

Emissions reduction action plan

Reducing our emissions, reaching our targets



I. Executive Summary

In 2014 the City of Canada Bay adopted its first Greenhouse Action Plan, which set a target to ‘reduce Council’s greenhouse gas emissions by 35% of 2011/12 levels by 2023’. Our efforts so far see us on track to reach our current target by 2023 and in response to this we have drafted a new plan.

This plan addresses greenhouse gas (GHG) emissions generated by both council operations and the City of Canada Bay community. For brevity we refer to greenhouse gas emissions as emissions. Emissions from council operations are referred to as corporate emissions and those from the City of Canada Bay local government area are community emissions.

Since 2014 Council has implemented a range of energy efficiency upgrades at council facilities, including significant improvements to the efficiency of our vehicle fleet and purchasing carbon-neutral paper across the organisation. In the last year, we have accelerated our action, implementing 134 kW of solar PV systems, committing to converting around 15% of streetlights to energy efficient LED technology, and upgrading both building and sporting field lights to LED. Council has also recently started to buy 20% of its electricity from the Moree solar farm in regional NSW.

This plan provides a discussion on the strategic context around emissions reduction and describes the approach we took in developing our plan. The plan then breaks into two distinct sections, addressing corporate and community emissions separately. For each we provide a breakdown of major emissions sources, outline how we are tracking against the current target, set an ambitious new target which responds to Council’s recent climate emergency declaration and provide an action plan to reach the target.

In developing this plan, we were committed to setting targets which considered Australia’s global emissions reduction obligations, precedents set by other councils in NSW, as well as input from the community and Council staff.

We undertook an extensive and structured consultation process which indicated that all stakeholders had a strong preference for ambitious emissions reduction targets for both corporate and community emissions. We undertook research to support the target development, engaging consultants to assist in mapping different emissions reduction scenarios, and to help us to assess the feasibility of each, the actions that would need to be taken, as well as the associated costs. This process led us to setting two new emission targets:

- Corporate target: Net zero emissions from Council operations by 2030
- Community target: Net zero emissions from the City of Canada Bay community by 2050

These targets are ambitious but achievable if Council and community members are committed to implementing a range of emissions reduction initiatives.

The corporate action plan lists 62 cost effective actions aimed at reducing operating costs and emissions from council operations. These actions will see us targeting sustainable procurement, expanding solar PV installations, replacing street lighting with more efficient LED globes, improving air conditioning, continuing to improve the efficiency of our fleet and installing energy efficient heat pumps at swimming pools in place of gas boilers.

The community action plan recognises Council’s role as a leader. Not only will we lead by example, we will empower the community through initiatives and programs about buying renewable energy and energy efficiency, supporting local community groups and schools to install solar PV systems, advocating for sustainable transport and engagement around waste initiatives. The community plan outlines 33 actions aimed at reducing emissions.



Contents

1. Executive Summary	2
2. About this plan	5
How we did it	5
What the stakeholders told us	5
Understanding our data	6
3. What is the strategic context?	9
What is the Climate Emergency?	9
Global, Australian and local responses to climate change	10
4. Journey to our corporate target	13
History	13
Emissions Profile	15
Did we meet our targets?	16
Where we are at	16
Pathway to the target	17
What is our new Corporate Target?	18
Action Plan	19
5. Journey to our community target	25
History	25
Emissions Profile	26
Pathway to the target	27
What is our new Community Target?	28
Action Plan	29
6. Glossary of terms and acronyms	35
7. References	36

List of tables

Table 1: Table of tracking towards previous targets	16
Table 2: Corporate Priority Area 1: Energy Efficiency	20
Table 3: Corporate Priority Area 2: Sports field lighting	22
Table 4: Corporate Priority Area 3: Street lighting	22
Table 5: Corporate Priority Area 4: Generating Renewable Energy	23
Table 6: Corporate Priority Area 5: Fleet	24
Table 7: Corporate Priority Area 6: Sustainable Procurement	24
Table 8: Corporate Priority Area 7: Buying Renewable Energy	24
Table 9: Community Priority Area 1: Grid Decarbonisation	30
Table 10: Community Priority Area 2: Buying Clean Energy	30
Table 11: Community Priority Area 3: Generating Renewable Energy	31
Table 12: Community Priority Area 4: Energy Efficiency	32
Table 13: Community Priority Area 5: Sustainable Transport	33
Table 14: Community Priority Area 6: Waste Management	34
Table 15: Community Priority Area 7: Council as Leader	34

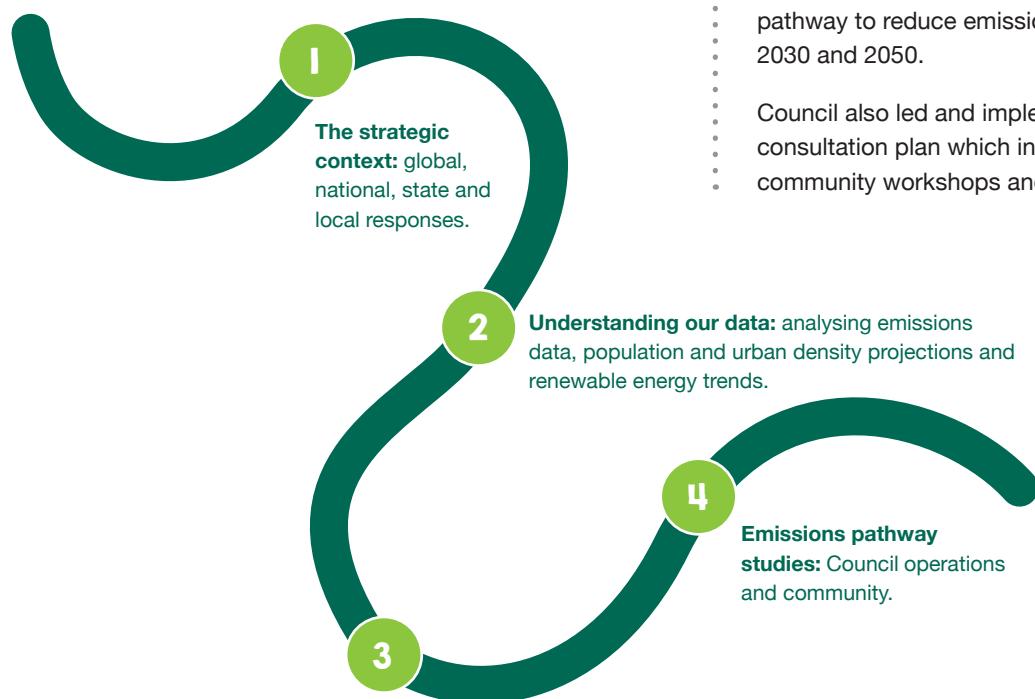
2. About this plan

How we did it

This action plan supports the delivery of targets outlined in the City of Canada Bay's Environmental Strategy. It provides an update on corporate emissions reduction progress since the publication of the first Greenhouse Action Plan in 2014 and provides an overview of work to date on reducing community emissions.

