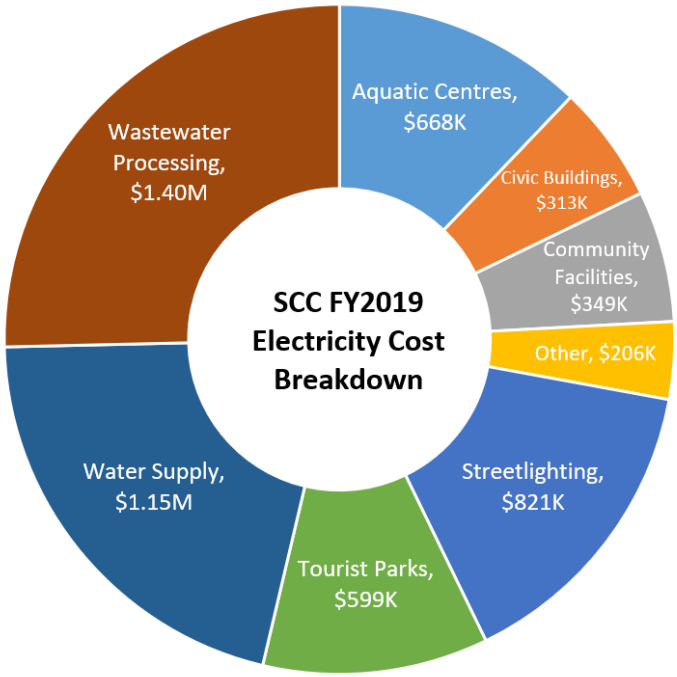


Figure 3. Shoalhaven City Council's 2018-2019 electricity costs by functional areas.

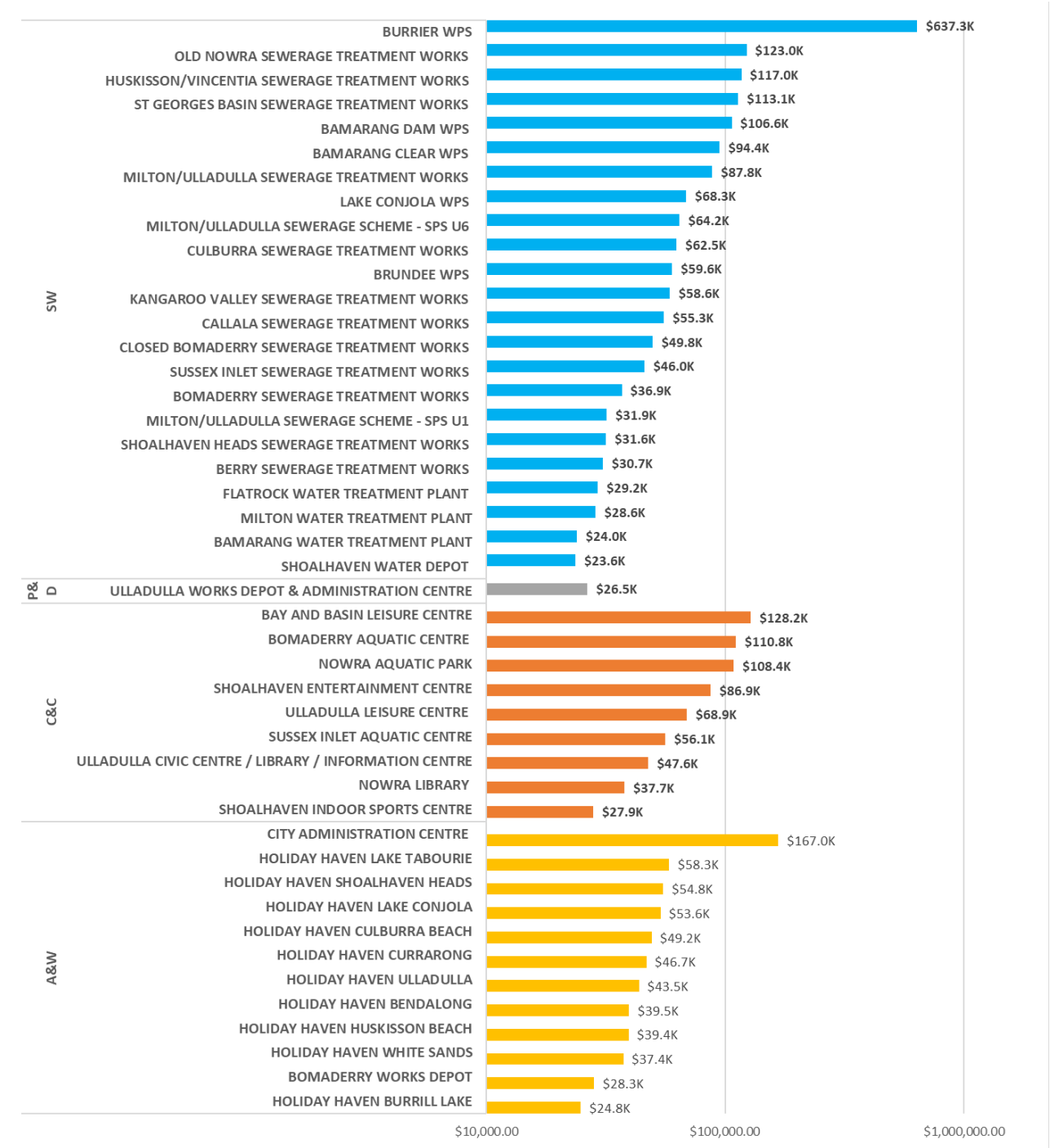


Figure 4. Shoalhaven City Council's 2018-2019 electricity spend by Council Groups (note Log Scale).

5.2 Energy Consumption Trends

Electricity

Shoalhaven Council's total electricity consumption has shown an upward trend over the past 6 years (Figure 5). The largest percentage increases in electricity consumption since 2012-13 have been at the Aquatic Centres, Holiday Haven parks and for the provision of Water Supply (18 to 20% increases, see Figure 6). These

assets are typically energy intensive, and have sometimes been upgraded with new facilities such as heated pools at Holiday Haven parks. With electricity contributing around 50% of Council's corporate greenhouse gas emissions, a continuing upward trend in electricity consumption will move Council further away from achieving its carbon emissions savings targets.

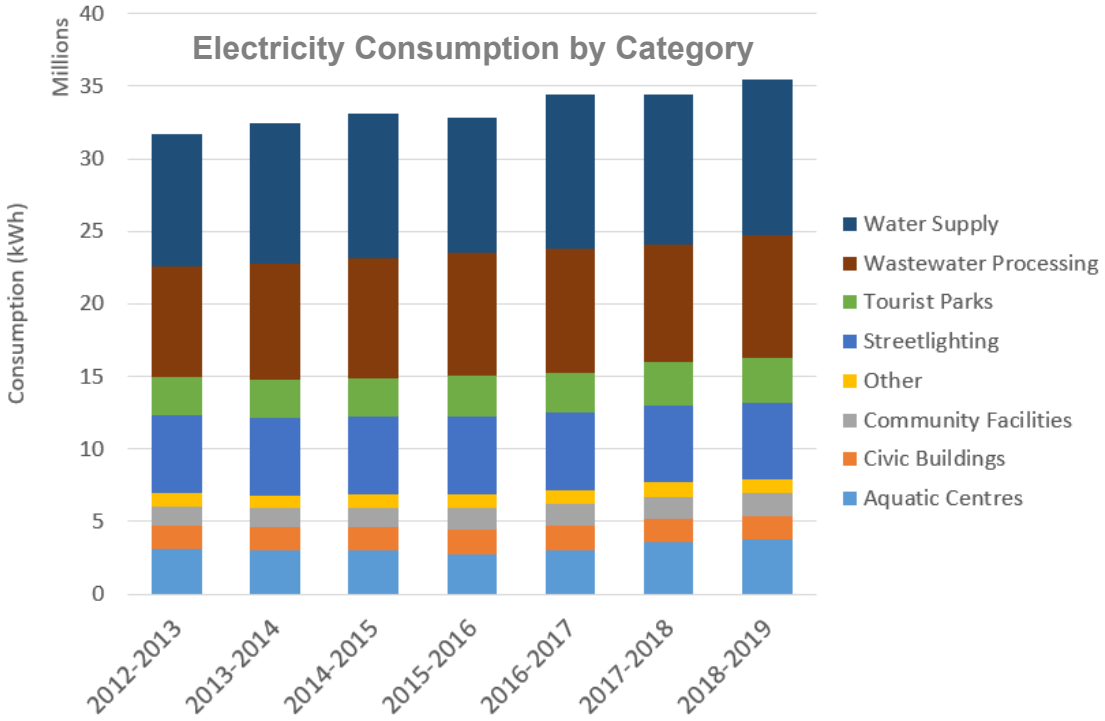


Figure 5. Shoalhaven City Council's annual trend in electricity consumption by group category

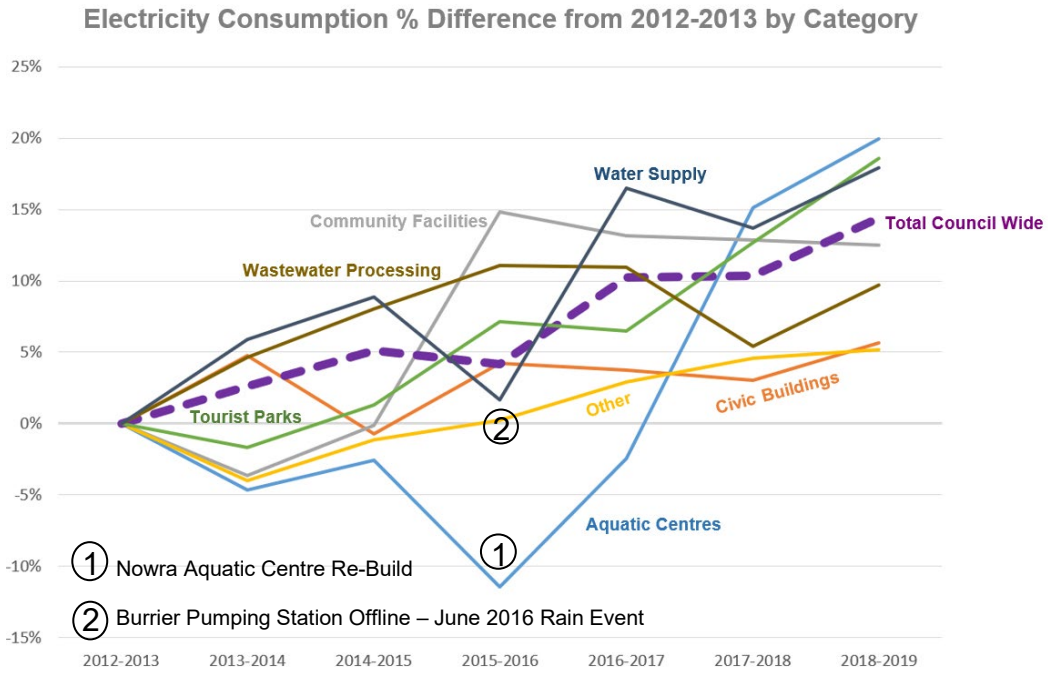


Figure 6. Shoalhaven Council's annual percentage change in electricity consumption by group category from 2012-13

Gas

Shoalhaven Council consumes both natural (mains) gas and LPG (bottled gas) at a number of its assets. Natural gas supply is limited to the Nowra and Bomaderry areas due to the gas pipeline coverage. The main Council assets that utilise natural gas include the Nowra Administration Centre, Shoalhaven Entertainment Centre and both the Bomaderry and Nowra Aquatic Centres. Sites that consume LPG bottled gas include the Holiday Haven tourist parks, other Aquatic Centres and the Shoalhaven Crematorium. Consumption of both natural gas and LPG tends to vary from year to year with no obvious trends (Figure 7). The price of bottled LPG gas has increased by 25% since 2015/16, so it makes economic and environmental sense to switch appliances from gas powered to electricity at the end of their working life, where possible. Electrical appliances can also be powered by renewable energy and this reduces their greenhouse gas emissions compared to gas combustion.

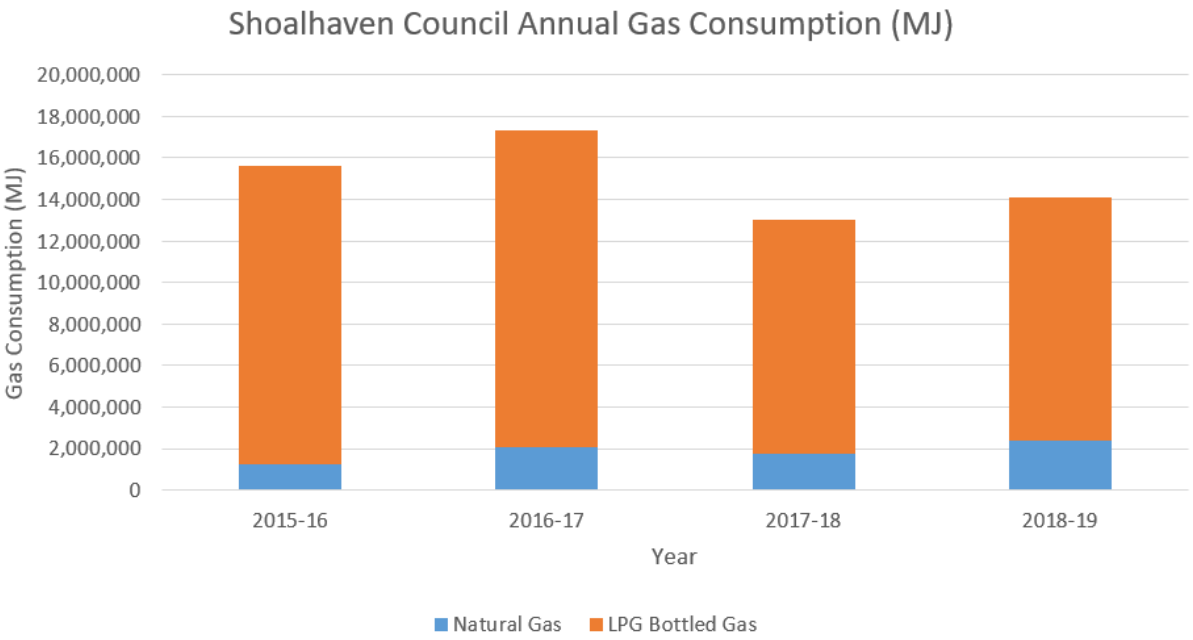


Figure 7. Shoalhaven City Council's annual gas (natural and LPG) consumption since 2015-16.

Fleet Vehicle Fuel

Shoalhaven Council's fleet vehicle fuel consumption decreased substantially by one-third in 2018/19, compared to 2016-17 (Figure 8). Much of this decrease was due to a large decline in diesel fuel usage over this period. In June 2019, Council took delivery of three Hyundai Kona fully Electric Vehicles (EVs) as part of a 2 year trial. The Kona EVs have had vinyl sign wraps reading '100% electric' attached to them to help promote the uptake of EVs across the region.

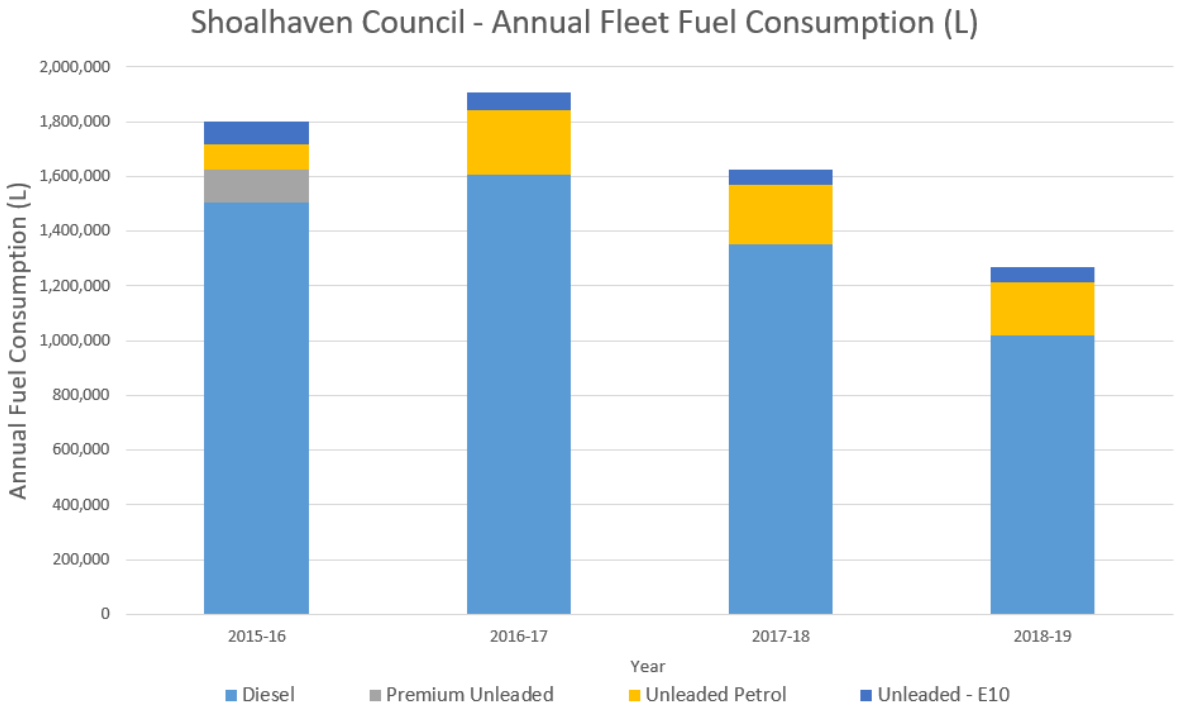


Figure 8. Shoalhaven City Council's annual fleet vehicle fuel consumption since 2015-16.

One of three Shoalhaven City Council fully electric Hyundai Kona fleet cars.

6 Greenhouse Gas Emissions

6.1 Corporate Emissions Profile

The consumption of electricity generated by fossil-fuelled power stations (typically coal or gas-fired) results in the emission of greenhouse gases (GHGs) to the atmosphere. The combustion of gas (natural or LPG) to heat Council's hot water or boiler systems also results in direct emissions of mostly carbon dioxide (CO_2 – the main greenhouse gas). Other sources of GHGs or 'carbon' emissions from Council's operations include methane gas escaping from landfills and wastewater treatment plants, and fuel combustion used to power Council's fleet vehicles. When all these sources of GHGs are added together, Council can calculate its annual GHG emissions (also known as our 'carbon footprint') to track its performance in mitigating climate change. Reducing GHG emissions is a goal of Council to achieve its target of net-zero GHG emissions by 2050, with interim targets to reduce emissions by 25% by 2025 and 50% by 2030, compared to 2015 levels. The total annual GHG emissions for Shoalhaven City Council in the baseline year of 2015 were calculated as 77,567 tonnes of greenhouse gases (carbon dioxide equivalents displayed as t CO_2-e).

In 2018-19, Shoalhaven City Council's operations emitted a total of 70,146 t CO_2-e (Scope 1, 2 & 3 emissions). Council's ***purchased electricity*** contributed the highest and almost half (46%) of Council's total annual corporate GHG emissions (Figure 9). Despite having 328 kW of installed solar panels on Council assets in 2019, this renewable energy only generated less than 2% of Council's electricity needs. The remainder of Council's grid supplied electricity is generated from coal or gas-fired power stations. Methane and nitrous oxide emissions from Council's wastewater treatment plants are the second highest source of GHG emissions at around 29%. Methane emissions from the Council-operated landfill at West Nowra generated the third largest amount of GHG emissions at around 17% (despite continually flaring off the gas for emissions reduction). Fleet transport fuels (e.g. diesel, petrol, etc.) and gas for stationary energy (both natural gas and LPG) make up the remaining 8% of Council's corporate carbon emissions profile.