To support this process we were guided by the following: our Community Strategic Plan Your Future 2030; actions taken by other cities around the world; policy settings of the NSW Government and other Australian Governments; climate impacts and changes in technology; demographics and urban densification trends; and our obligation to contribute to the United Nations' Sustainable Development Goals.

Our target setting process



This plan has been further informed by two research studies which Council engaged 100% Renewables to undertake:

Emissions Pathway Study – Council Operations

This report involved the assessment of Council's corporate emissions footprint based on: analysis of energy consumption data, site inspections, a detailed technical report and recommended actions. The recommended actions were workshopped with internal staff in key areas and funding mechanisms identified for inclusion in the operational plan.

Emissions Pathway Study – Community

This report analysed and described the City of Canada Bay community emissions profile, modelled pathway scenarios, considered Council's areas of influence, and made recommendations for key actions that support community emissions reduction.

Through both of these studies we analysed opportunities relating to the major sources of emissions: energy supply, buildings, transport and waste and calculated the potential pathway to reduce emissions from each proposed action by 2030 and 2050.

Council also led and implemented an engagement and consultation plan which involved community surveys, community workshops and an internal Council working group.

By using this approach, Council has had the opportunity to reflect on the potential reduction pathways, analyse external factors and risks, and make informed and realistic decisions in setting the new reduction targets.

Figure 1: Target setting process - overview

What the stakeholders told us

Corporate target

During community consultation, the majority of people who completed the community survey wanted to see a 100% greenhouse gas reduction target, which equals a goal of 'net zero' or 'carbon neutrality'.

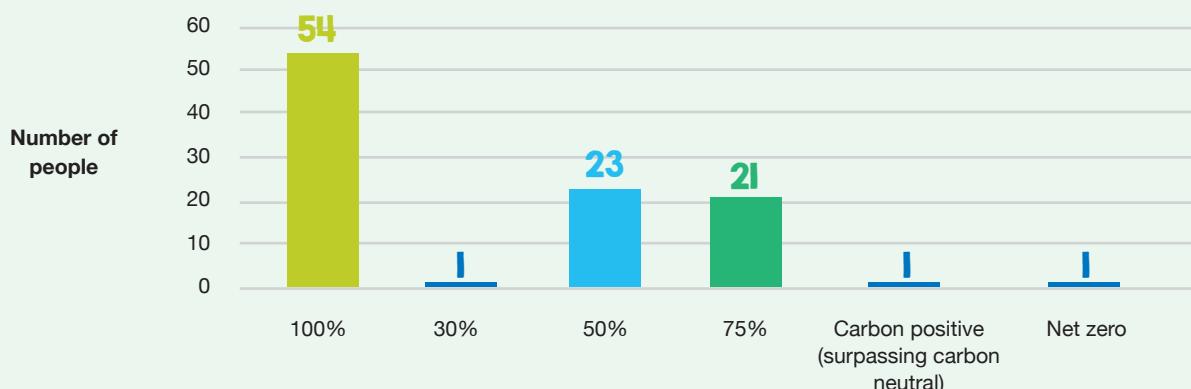


Figure 2: What greenhouse gas reduction target should Council aim for in its operations?

Council staff and Environmental Advisory Committee (EAC) members also strongly support a 75–100% reduction target, with a proposed target date of 2030.

Community target

Workshop participants were asked to indicate what their aspirations were for emissions reduction and/or renewable energy generation in the community. A range of possible targets and timeframes were provided.

A fairly clear preference was indicated for an aspirational goal of 100% reduction in carbon emissions, which equals a 'carbon neutral' or 'net zero' goal (shown in Figure 3 below), with a strong preference to meet this goal by 2025 or 2030.

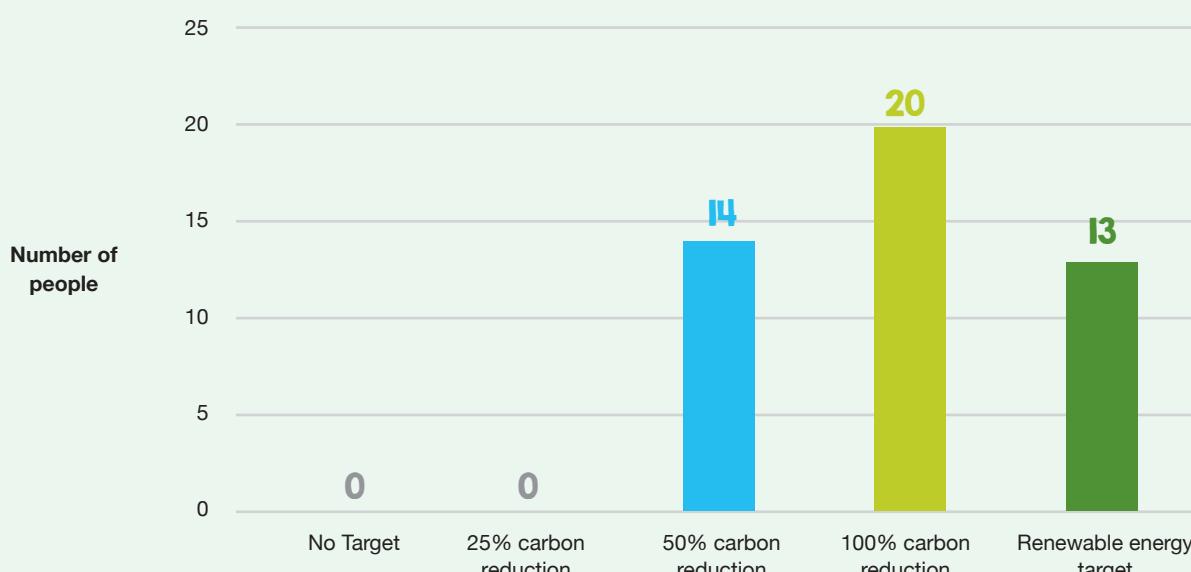


Figure 3: Council staff, EAC and community consultation workshops—recommendations for LGA targets

Understanding our data

Data from a number of sources was used to gain a detailed understanding of current corporate and community emissions and to provide input for future emissions projections. Some of these sources and their influence are summarised below:

Calculating emissions inventories

One of our first steps in setting targets was to calculate corporate and community emissions inventories. Greenhouse gas emissions come from a range of different sources, including electricity, natural gas, transport fuel and emissions from waste. Greenhouse gas emissions are grouped into three ‘scopes’ when developing an emissions inventory.

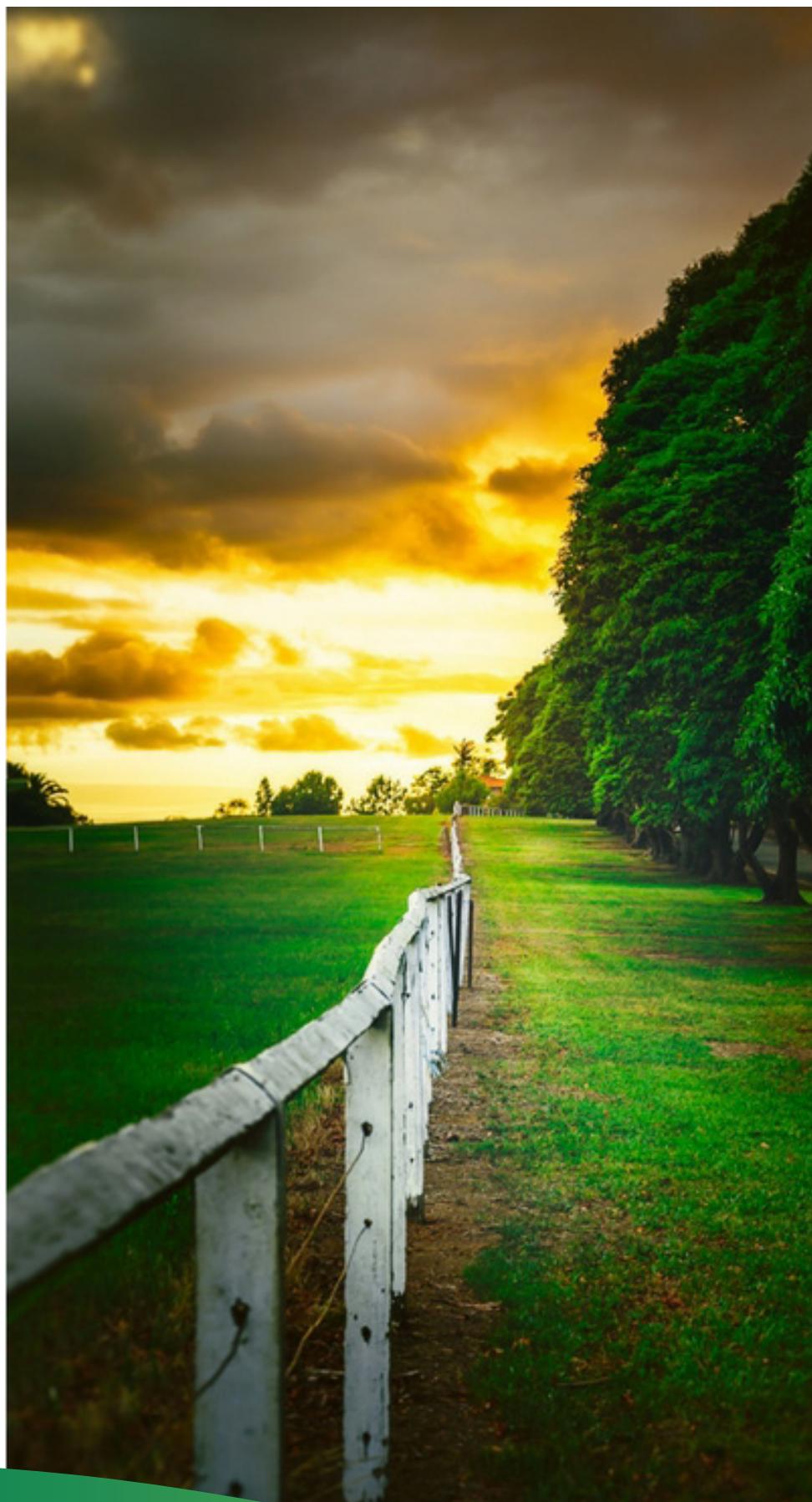
These are:

Scope 1: direct emissions from owned or controlled sources e.g. fuel consumed on site such as natural gas and transport fuel

Scope 2: indirect emissions from the generation of purchased energy e.g. electricity sourced from the grid

Scope 3: all indirect emissions (not included in scope two) that occur in the value chain of the reporting organisation, including both upstream and downstream emissions e.g. transmission and distribution losses from grid electricity and emissions from waste.

We sourced data to calculate each of the inventories from reliable, repeatable sources and inclusions are outlined in more detail in sections five and six.



Forecast business as usual carbon footprint

The business as usual carbon footprints for both Council operations and the whole LGA were calculated. This means looking at what would happen to emissions in each case if neither Council nor the community took any action to reduce emissions. In the absence of emissions reduction actions, emissions would still change over time due to a number of factors covered below:

Population growth

The current population of over 90,000 is expected to grow to almost 120,000 by 2036, a growth rate of more than 1% per year. This will have an impact on Council's energy demand in a number of ways - through the increased demand for more road maintenance and parks maintenance, new street lighting for new sub-divisions, and higher demand for Council's community services facilities, sporting fields etc. This population growth will also have an impact on the total community emissions: we would expect carbon emissions in the community to grow, possibly in line with population growth.



Figure 5: Projected population increase to 2036 in the City of Canada Bay

Major asset changes within the City of Canada Bay

There are a number of known and expected asset changes to Council facilities in coming years that could have a significant impact on our corporate emissions, including:

- Construction of Rhodes Recreation Centre
- Redevelopment of Concord Oval (ROCO)
- Continued activation of new sporting fields including lighting
- Potential expansion of Cintra Water Treatment Plant facilities and/or demand.

Grid decarbonisation

Electricity in the grid comes from a variety of power plants that are either powered by renewables or fossil fuels. Currently, around 80% of Australia's electricity is produced from fossil fuelled power plants, which makes the grid highly carbon intensive. With more and more utility scale renewable energy projects feeding electricity into the grid, the grid decarbonises over time. This means that emissions associated with electricity consumption decline over time.

These BAU forecasts of energy use and emissions form the starting point for the development of Council's carbon emissions pathway.

Applying a science based target

Targets are considered science-based if they are in line with the level of decarbonisation required to keep the global average temperature increase well below 2°C compared to pre-industrial temperatures, as described in the Fifth Assessment Report of the IPCC. All science-based target setting methods use an underlying carbon budget.

There are two science-based temperature scenarios that the City of Canada Bay considered: well below 2°C and 1.5°C scenario.

Aligning with the C40 approach

C40 is a network of the world's megacities committed to addressing climate change. Cities that commit to being part of C40 need to have a plan to deliver their contribution towards the goal of constraining global temperature rise to no more than 1.5°C . In Australia, Sydney and Melbourne are members.

To remain within a 1.5°C temperature rise, average per capita emissions across C40 cities need to drop from over 5 t CO2-e per capita to around 2.9 t CO2-e per capita by 2030. Every city needs to diverge considerably from its current BAU pathway.

We decided to align with the C40 (no more than 1.5°C) approach for both the Council and Community targets, given community and stakeholder feedback for Council to show leadership in emissions reduction and to support Council's climate emergency declaration.



3. What is the strategic context?

Climate change has a real and identifiable impact on our local environment. Changes in some types of natural hazards have already been observed. For example, there have been increases in the frequency and intensity of heatwaves and heavy precipitation. These types of weather events will impact on the natural, social and economic welfare of NSW.