Figure 10 shows Council's corporate greenhouse gas emissions for the 2015 baseline year, 2018-19 financial year (FY) and emissions targets and trajectory for 2025, 2030 and 2050. The initial decline in GHG emissions from 2015 to 2018-19 was mainly due to a reduction in legacy methane emissions from West Nowra landfill from 19,072 to 11,796 tonnes of CO_2-e, with some savings in fleet vehicle fuels as well. All other sources of Council's carbon emissions have either been steady or increased over this same period.

Council must adhere to a consistent and standardised method for calculating annual greenhouse gas emissions for its operations. The most appropriate method is to use the National Greenhouse and Energy Reporting Scheme (NGERS) protocols. This will ensure that Council tracks its GHG emissions accurately and also understands its liability against the NGERS reporting thresholds for corporations and facilities, if applicable.

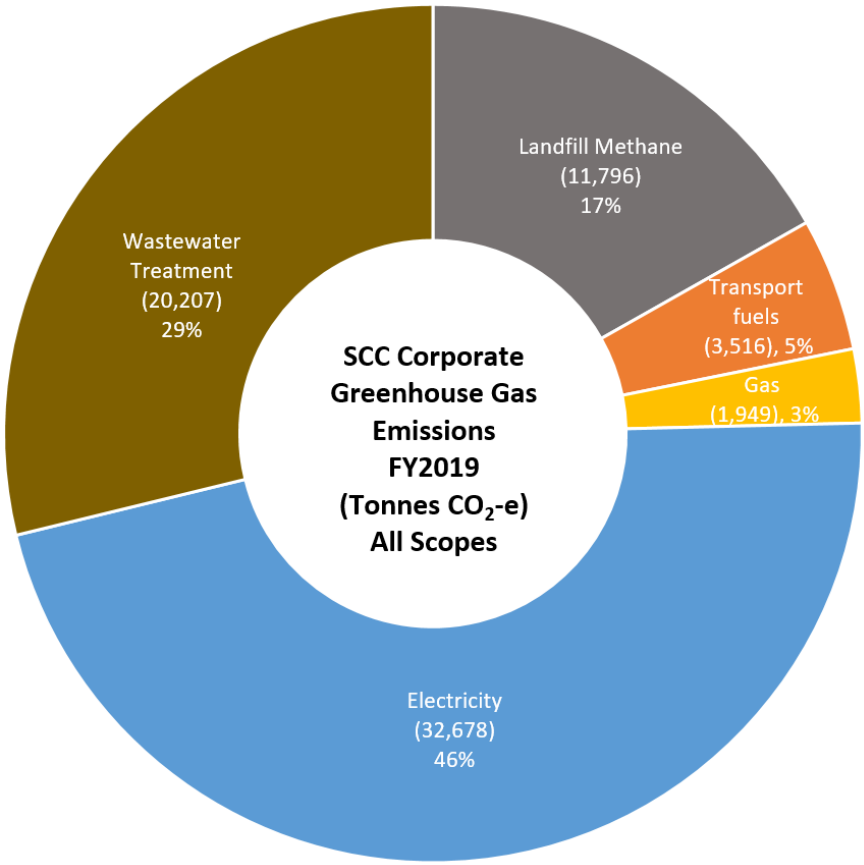


Figure 9. Shoalhaven City Council's corporate greenhouse gas emissions profile for 2018-19.

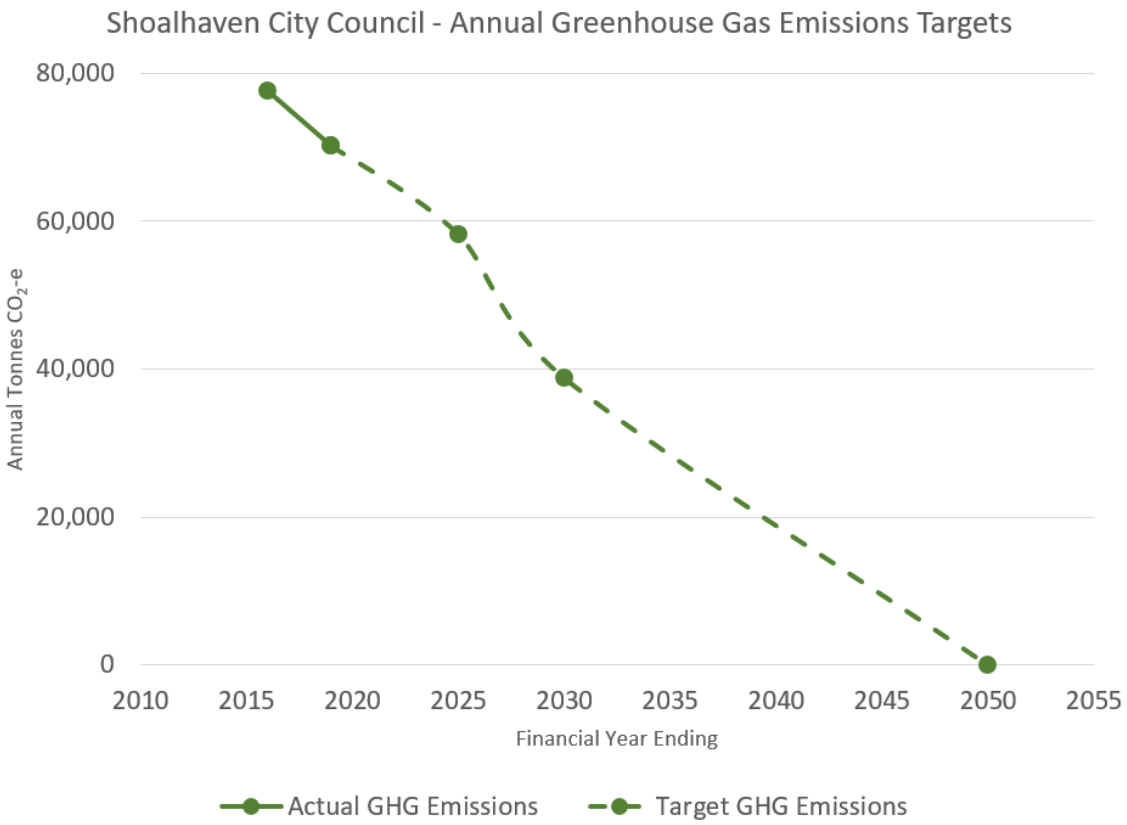


Figure 10. Shoalhaven City Council's corporate greenhouse gas emissions targets and trajectory.

6.2 Community Emissions Profile

Just as Shoalhaven City Council can calculate its greenhouse gas emissions from all of its operations, it is possible to estimate total community emissions from the activities of the wider Shoalhaven community. The Shoalhaven Local Government Area (LGA) total annual ***community*** (municipal) emissions in 2017 have been calculated (Figure 11) as 1,332,600 tonnes CO_2-e, using the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) methodology (Beyond Zero Emissions and Ironbark Sustainability 2019). The largest source of carbon emissions in the Shoalhaven region is stationary energy, mostly comprised of grid supplied electricity consumed by residential/commercial buildings and industrial operations. Electricity consumption accounts for 50% (671,300 tonnes CO_2-e) of total municipal carbon emissions. After this, transport (on-road use and domestic passenger air travel) is responsible for 36% of emissions, then emissions from agriculture at 6%, gas consumption for stationary energy is at 5% and then waste (landfill and wastewater) accounts for 3% (see Figure 11 Snapshot below).

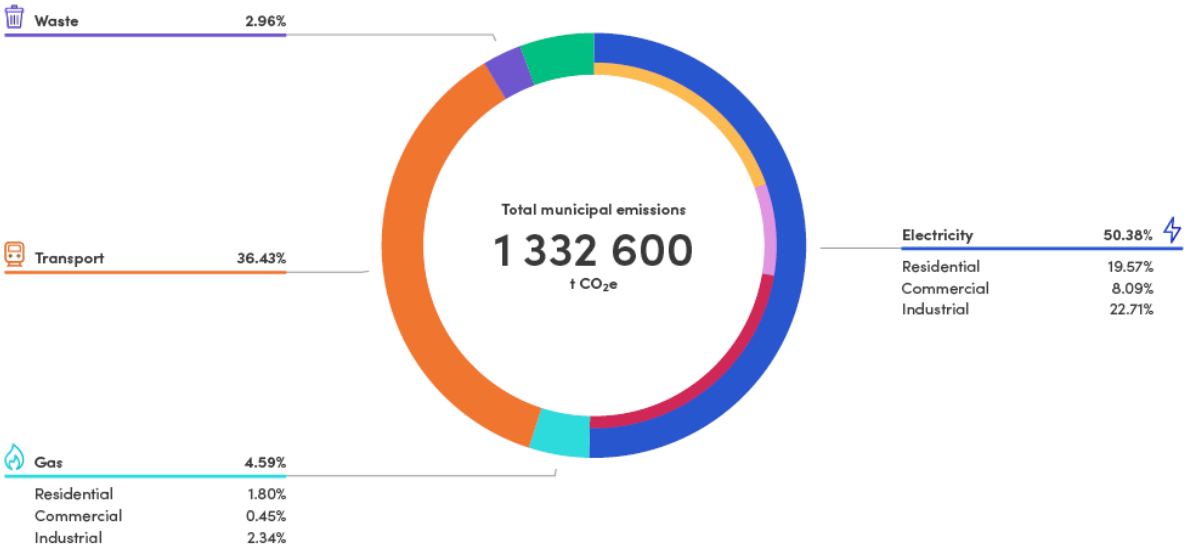
Note that whilst this profile is compliant with the international GPC standard and covers emissions from the entire Shoalhaven community, Council only has a limited amount of control and influence over many of the emission sources (e.g. household electricity usage, resident's driving habits, etc.). While Council can continue to advocate and assist the broader community to implement energy efficiency and renewable energy projects, a cross-sectoral approach, with residents, businesses and other levels of government, is required for substantial emissions reductions throughout the region (Ironbark Sustainability 2018).

Snapshot Report

Shoalhaven

2017 municipal emissions snapshot

snapshot
COMMUNITY CLIMATE TOOL



Source	Sector	Emissions (t CO_2e)
Electricity	Residential	260 800
	Commercial	107 800
	Industrial	302 700
Gas	Residential	24 000
	Commercial	6 000
	Industrial	31 200
Transport	On road	485 400
	Domestic air travel	0
Waste	Landfill	23 600
	Water	15 900
Agriculture		75 200

Figure 11. Shoalhaven Local Government Area (LGA) total annual community (municipal) greenhouse gas emissions for 2017.

7 Council's Energy and Emissions Targets

Shoalhaven City Council's adopted Sustainable Energy Policy identifies a number of energy and emissions targets, both interim and longer term. These targets are shown below in Figure 12, Figure 13 and Figure 14, along with actual performance tracking data for 2018 and 2019. Council will prepare an Annual Energy Review every October to publish the previous financial year's energy consumption and greenhouse gas emissions data. This Annual Energy Review will monitor and track Council's performance in achieving its adopted sustainable energy and emissions targets.

Figure 12. Shoalhaven City Council's street lighting replacement with energy savings LEDs.

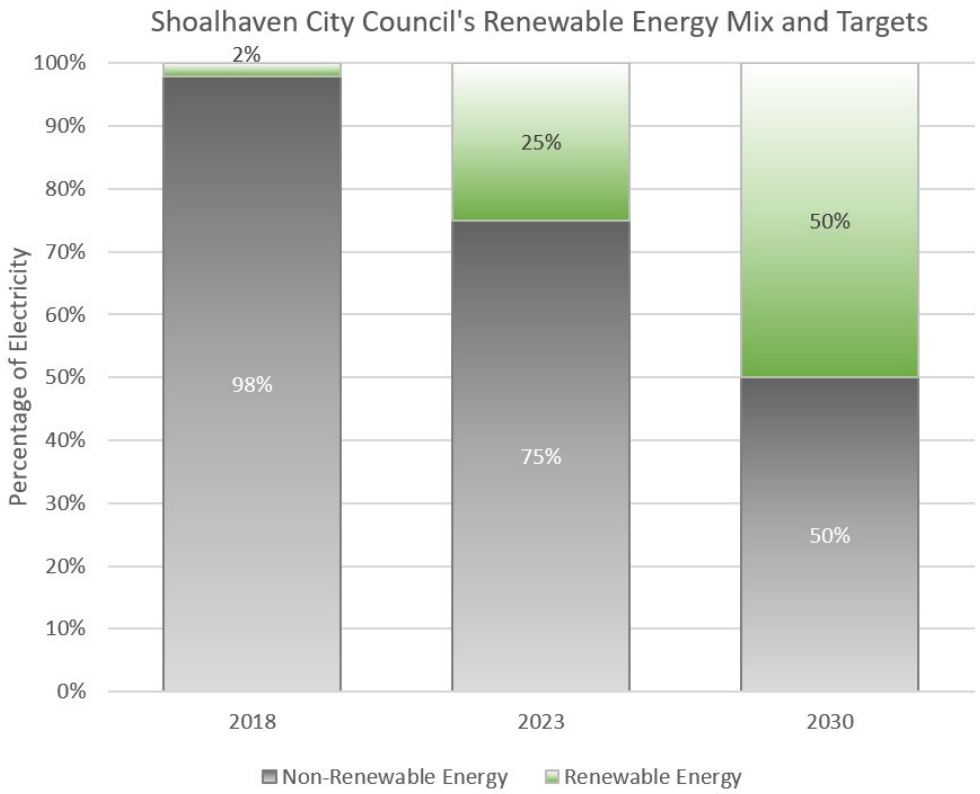


Figure 13. Shoalhaven City Council's percentage of renewable energy consumed – 2018 is actual, 2023 & 2030 are targets.

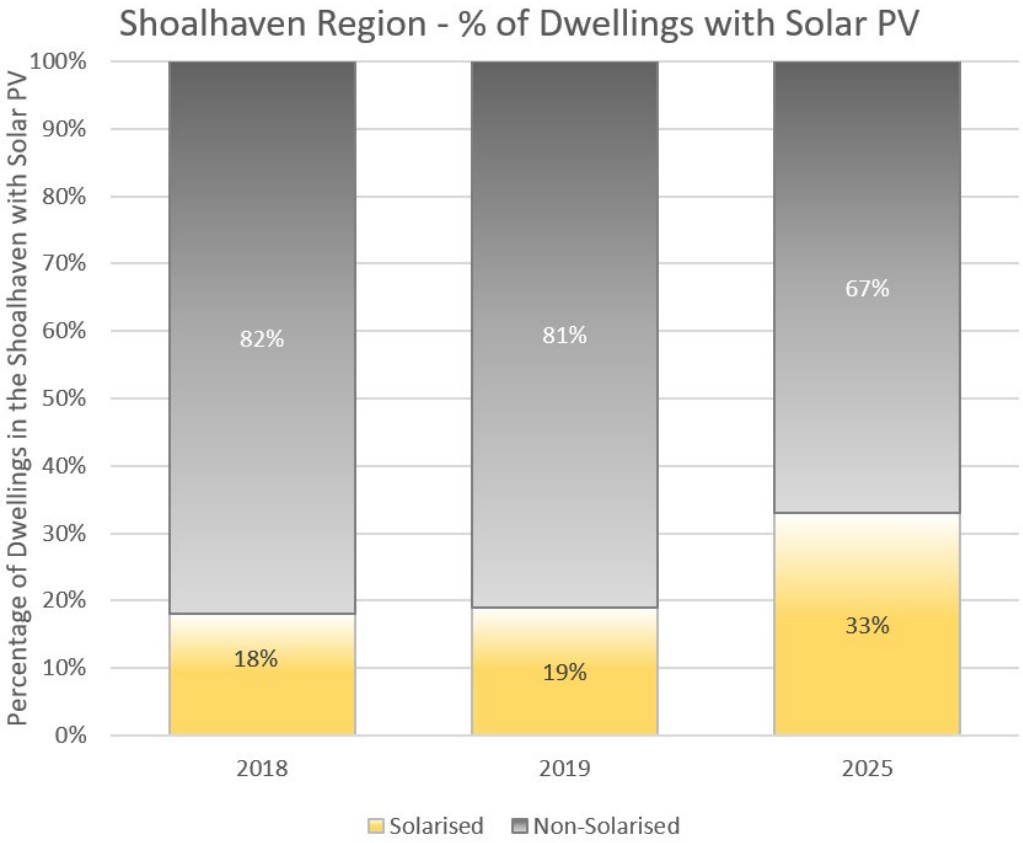


Figure 14. Shoalhaven LGA solar PV installations on dwellings – 2018 & 2019 are actual, 2025 is a target.

8 Consultation

The development of this strategy involved a number of stakeholders to ensure there was adequate engagement, participation and consultation. The following consultation and preparation pathway was followed:

1. Preliminary discussions with relevant internal Council staff and management
2. Review of existing work, studies, audits and policies
3. Establishment of baseline measurements
4. Drafting of Strategy and review by internal Council stakeholders e.g. GDs
5. Final Strategy approved by GDs
6. Final Sustainable Energy Strategy commences implementation phase

9 Our Vision

SHOALHAVEN CITY COUNCIL'S VISION IS TO OPERATE ITS ENERGY CONSUMING ASSETS AND FLEET TRANSPORT IN A SUSTAINABLE MANNER WITH MINIMAL EFFECT ON THE NATURAL ENVIRONMENT

10 Our Priorities

EMISSIONS

INCREASE ENERGY EFFICIENCY AND PRODUCTIVITY

TRANSITION COUNCIL'S FLEET VEHICLES TO CLEANER FUELS AND ELECTRIC VEHICLES

SWITCH TO MORE RENEWABLE ENERGY SOURCES FOR CORPORATE AND COMMUNITY ENERGY NEEDS

ENERGY

TRANSITION AWAY FROM FOSSIL FUELS TOWARDS RENEWABLE ENERGY SOURCES

IMPROVE ENERGY EFFICIENCY OF COUNCIL AND COMMUNITY ASSETS

ENCOURAGE THE COMMUNITY AND BUSINESSES TO INCREASE SOLAR POWER ON THEIR BUILDINGS

11 Our Commitments

To demonstrate leadership, Shoalhaven City Council is committed to the following ambitious renewable energy and carbon emissions targets.

AIM TO ACHIEVE NET-ZERO GREENHOUSE GAS EMISSIONS BY 2050

INTERIM TARGETS TO REDUCE EMISSIONS ARE 25% BY 2025 AND 50% BY 2030, COMPARED TO 2015 LEVELS

CONTINUALLY IMPROVE MANAGEMENT PRACTICES TO STRIVE TOWARDS IMPROVED ENERGY EFFICIENCY ACROSS THE ORGANISATION

SEEK OPPORTUNITIES TO SOURCE OR GENERATE ELECTRICITY SUPPLY FOR COUNCIL'S OPERATIONS FROM RENEWABLE ENERGY SOURCES, WITH AN INTERIM TARGET OF 25% RENEWABLES BY 2023 AND EVENTUALLY 50% FROM RENEWABLE SOURCES BY 2030

PROMOTE RELEVANT INITIATIVES TO THE COMMUNITY AND BUSINESSES TO INCREASE THE UPTAKE OF INSTALLED ROOFTOP SOLAR PANELS ACROSS THE SHOALHAVEN LGA TOWARDS A TARGET OF 33% OF DWELLINGS BY 2025

UPGRADE ALL STREET LIGHTING TO ENERGY SAVING LEDS BY 2025

12 Objectives

This Strategy aims to deliver the objectives of Council's adopted Sustainable Energy Policy and to achieve:

- *Cleaner Energy*: Transition to cleaner (lower emissions), more sustainable and more affordable energy sources.
- *Less Energy*: Reduce the energy requirement for Council by maximising energy efficiency in all aspects of Council's operations.
- *Measuring and Monitoring Energy:* Ensure systems, processes and expertise are in place to measure, monitor and manage energy consumption and renewable electricity generation effectively.
- *Demonstration of Leadership:* Council will 'lead by doing' to encourage the local community and businesses to also transition to a more resilient, reliable and renewable energy future.