Native species and ecosystems are impacted by rising temperatures and sea levels. Changes in fire regimes, water quality and ocean chemistry will have wide ranging impacts on biodiversity and will intensify existing threats such as habitat loss, weeds, pests and drought.

Sea level rise raises concerns for management of coastal zones and low lying areas around the foreshore. Storm surges and salt water intrusion into estuaries may have significant implications in the medium to long term for freshwater and saltwater ecosystems, as well as the urban development around them.

Heatwaves are a significant hazard in Australia. They have been responsible for more human deaths than any other natural hazard. Temperatures in NSW are projected to increase in the near and far future. With more hot days and less cold nights, changes in heat have the potential to affect human health, infrastructure, transport, emergency management, primary industries, and the environment.

A number of responses have been developed to tackle climate change on a global, national, state and local level. This Emissions Reduction Action Plan outlines some of these on the adjacent page.

What is the Climate Emergency?

At Council's September meeting, a Climate Emergency motion was passed unanimously. It outlined Council's commitment to recognise that we are in a state of climate emergency. The motion requires urgent action by all levels of government, including local councils and acknowledges that by taking urgent action it is still possible to prevent the most catastrophic outcomes. If we want to avoid the worst consequences of climate change, we need to make a serious commitment now to reduce corporate and community emissions. In determining our target, we have used a science-based approach which pursues efforts to limit the rise of global mean temperature to 1.5 °C and to achieve net-zero emissions.

To stay below 1.5°C, carbon dioxide levels in the atmosphere must not exceed a certain amount – referred to as the global carbon budget. If annual global greenhouse gas emissions remain at current levels, the global carbon budget will be used up within less than a decade and human-driven warming will exceed 1.5°C sometime between 2030 and 2052.

Global emissions need to be cut by 45% on 2010 levels by 2030 to prevent exceeding 1.5°C and the worst impacts of climate change.



Global response to climate change

Internationally, there are three primary drivers for urgent action on climate change. In addition to the second commitment period of the Kyoto Protocol, which runs until 31 December 2020.



1) United Nations' Sustainable Development Goals

Governments, businesses and the community are working with the United Nations to achieve the 17 Sustainable Development Goals Agenda by 2030. The 17 goals have identified targets which Council is working to contribute to and these have been mapped in the action plans below.



2) Paris Agreement

Signed on 12 December 2015, the signatories including Australia, agreed to work to limit global temperature rise to well below 2°C, and given the grave risks, to strive for 1.5°C.



3) Special IPCC report on 1.5°C warming

In October 2018 in Korea, governments approved a special report on limiting global warming to 1.5°C. The report indicated that achieving this would require rapid, far reaching and unprecedented changes in all aspects of society to limit global warming to 1.5°C.

National, state and territory responses to climate change

At a national level, Australia's response to the Paris Agreement has been to set a goal for greenhouse gas emissions (GHG) of 5% below 2000 levels by 2020 and GHG emissions that are 26% to 28% below 2005 levels by 2030.

States and Territories have adopted aspirational emissions targets, as seen below.

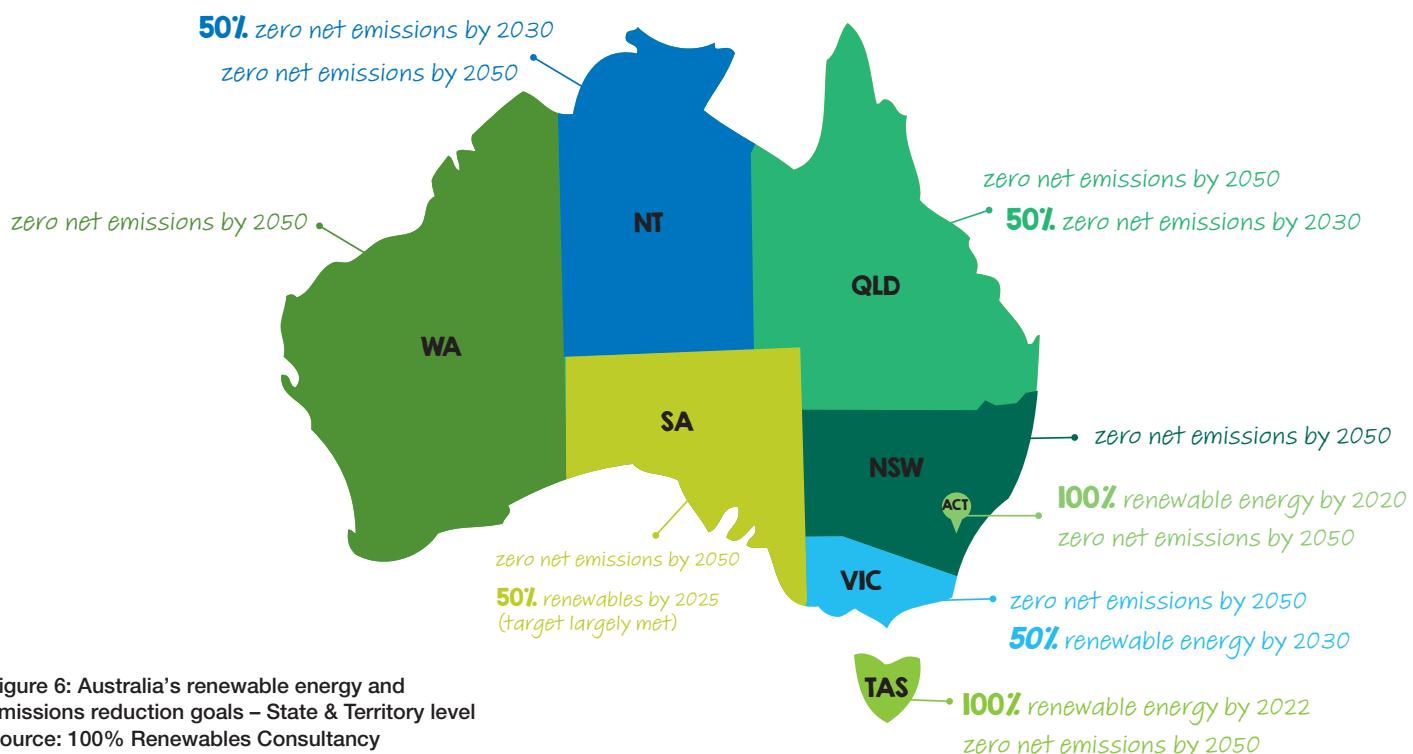


Figure 6: Australia's renewable energy and emissions reduction goals – State & Territory level
Source: 100% Renewables Consultancy

NSW state target

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

State response

Many councils and communities across NSW have already set ambitious renewable energy and emissions reduction targets in response to the threats of climate change. These are summarised in Figure 7 below.

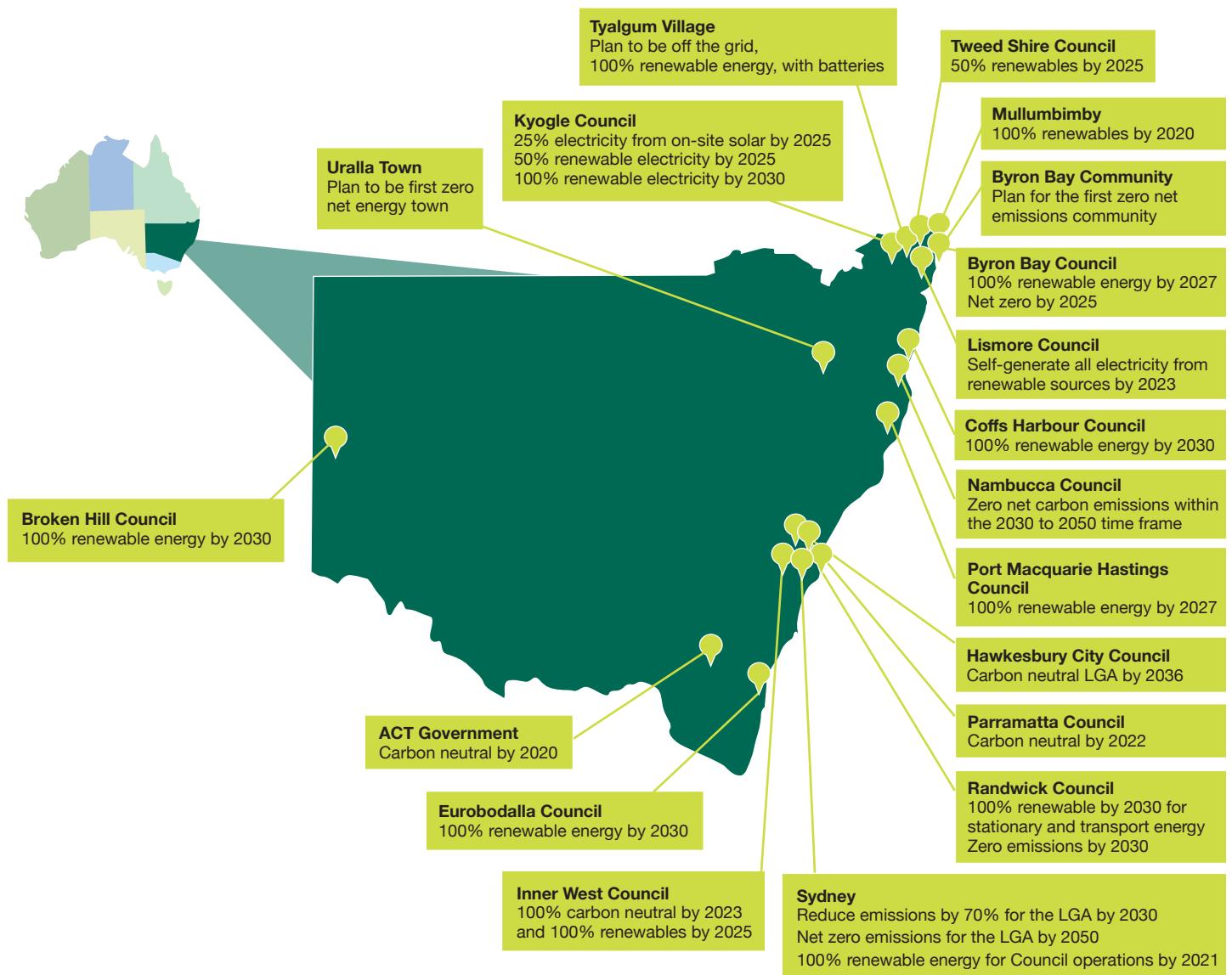


Figure 7: Renewable energy & emissions reduction targets by NSW Councils and Communities
Source: 100% Renewables Consultancy

Local Response

When developing this plan we followed the Guiding Principles for Councils within the Local Government Act 1993, Chapter 3, 8A. It states that councils are obliged to consider the long term and cumulative effects of actions on future generations and that they should consider the principles of ecologically sustainable development.

Strategic framework

Action to mitigate climate change is aligned with the City of Canada Bay Community Strategic Plan YOUR future 2030, with several goals and strategies leading to more sustainable outcomes and lower carbon emissions, including:

Community Strategic Plan Goals addressed in this plan:

Goal 2.1 – Working together, we adopt practices that sustain our environment.

Delivery Strategy 2.1.1 – Respond to the impacts of Climate Change through planning for environmental sustainability and implementing energy, water and greenhouse gas mitigation and adoption programs.

Goal 3.2 – A connected network of quality active and public transport routes and services minimise traffic and make it easier to get around.

Delivery Strategies 3.2.3 – Provide efficient lighting for streets, public spaces, parks and sporting fields to ensure a safer environment and to contribute to reducing energy use and greenhouse gas emissions.

Goal 4.2 – High quality sustainable urban design results in innovative development sensitive to existing local character.