Replacement of Shoalhaven residential street lights with energy efficient LED lights in 2019/20.

13 Meeting our Commitments

13.1 Cities Power Partnership

The Cities Power Partnership (CPP) is Australia's largest local government climate network, made up of over 120 Councils from across the country, representing almost 11 million Australians. Local councils who join the partnership make five action pledges in either renewable energy, efficiency, transport or working in partnership, to tackle climate change. On 22 August 2017, at the Ordinary Meeting of Council, it was resolved to join the CPP and adopt five pledges, one for each group within Council. These pledges are shown below:

General Managers Group Pledge: *Work Together and Influence* - Implement an education and behaviour change program to influence and build resilience and adaptive capacity of council officers, local residents and businesses within the municipality to drive the shift to renewable energy, energy efficiency and sustainable transport.

Corporate and Community Group Pledge: *Work Together and Influence* – Set city-level renewable energy targets, emissions reduction targets and sustainable energy policies to provide a common goal and shared expectation for residents and businesses.

Assets and Works Group Pledge: *Transport* – Encourage sustainable transport use (e.g. ride share / electric vehicles, public transport, walking and cycling) through Council transport planning and design – in the form of a PAMP review.

Planning, Environment and Development Services: *Energy Efficiency Pledge* -: Investigate/recommend minimum energy efficiency benchmarks for all planning applications in consultation with the local developer's forum.

Shoalhaven Water Group Pledge: *Renewable Energy* – Install renewable energy pilot plant on water/sewer assets where viable.

These original CPP pledges are due to be revised in mid-2020 by Council, as most of them have been fully or partially completed.

13.2 Revolving Energy Fund (REFund)

In 2019, Council implemented a Revolving Energy Fund (REFund) to assist with future funding of energy efficiency and renewable energy projects. Savings made by these approved projects are reinvested back into the REFund to contribute towards future projects. The REFund provides a mechanism to support the implementation of Council's sustainable energy projects. In 2019, Council resolved to 'seed' the REFund with $230,000 to 'kick start' the initiative. These funds are being allocated towards energy efficiency and renewable energy projects that have short payback periods to ensure the REFund balance is replenished for future project investment. The REFund is allocated and managed through an internal Council Committee. Where available, external funding and rebates will also be sought to contribute towards energy-related projects for Council and the Shoalhaven community.

13.3 Achieving our Targets

Energy and administrative initiatives that Shoalhaven City Council can undertake to reach its sustainable energy targets fall into the following categories:

- Energy efficiency and demand management
- Fuel switching
- On-site renewable energy
- Off-site renewable energy
- Carbon offsets
- Resourcing, implementation and expertise

For Council to achieve its long-term renewable energy target of sourcing 50% of its electricity needs from renewables by 2030, there must be a methodical and planned approach taken to assess the capacity and cost-effectiveness of actions in the short, medium and long-term. *The pathway to 50% renewables will need to be built in the following order of priority, namely, reduce energy demand; produce renewable energy; and finally, to purchase renewables/offsets, where necessary.* Efficiency and onsite renewables can typically reduce a local government's operational energy use by 20% to 40%, depending on past initiatives, age of equipment and controls, and available land and roof space. If Shoalhaven Council aims to source 50% of its electricity from renewables, then purchasing renewable energy must be a part of the solution. Integration of renewables in Council's electricity procurement process is therefore needed (NSW Government, 2019).

The priority initiatives outlined in the remainder of this Strategy will effectively achieve the corporate greenhouse gas emissions target adopted for 2025 i.e. reduce emissions by 25% compared to 2015 levels (see waterfall graph – Figure 15). Some of the initiatives listed, such as a Council-owned solar farm, are only required to achieve emissions targets beyond 2025. However, they demand a lead-in time of several years to plan, approve and build, hence their inclusion in this Strategy. Likewise, the purchase or creation of carbon offsets is only required beyond 2030 to achieve the net-zero emissions target by 2050. Again, it has been documented in this Strategy purely to show the expected longer-term solutions for achieving these emissions target.

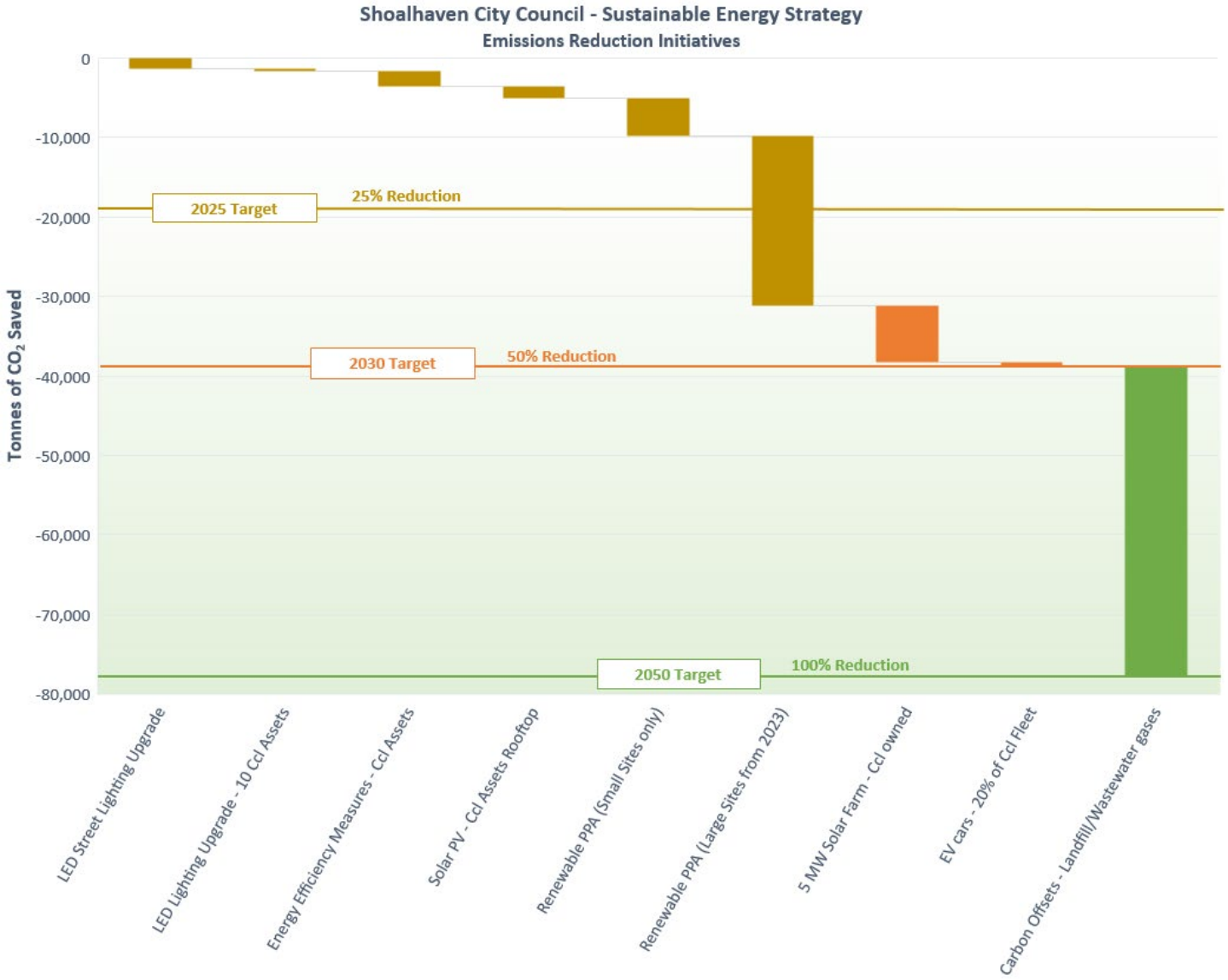


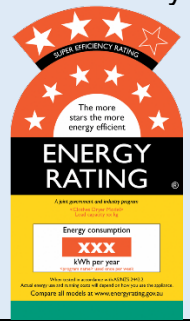
Figure 15. Recommended initiatives to achieve Council's greenhouse gas emissions adopted targets.

14 Energy efficiency and demand management

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Upgrade aged Heating, Ventilation and Air-conditioning (HVAC) systems in Council's main administrative and community buildings for significant energy savings	Council's Nowra Administrative Centre is centrally air-conditioned for year-round comfort of staff and visitors. The HVAC system is a huge consumer of electricity and as it ages it becomes less energy efficient compared to modern HVAC systems. Nowra Library has 4 large package air-conditioning (AC) units servicing the building's heating and cooling needs. These units have a capacity output of 45-65 kW – the total equivalent of around 45 residential split system air-conditioners. Future energy savings at the Library will therefore be largely dependent on improving the energy efficiency of these AC systems.	Chiller upgrades are scheduled and commenced in 2020 for the Nowra Admin Centre. Further electricity savings can be made if the system is programmed for improved energy efficiency. This includes the temperature set points; start-up and power down times, appropriate settings for weekends and public holidays, as well as regular maintenance to ensure it is operating efficiently year-round. The Nowra Library had new energy savings LED lighting installed in early 2020 and is scheduled to have a solar PV array installed on the roof in mid-2020. Funds will need to be allocated to replace its aged and inefficient package air-conditioning units to make the library a best-practice model of energy efficiency and for additional cost savings.
Work in collaboration with Endeavour Energy to further upgrade Shoalhaven LGA street lighting to energy saving LED lights	Shoalhaven Council LGA has approx. 11,000 street lights for which Council pays the electricity usage (around $820,000 per year), making it one of the largest electricity costs for Council. By mid-2020, 55% of these lights are scheduled to be replaced with energy savings LEDs. Continuation of the street lighting lamp replacement program should take place to	Shoalhaven Council approved the expenditure of $1.2M to allow Endeavour Energy to replace 4,231 residential street lights with LEDs during 2019/20. This accelerated street lighting upgrade has been part subsidised by the NSW Government. Council should seek further funding to assist with the future upgrade of additional street lights to LEDs. Council's new contract for the supply of electricity for street lighting commenced in Jan 2020 and

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	ensure the target of 100% LEDs by 2025 is met.	resulted in a 71% increase on the retail price component compared to the previous contract. This makes for a more favourable business case and reduced payback periods for further LED street lighting upgrades. Accessing NSW Government funding also improves the business case.
Upgrade of Council building, parks and sporting field/court lighting to energy saving LED lights and smart lighting controls	Priority upgrade areas to maximise NSW Energy Savings Scheme certificates ('escies') will be Council building assets that have long operating hours with existing inefficient fluorescent or halogen lamps e.g. - Nowra Admin Centre - Ulladulla Admin Centre - Indoor Aquatic Centres - Shoalhaven Entertainment Centre - Works Depots (incl. high bay lights) - Libraries Note: some of these assets already have some LED lights installed. Parks & sporting field/court flood lighting replacement with LEDs should be rolled out as funding allows and may be eligible for Government funding to community sports clubs.	The NSW Government's Energy Savings Scheme (ESS) is legislated to run until 2025. Under the ESS, certain lights such as LEDs are eligible to create energy savings certificates ('escies'), which once sold through an Accredited Certificate Provider (ACP) will reduce the cost of the project. Council should conduct a lighting upgrade of its buildings, parks and sporting fields/courts before 2025 to optimise this available funding.
Installation and maintenance of Power Factor Correction (PFC)	Existing assets that have a Time of Use (ToU) network tariff are susceptible to attracting high demand charges if they engage large electrical loads between the hours of 4pm and 8pm on	Routine monitoring and verification of electricity billing to check on network demand charges should be made. Anomalies in demand charges should be further investigated by the Asset manager.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
units to reduce maximum network demand charges	working days. Maximum demand charges can account for up to 50% of the cost of an electricity bill. Most assets with large induction loads that would benefit from PFC already have them installed and only require maintenance to keep them operating effectively. Only Large Sites (>100 MWh/pa) will incur demand charges so all these assets should have functional and well-maintained PFC units.	Monitoring of Power Factor (a PF of 1 is best) through PLUS ES electricity monitoring (30 minute interval data) and maximum network demand charges on billing is recommended every 6 months for Large Sites.
Load shifting of major electrical loads outside critical time slots to avoid excessive network demand charges	Avoidance of high electrical loads at Council's large assets between 4pm and 8pm on working days will considerably reduce the site's maximum demand charges (shown as kilovolt-ampere or kVA on the power bill). Some sites will have the flexibility to 'load shift' outside these critical time periods and avoid the excess charges. Demand charges are only incurred by assets on the Large Sites electricity supply contract (>100 MWh usage per year) with a Time of Use tariff. The kVA charges are not based on an assets energy consumption (i.e. kWh) and therefore do not reduce overall power usage, but can significantly lower the overall cost of the bill. Demand charges can make up to one-third of the total electricity bill amount.	Asset managers whose sites are on the Large Sites electricity contract should monitor their monthly demand charges (shown as kVA) on their electricity bill. Excessive demand charges may be avoidable by 'load shifting' electrical equipment and appliances outside the 'hot zone' (4pm-8pm working days). Load shifting may involve resetting automatic timers, SCADA or BMS systems, to spread the intensive loads across other periods of the day, provided operational needs are still met. Checking maintenance schedules for Shoalhaven Water assets is critical as these may inadvertently trigger high demand charges if occurring between 4pm and 8pm on working days. Wastewater treatment batch processes may also have some opportunities to be adjusted for improved energy efficiency.
Energy efficiency measures for Council	The current electrical base load of certain Council assets, including the Nowra Admin	Walk-through energy audits are recommended as the first step to identify possible causes of the high

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
assets to reduce excessive base load electricity	Centre (around 45 kW base load after hours – the equivalent of 450 small fridges constantly running), is very high when the buildings are predominantly unoccupied. The cause of this excessive base load needs to be identified and rectified. Appliances including fridge/freezers, servers, server room air conditioners, computers, etc. are the obvious contributors to this high electrical consumption after hours.	base load in priority buildings. Once identified, solutions to reduce their energy demand should be implemented. Some energy efficiency opportunities may include: automatic PC shutdown every night, adjustment of temperature set points for server rooms to reduce air conditioner loads, optimising Building Management Systems (BMS) to ensure after hours (e.g. overnight, public holidays, weekends) shutdown of major Council building HVAC systems, etc.
Purchase energy efficient plant and equipment for new installations (use the Energy Rating Label, where applicable, the more stars the more energy efficient)	The selection of energy efficient appliances is particularly important for energy intensive items such as air conditioners and fridges. These must display an Energy Rating Label, which provides consumers with energy performance information, and ideally choose the most efficient one that meets their needs.	Staff responsible for purchasing electrical appliances should give consideration to the energy performance and Energy Ratings Label (shown below) of the items. Some items that cost less up-front may ultimately cost more over their working life due to their higher electricity consumption. 
Consider 'load shedding' opportunities for suitable sites	Load shedding is an opportunity to 'power down' high electricity consuming sites during times of peak demand and be reimbursed for this period. It is organised through an energy retailer and requires simple instrumentation to enable shutdowns to be programmed remotely,	Load shedding must be arranged via a formal agreement with an electricity retailer for specific sites. Approval to remotely shutdown these sites when certain conditions are met is established prior to any event being triggered. Load shedding can be lucrative for those that participate and

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	if approved. Load shedding may be suitable for some high energy intensive assets such as wastewater treatment plants where electricity loads may be moved outside of peak periods.	provided it does not affect operational needs could be considered.
Fuel efficiency to be one of the criteria in the tendering and selection of Council trucks, cars and heavy plant	In 2018/19, Council vehicles consumed 1,269,191 litres of fuel equating to 3,516 tonnes CO_2-e of GHG emissions. With more hybrid and electric vehicle models now available on the Australian market, Council has a wider range of suitable vehicles with zero or low emissions to choose from for its fleet. Battery life is also now improved with some EV models having a driving range of over 450 km per charge.	Ongoing. Fleet Services and staff involved in procurement and tendering for Council vehicles to be aware of this initiative to drive down fuel costs and tailpipe emissions.
Council's Aquatic Centres to adjust pool heating settings for improved energy efficiency and to reduce maximum network demand charges	Pool heating (particularly for outdoor pools) is one of the highest electricity consuming processes for Council. Maintaining pool temperatures at a comfortable level for patrons year-round requires a large heating load. Avoiding high power loads during peak demand periods (from 4pm to 8pm on working days) is critical to lowering electricity bill charges. Other simple measures such as always using pool blankets to reduce heat loss should also continue to be implemented. Nowra and Bay n Basin Aquatic Centres are priority assets for implementing energy savings measures.	Council's Aquatic Centres are one of the highest energy consuming asset groups for Council and should all be constantly managed for improved energy efficiency. Being Large sites on a Time of Use tariff, they are susceptible to excessive maximum network demand charges. Demand charges can comprise around one-third of the total cost of the electricity bill. With some adjustments to timers/controllers, most pools should be able to reduce their energy loads during peak electricity demand periods and save significant amounts on their power bills.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Investigate energy savings solutions for Burrier Pumping Station on the Shoalhaven River	Burrier Water Pumping Station (WPS) uses by far the most electricity of any Shoalhaven Council asset every year. The existing pumps consume around 40,000 kWh per day when they are switched on and pumping river water up to Bamarang Dam. That is the equivalent daily electricity consumption of 2,000 average homes. The pumping can only take place when certain river water levels are reached, and this can sometimes mean pumping at short notice with little opportunity for energy savings. Burrier WPS is decades old and designed for water pumping efficiency rather than energy efficiency. Future upgrades to the water pumping infrastructure, electrical components, operational conditions, etc. could all be further investigated to potentially reduce the energy demand and charges at Burrier WPS.	Shoalhaven Water to investigate all opportunities to reduce the electricity consumption and excessive network demand charges at Burrier WPS. Shoalhaven Water to prepare an energy efficiency operational plan/procedure for Burrier WPS.