Figure 8: How Council plans fit together

4. Journey to our corporate target

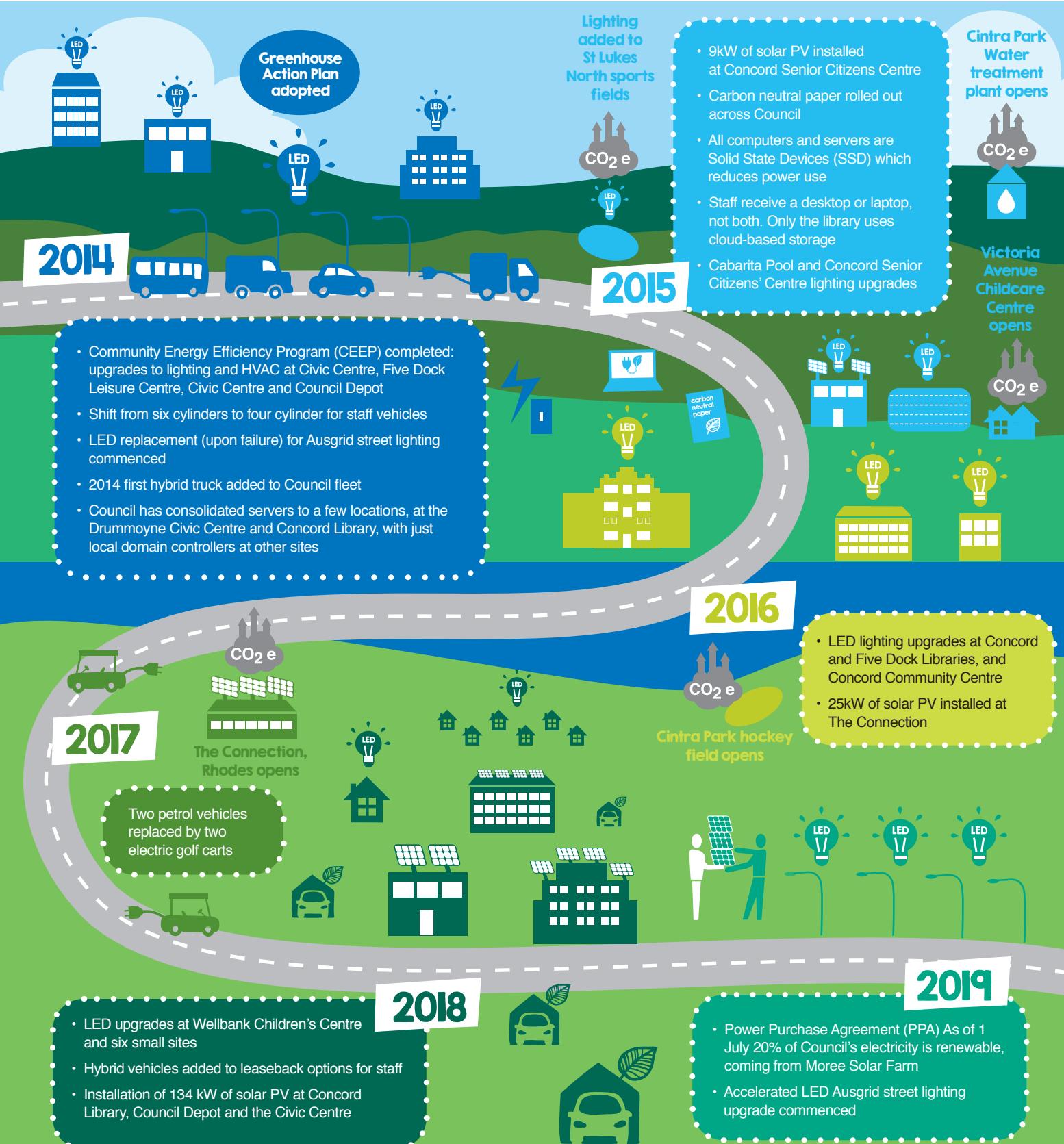
History

The City of Canada Bay has a long history of emissions reduction and climate adaptation programs as can be seen in Figure 9 below, which maps our emissions reduction journey since 2014.



indicates a new project or facility that adds to corporate emissions

Figure 9: Corporate history of emissions reduction



Corporate Emissions profile

In 2017-18 Council operations consumed 44,102 gigajoules of energy from fossil fuels, resulting in greenhouse gas emissions of 7,579 tonnes of carbon dioxide equivalent (t CO₂-e).

This equates to around 1% of the total estimated GHG emissions by the City of Canada Bay local government area for this period which were 772,220 t CO₂-e.

Corporate emissions include the following sources:

Scope 1: Emissions from transport fuel in Council's fleet and natural gas used in Council facilities.

Scope 2: Emissions from electricity consumed at Council facilities, including: buildings, pools and sports fields and Council-owned street and park lighting.

Scope 3: Emissions from Ausgrid-owned street lighting¹, also transmission and distribution losses for electricity and upstream emissions for natural gas, petrol and diesel.

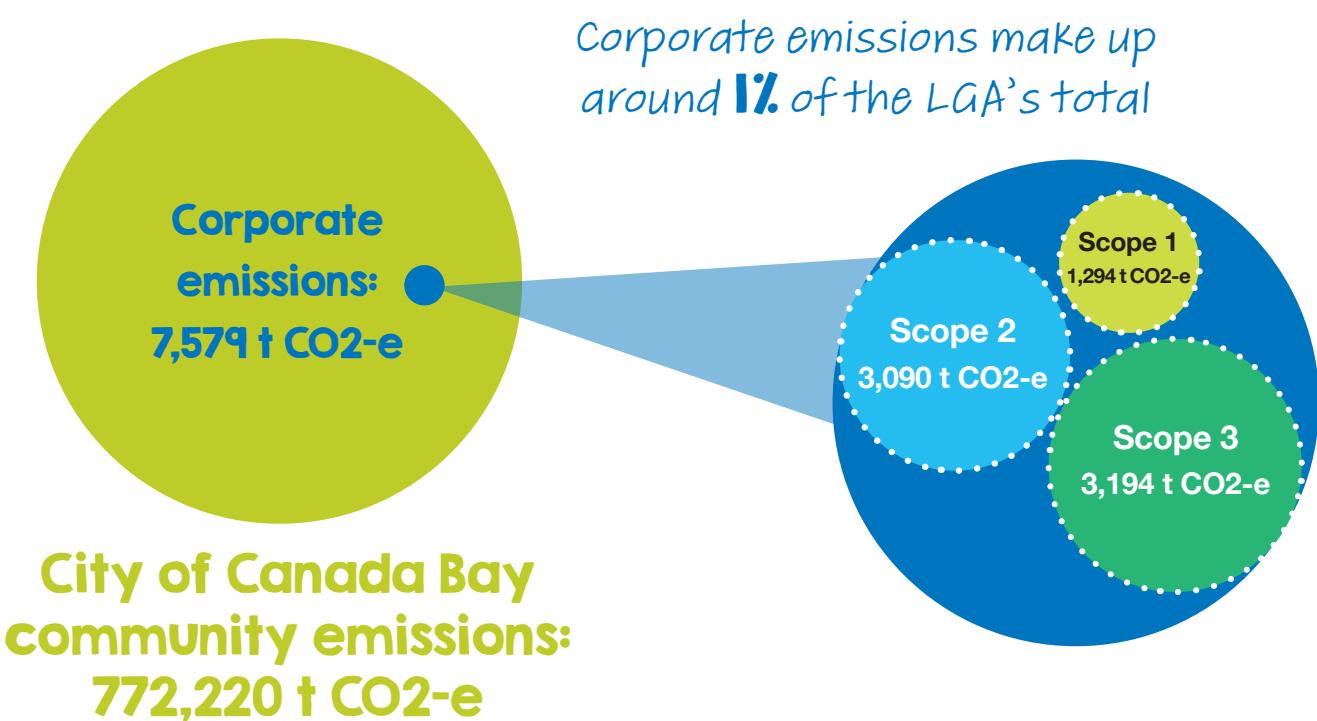


Figure 10: Corporate Emissions Profile



¹ The 2014 Greenhouse Action Plan excluded emissions for Ausgrid-owned street lighting from Council emissions, as at the time, we had no scope to influence this figure. Since 2014 the energy landscape has shifted considerably: Council has had the opportunity to participate in the Accelerated Street Light Replacement program and there are more possibilities to cost-effectively offset these emissions by purchasing renewable energy. For these reasons we have decided to include Ausgrid-owned street lighting emissions in the scope of this Emissions Reduction Action Plan.

Corporate emissions by source

Energy use and emissions from Council's operations are dominated by electricity from the grid, used to supply Council's assets and facilities as well as streetlights. This is illustrated in the chart below.