15 Fuel Switching

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Transition Council's fleet vehicles to hybrid or fully electric vehicles (EVs) where fit for purpose, cost-effective and rechargeable	In 2019, Council purchased 3 fully electric fleet vehicles as part of a 3-year trial to gauge how EVs might operate effectively across the organisation. Depending on the outcome of this trial, additional fleet EVs could be leased	Depending on the outcomes of the trial of the current 2019 EVs (being initially reviewed in mid-2020), additional EVs may be ordered from FY2020/21. It is expected that the purchase price of EVs will reduce considerably and their resale

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
from renewable energy sources.	where fit for purpose. This is likely to include standard pool cars used for general work travel, rather than specialist vehicles such as utilities. Recharging the EVs by renewable energy is a priority as this enables them to be 'zero emission' vehicles. So although EV charging will add to the demand for electricity, the emissions from vehicle charging will fall as Council aims to increase its renewable electricity supply. Zero carbon emission hydrogen fuelled vehicles are currently being trialled in Australia e.g. the ACT Government recently purchased 20 hydrogen cars. However, their limited commercial availability and lack of refuelling stations means they are not yet a viable option for inclusion in this 2020-2025 Strategy.	value will increase once their uptake becomes more mainstream. The wide availability of EV charging stations will also be a key factor in accelerating the uptake of EVs in Australia.
Installation of Council-owned electric vehicle (EV) charging stations in strategic locations across the Shoalhaven LGA.	In May 2019, Council adopted the 'Electric Vehicle (EV) Charging Stations on Public Land Policy' (POL18/32). The Policy provides criteria for the installation of EV charging stations to encourage their uptake across the Shoalhaven region. The minimum capacity of Council-owned public EV charging infrastructure should be 50 kW DC to enable fast charging and future-proofing. Charging (billing) customers for the use of the DC Fast EV Charger(s) is also recommended to help Council with the	The preferred locations for Council-owned public EV chargers adhering to Council's own Policy for 'EV Charging Stations on Public Land', are: - Shoalhaven Entertainment Centre carpark - Ulladulla Admin Centre/Visitor Centre car spaces - Huskisson Town Centre These locations are tourist hotspots and can therefore attract visitors to the region from Sydney and Canberra.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	upfront capital and ongoing maintenance costs.	Figure 16 shows an EV fast DC 50 kW charging station installed by the NRMA at the Berry Bowling Club in early 2019 and a row of Tesla Superchargers installed at Silos Estate near Berry.
At the end of their working life, replace gas hot water systems on Council owned assets with heat pumps or solar hot water.	Gas-fired (either natural gas or LPG bottled gas) hot water systems are becoming more costly to operate as gas prices have risen considerably over recent years. Electric storage hot water systems can also be costly to operate if not connected to an Off Peak meter (i.e. Controlled Load). Some of Council's smaller assets (e.g. community centres, halls, sporting amenities, etc.) have gas hot water systems and would save on energy costs by switching these to heat pump or solar hot water systems when due for replacement.	All Council-owned assets with gas-fired hot water systems should be replaced with electric heat pump or solar hot water systems at the end of their working life.

Figure 16. Electric Vehicle (EV) 50 kW DC fast charging station installed by the NRMA at the Berry Bowling Club in early 2019 (left) and 6 Tesla Superchargers installed at Silos Estate near Berry in mid-2019 (right).

16 On-site Renewable Energy

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Install solar PV systems on suitable Council-owned assets (rooftop or ground-mounted) where the business case is favourable to generate daytime electricity.	Solar power generated via 'behind-the-meter' solar PV installations costs less than electricity supplied from the grid. With zero carbon emissions, renewable solar power is encouraged on all Council assets, where suitable. Suitable Council-owned assets for solar PV will satisfy the following criteria: - Sufficient daytime electricity consumption/load;	Good quality solar PV panels have a 25 year warranty and require minimal maintenance over this extended period. Solar PV inverters may need replacing after 10 years and this can be achieved whilst keeping the same solar panels. Ongoing monitoring of the solar PV performance is essential and can be achieved via online dashboards such as SunnyPortal. An annual maintenance program (e.g. panel cleaning, inverter/electrical checks) across all of Council's

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	- Adequate (structurally sound) roof with >20 years expected life remaining, or suitable ground mounting area in both size and aspect; - Minimal shading from trees or other structures; - Favourable electricity tariff costs/charges. Where Council assets are evaluated and found to be suitable for solar PV installations, these should be budgeted for and implemented as a priority. With solar power costing less than grid electricity and reducing carbon emissions, there is no reason to delay solar PV installs on suitable Council owned assets if funds allow.	solar PV sites is recommended to maintain system efficiency and power generation. Ongoing installations of solar PV on Council assets will contribute towards achieving Council's target of generating 50% electricity supply for its operations from renewable energy sources by 2030. It should be realised, however, that only 5-10% of a Council's base energy use is likely to be satisfied by solar PV installed on Council's facilities ('behind the meter' installations not including solar farms). Council's existing Revolving Energy Fund (REFund) has been utilised to fund solar PV systems on Council assets where the payback period is favourable. The REFund remains a funding option for future solar PV installs on Council assets.
Battery storage to be incorporated with solar PV installations where an asset's energy and load profile suits and the business case is favourable.	Lithium ion storage batteries are currently quite expensive and have long payback periods, however, the cost of batteries is reducing as demand for them increases. Although costly, storage batteries can play a role in reducing network demand charges during peak periods and this improves their business case. A 20 kWh storage battery was installed at Berry Wastewater Treatment Plant in early 2019 to trial the use of the technology. The battery is charged via a 22.5 kW solar PV	Storage battery solutions work best on assets that have electrical loads outside daylight hours. This is the period (often peak times) when the battery is setup to discharge and contribute electricity to the operation of the asset. During the day the battery ideally gets recharged by solar power. Future solar PV installations by Council would be well placed to be over-sized and therefore 'battery ready' for the future when battery prices are likely to become more affordable. Expansion of Council's solar battery storage capacity across

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	system at the plant and discharged when peak plant electrical loads occur to reduce energy charges (Figure 17). The battery can also be utilised as a backup power supply for communications during power interruptions to the plant.	suitable assets will be come more financially viable in the coming years when battery prices are expected to fall. The Shoalhaven Entertainment Centre (SEC) is an ideal asset for a storage battery as it has an 81kW solar PV system installed on the rooftop and often hosts evening entertainment shows. Being a Large Site, the SEC is also on Time of Use electricity metering and can benefit by minimising grid electricity usage between 4pm and 8pm on working days. This could be the period when a battery is discharged to lessen the peak consumption from the grid and save on network energy demand charges.
Council continues to implement landfill gas methane flaring at its primary landfill facility at West Nowra.	Council's West Nowra Landfill site has a landfill gas abatement generation facility to flare off the methane gas emanating from the waste cells and generate renewable electricity into the grid. The generation facility has been out of operation for an extended period since AGL left the site, although the methane gas continues to be flared off for greenhouse gas emissions reduction. The generation facility has a 1MW capacity and should therefore be recommenced to generate renewable energy back into the grid.	If the project is approved as an Eligible Offsets Project with the Clean Energy Regulator the activity is eligible to generate Australian Carbon Credit Units (ACCUs) under the Carbon Farming Initiative. Council will participate in the Carbon Abatement Purchasing Process and enter into further Carbon Abatement Contracts. The Contractor is entitled to the revenue from the sale of renewable electricity to the grid and provides a payment to Council in proportion to that revenue.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Continue investigations into a mid-scale solar farm (<5 MW capacity) on the Callala Wastewater Treatment Plant site to generate renewable energy to meet some of Council's future electricity needs beyond 2025.	Mid or utility-scale solar farms (<5 MW in size) are being installed around Australia as a means of generating large amounts of renewable energy. These facilities typically work 'in front of the meter' (or grid side) so do not avoid network charges associated with the delivery of electricity across the grid. The electricity generated needs to be sold into the energy market like any other power generator, and on sold to Council via a retailer under the National Electricity Market (NEM) rules. A 5 MW ground-mounted solar farm will require approx. 10 ha. of suitable land space. Shoalhaven Water has previously investigated a 5 MW solar farm proposal for the Callala Wastewater Treatment Plant (WWTP) site. This project has not progressed further due to uncertainty surrounding future retail arrangements, energy market pricing and energy policy. However, this project could be further progressed as a priority site now that Council has committed to reducing its greenhouse gas emissions and increasing its renewable energy generation. If Council cannot generate its own additional renewable energy to meet its renewable energy and emissions targets, it will ultimately need to source it from third parties under a corporate Power Purchase Agreement (PPA) or by purchasing accredited GreenPower®.	Further investigations into the proposed Callala WWTP solar farm will need to include additional enquiries with Endeavour Energy about their permission to connect 5 MW into their grid at this location. The capacity of the local electricity grid to cope with this extra load is at the discretion of Endeavour Energy. There is a future risk within the 25-year life span of a solar farm that the National Electricity Market may become saturated with solar energy during the daytime and there could be constraints placed on solar generators or even negative pricing. Future Large-scale Generation Certificate (LGC) market factors, pricing, selling and surrender are also risk factors. These risks will need to be identified, evaluated and mitigated for any Council-owned mid-scale solar farm. Price reductions in grid-scale technology (e.g. solar panels, inverters and battery storage), as well as construction costs, may trigger a new feasibility assessment of the Callala WWTP solar farm in the next few years. Ongoing liaison with the City of Newcastle Council and Repower Shoalhaven should be made as these groups have progressed and/or constructed solar farms in recent years.

Figure 17. Shoalhaven Council received recognition for its Renewable Energy achievements at the 2019 Cities Power Partnership national awards for projects including solar PV and storage battery installations at a number of its assets such as Bamarang WTP (bottom left) and Berry WWTP (bottom right).

17 Off-site Renewable Energy

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Develop and implement a corporate Power Purchase Agreement (PPA) to source renewable energy off-site (e.g. solar/wind farms) to achieve Council's adopted renewable energy targets.	In the emerging renewable energy market, corporates and groups can now buy renewable energy from specific renewable energy projects, such as large solar or wind farms. A number of organisations, including the Southern Sydney Regional Organisation of Councils (SSROC), are now entering into long-term (e.g. >7 years) corporate PPAs to source off-site renewable energy for their operations. The City of Newcastle, Hawkesbury City Council and Sydney City Council's also entered into long-term renewable PPAs sourced from utility-scale solar and wind farms operating in NSW. The cost to secure this long-term renewable energy can be achieved at no greater cost and with no greater risk than purchasing regular grid power. Shoalhaven Council typically purchases large amounts of electricity via three separate contracts i.e. Large Sites, Small Sites and Street Lighting. Given the contracts for both Large Sites and Street Lighting have now been committed for the next 3 years until the end of 2022, this leaves the Small Sites contract open for Council to enter into a corporate renewable	Shoalhaven Council has around 540 sites (accounts) on its Small Sites contract with a total annual electricity consumption of approx. 5,243 MWh. The Small Sites moved to the NSW Govt 776 contract for the retail supply of electricity in Jan 2020. There is no 'lock in' contract period for the 776 Small Sites contract, so Council can roll out of it at any time, if desired. This flexibility allows Council to prepare, plan and procure a corporate renewable PPA for its Small Sites. This is a complex process that may require outsourcing to an expert energy market consultant to negotiate the PPA on behalf of Council (or ideally a larger collective buying group). In 2022, Council should commence the planning stages for entering into a corporate renewable PPA for its Large Sites (electricity supply from Jan 2023 onwards). Council is currently contracted through Local Government Procurement (LGP) for its retail electricity supply for Large Sites and Street Lighting until 31 Dec 2022. Switching this large grid electricity load to renewables will be necessary to achieve Council's GHG emission reduction target for 2025 (see Figure 15).

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	PPA as soon as possible. An opportunity also exists for Shoalhaven Council to be part of a collective buying group with other Councils or organisations to increase the buying power for an affordable long-term renewable PPA.	
Encourage local community renewable energy uptake for rooftop solar PV and storage batteries for residents and businesses in the Shoalhaven via Council-run: - Education and information programs; - Renewable energy bulk-buy programs.	Council can help and encourage the Shoalhaven community to act to reduce their emissions and save money on their energy bills by running a range of education and information programs. Renewable energy bulk buys have also been an effective way to increase the level of solar PV in communities. A Council-run renewable energy bulk-buy can benefit the local community by getting access to cheaper solar PV installations (discounted pricing) and pre-vetted quality installers.	From 2020/21, Shoalhaven Council will run free Sustainable Energy Expos for residents and businesses to showcase solar PV systems, storage batteries, EVs, etc. The Expos will bring suppliers, technical know-how and the community together. It will aim to demystify solar PV and storage batteries for Shoalhaven residents and businesses in an attempt to increase the number of dwellings with installed solar PV systems. The target is for 1 in 3 Shoalhaven dwellings to have installed solar PV by 2025. Empowering residents to confidently choose suitable solar power systems for their dwellings is within Council's role and responsibilities. The Expos will need to be held at a variety of locations across the Shoalhaven LGA to enable residents and businesses to easily attend. From 2020/21, Council will aim to set up a bulk-buy program for solar PV, inverters, battery storage systems and solar hot water systems. The program will involve negotiating discounts for top-tier quality technologies, establishing a

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
		panel of preferred suppliers with standard pricing and developing a communication plan on how Council will advise residents and businesses about the opportunity.
Work with Shoalhaven community groups proposing large scale community energy projects in the region.	Community energy projects such as solar farms can benefit the local community by supplying renewable electricity at more affordable rates. In 2018/19, Shoalhaven Council collaborated with a local community energy group, Repower Shoalhaven, on a feasibility study for a 'Social Access Solar Garden' in the Shoalhaven. A Solar Garden is essentially a solar farm which supplies some of it power to disadvantaged people who may not be able to own their own rooftop solar PV system. Community energy schemes can benefit the local economy and support communities' transition to renewable energy.	Repower Shoalhaven have commenced investigations into the development of a solar farm in the Shoalhaven region consistent with the Social Access Solar Garden feasibility study. Council will work with community energy groups such as Repower Shoalhaven (possibly establishing a Community Energy Hub) to facilitate solar farms and renewable energy projects in the region as they support the local economy, low income residents and greenhouse gas emissions reduction. Council may be able to purchase the electricity output from community energy projects via a corporate PPA through an energy retailer.
Participate in emerging energy technologies, such as battery storage, microgrids, embedded networks and Virtual Power Plants (VPP), where opportunities arise and if they support Council or the community's economic, social or environmental outcomes.	As technology evolves, the roll-out of new schemes that offer low cost renewable energy delivered in a different way may become financially viable. Microgrids can help communities transition to renewables cost effectively and provide local, reliable and affordable energy security. Trials of VPPs that harness the power of decentralised energy resources like solar PV installations and batteries during grid	Shoalhaven Council should remain open to viable opportunities that may arise with new energy technologies. For instance, Endeavour Energy have proposed the Bawley Point Kioloa Community Renewable Energy Project that will coordinate a diverse set of local energy generation options, as well as demand response to improve energy security and quality, sustainability and affordability for these communities.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	overload or outages are already underway in Australia. These stand-alone power supply systems are so vital for many Shoalhaven villages, after the 2019/20 bushfires left so many residents without power for extended periods.	Reliable and stand-alone electricity supply in these isolated villages is essential for them to overcome natural disasters such as bushfires and floods. Emergency Evacuation Centres established within Council's assets should be priority locations for these stand-alone power systems.

18 Carbon Offsets

Once Shoalhaven Council has fully exhausted the installation of solar PV on its own assets (both roof and ground mounted), as well as purchased renewable energy via Power Purchase Agreements, it will then be left with offsetting its remaining carbon emissions from gas/fuel combustion, fugitive landfill gases and wastewater/sludge gases. Renewable energy can only be used to offset Council's carbon emissions associated with electricity consumption, not to offset these other emissions. For these emission sources, carbon offsets may need to be purchased from certified carbon offset schemes. The purchase of carbon offsets is not recommended in the period covered by this Strategy i.e. 2020-2025, when Council should be continuing to invest in its own renewable energy generation and purchasing to achieve its interim carbon emissions targets. Carbon offsets are mentioned in this Strategy to show what will be required in the longer term for Council to achieve its ultimate goal of net-zero greenhouse gas emissions by 2050, which is also known as being 'carbon neutral'.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Afforestation projects – carbon sinks	Shoalhaven Council own or manage a number of areas within the LGA that could be planted with suitable native plant species. As these plants grow, they 'soak up' carbon from the atmosphere in carbon sinks. If these plants are forest trees, they may live for 50 years and capture carbon for that period.	Suitable areas for carbon sink forests will need to be determined by Council and a program established with volunteers or paid staff, to plant out the site with suitable native species. A number of current Council programs exist to support this action, such as Bushcare. This initiative requires a long-term

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	Planting forests could be considered for areas that are currently weed infested or lacking vegetation cover. Planting native trees also provides biodiversity and fauna habitat benefits for the region.	sustained effort to ensure forest trees grow to maturity and act as 'carbon sinks'.

19 Resourcing, Implementation & Expertise

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Employ an Energy Manager to coordinate, communicate and implement Council's sustainable energy policy, strategy and plans.	The Energy Manager would be a Council-wide position as it works across all Groups. Shoalhaven Council is one of the largest energy consuming Councils in NSW due to it being a water utility covering a large regional area. As Shoalhaven Water consumes around 50% of Council's total electricity consumption, the Energy Manager would be best placed within this Group for maximum influence and effectiveness.	With Shoalhaven Council being a large energy consuming Council, there is scope for ongoing energy savings opportunities. The position of Energy Manager will basically 'pay for itself' through achieved energy cost savings.
Maintain Council's Revolving Energy Fund (REFund) to provide future funds for high priority energy efficiency and renewable energy projects.	The REFund will prioritise energy and emissions savings projects that have short payback periods to ensure the fund is replenished quickly to enable future projects. A Shoalhaven Council corporate procedure (PRD18/104) has been prepared to administer the REFund and select suitable projects.	A REFund Committee has been established to implement and manage the REFund and its approved projects. Council has 'seed funded' the REFund with $230,000 in 2019/20 to kick start the projects. REFund projects have commenced in 2020, including the upgrade of Nowra Library lighting with energy savings LED lights.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
Identify and seek funding and financing to implement priority energy savings projects with solid business cases.	Council's financing strategy for energy savings initiatives will be based around the following methods (in order of priority): 1. External funding, including incentives, rebates and grants; 2. Funding from Council's budget including the Revolving Energy Fund; 3. Loan financing (e.g. via T-Corp or Clean Energy Finance Corporation); 4. Third-party borrowing (Energy Performance Contracts or on-site solar PPAs).	Most of the energy savings measures recommended in this Strategy have favourable payback periods. Council should make budget allocations to ensure these measures are implemented within the next 5 years to 2025. Government energy schemes offering rebates, such as the NSW Energy Savings Scheme and Renewable Energy Certificates, have a limited life so should be maximised by Council whilst they are still available.
To track progress towards its energy and emissions targets, Council will prepare an Annual Energy Review in October every year to publish the previous financial year's energy consumption and greenhouse gas emissions data.	The Annual Energy Review will cover all of Council's operations, assets and facilities. This will include electricity and gas consumption/costs, fleet vehicle fuel, landfill and wastewater/sludge emissions.	The Energy Manager will prepare the Annual Energy Review with data obtained from several reliable sources. The Review shall be reported to Council's Strategy & Assets Committee on an annual basis.
Calculate and report on Council's greenhouse gas emissions using acceptable methodology and protocols.	Using the *National Greenhouse & Energy Reporting* (NGERS) scheme methodology, Council will report on its annual carbon emissions from sources including: • Landfill gases • Wastewater treatment plant gases and sludge	Annual reporting of Council's greenhouse gas emissions will be made in the Annual Energy Review.

ENERGY INITIATIVE	RATIONALE	IMPLEMENTATION
	• Fleet vehicle fuels • Refrigerant gases • Electricity and gas usage	
Maintain membership to the Climate Council's national Cities Power Partnership (CPP) program and continue implementing pledges under the program.	All Group Directors have pledges to implement under the CPP and these are reported back to the CPP every 6 months. The GDs meetings are suitable forums to report on the progress of these pledges.	A progress implementation table for the CPP pledges has been prepared and will be updated every 6 months and reported to the GDs meeting. The original CPP pledges are due to be revised in mid-2020 by Council, as most of them have been fully or partially completed.
Maintain access to an online dashboard energy portal to access and monitor all energy and emissions data, monitoring, reporting and billing.	Azility has been well utilised by Council's energy and accounts staff for energy monitoring and billing. Keeping track of electricity and gas accounts is critical to verify billing. Having an online dashboard to quickly interrogate energy data is essential for prompt responses to account queries and energy reporting.	There are several third-party energy dashboard platforms that are available on the market. Council would be prudent to seek quotes and proposals from a range of providers to ensure value for money and the best solution for its energy monitoring, reporting and billing purposes.

The rooftop of the Shoalhaven Entertainment Centre in Nowra showing the 81kW solar PV installation (200 solar panels) completed in Oct 2019.

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