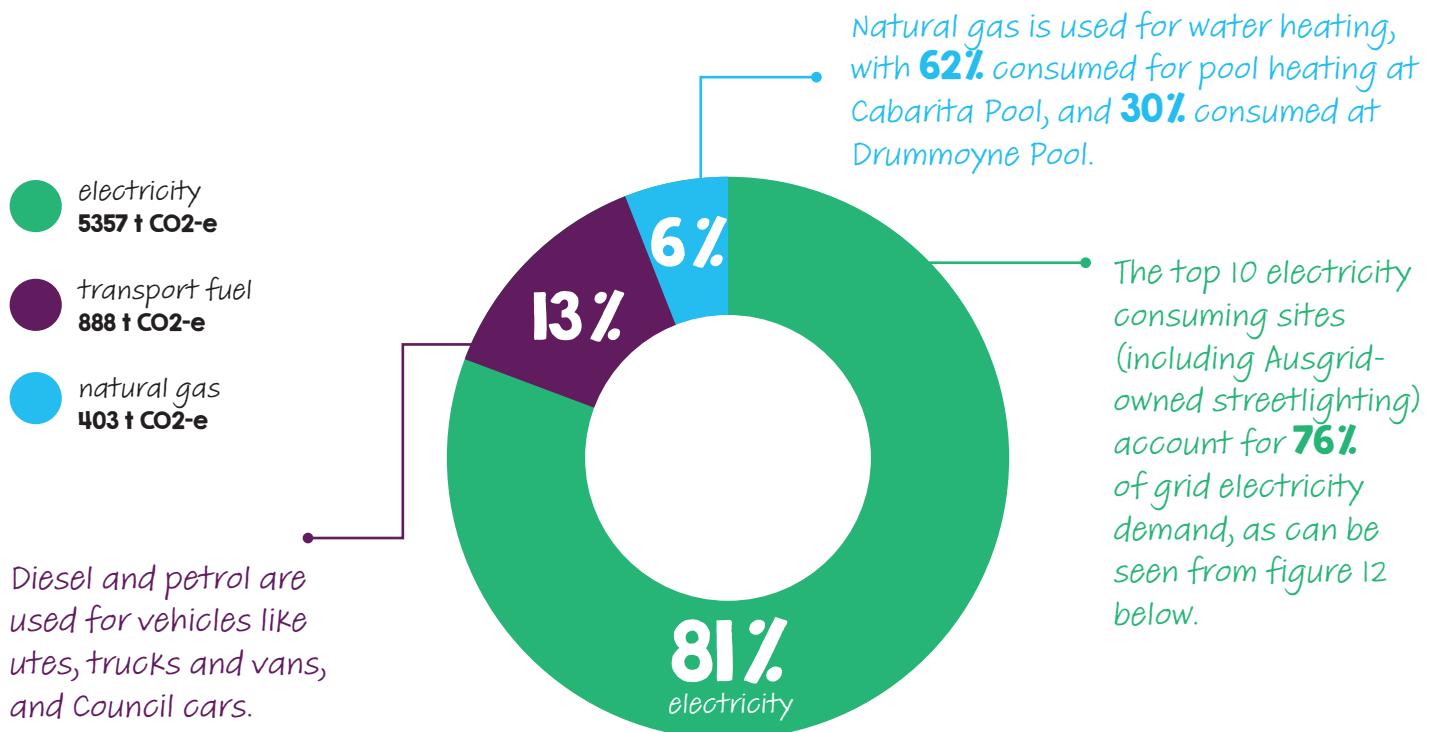


Figure 11: Corporate Emissions by Source

Corporate emissions by top 10 sites

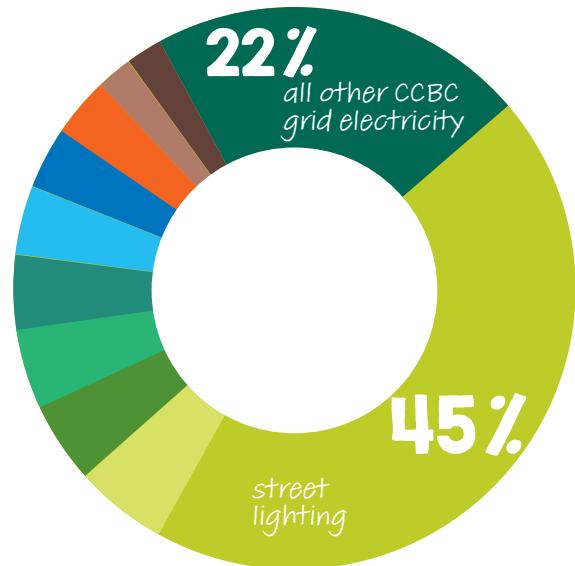
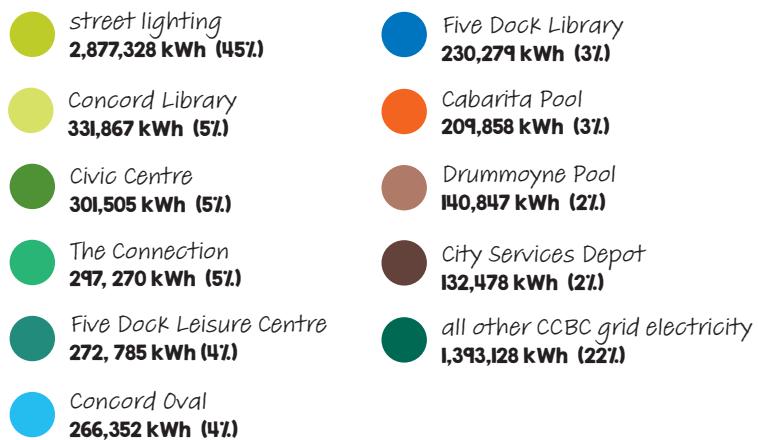


Figure 12: Corporate grid electricity use by top 10 sites

Understanding end-use of electricity was an important step in identifying potential abatement opportunities as part of the Council Emissions Reduction Pathway Study. This analysis, along with onsite energy audits and input from key Council operational staff informed the actions included in Section 5.

Did we meet our targets?

Target (set in 2014 Greenhouse Action Plan)	Current performance until end 2019
Reduce greenhouse gas emissions by 35% 	8.3% reduction on baseline
30% of traditional energy supply with renewable sources  30%	27.3% of electricity consumed is from a renewable source
Reduce fuel consumption by 10% 	23.5% reduction on baseline
Reduce emissions from paper consumption by 10% 	95% reduction on baseline
Reduce energy consumption by 30% 	3.8% reduction on baseline

Table 1: Table of tracking towards previous targets

Although our emissions have only dropped slightly in this reporting period, the range of facilities managed by Council have significantly increased since our baseline year, with our gas consumption almost doubling.

The net effect of Council's actions to date has been to maintain energy use and emissions levels, with savings largely offset by increased services from existing and new facilities across the local government area. The effect of major measures like street lighting LED upgrades, the renewable energy power purchase agreement (PPA) and recent solar PV installations will see emissions fall in coming years.

Where we are at

Total GHG Emissions (Scope 1 & 2)

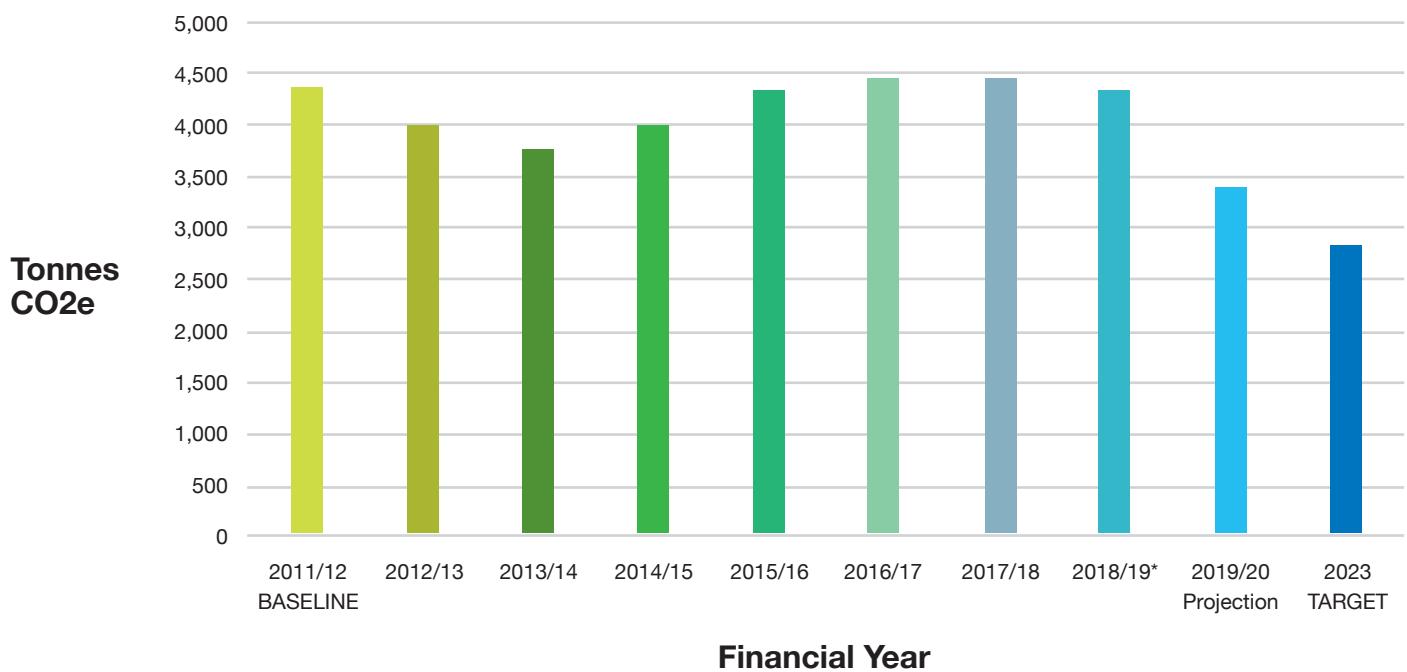


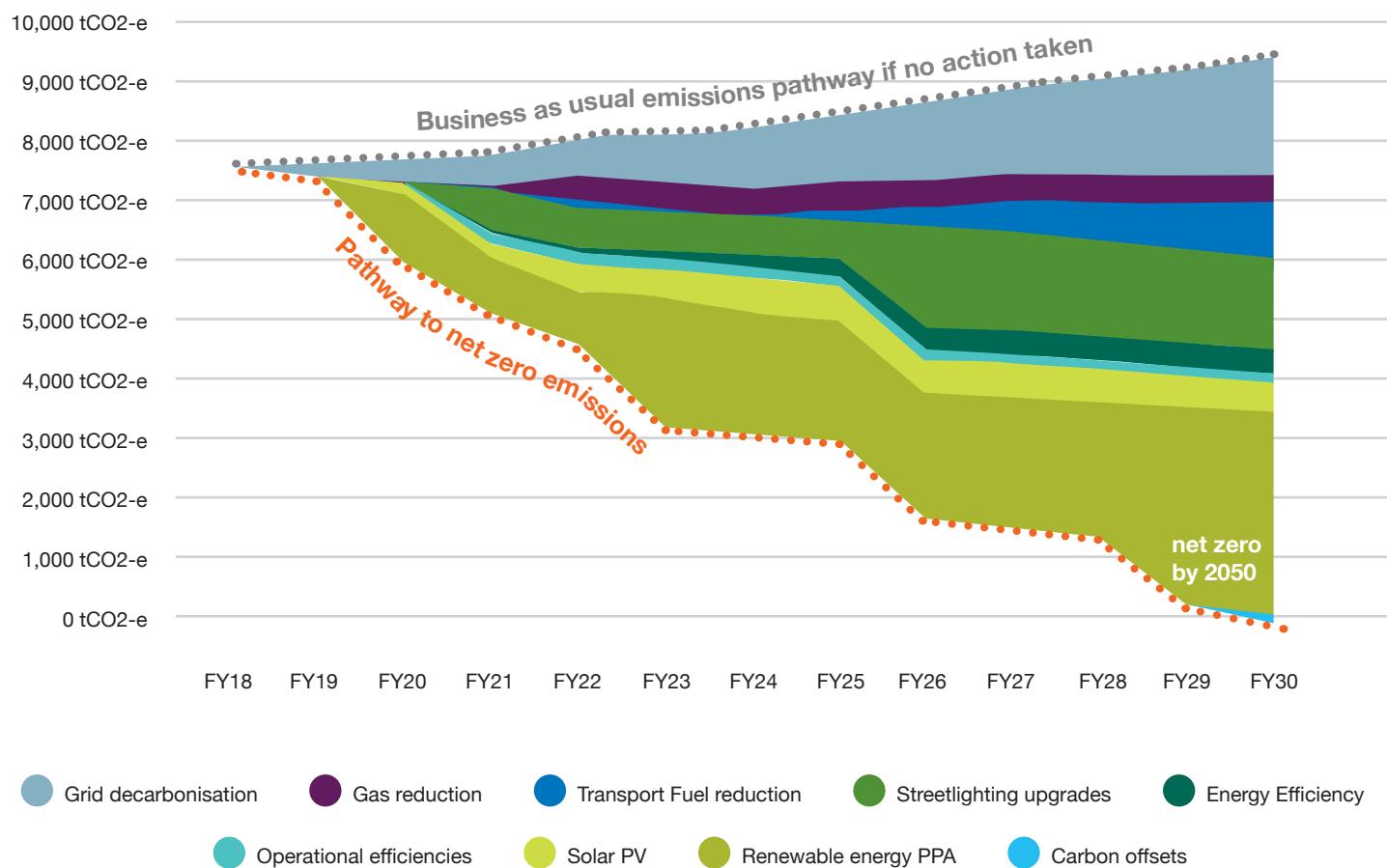
Figure 13: Total Corporate Emissions

*due to approximately a 3-4 month lag in utilities data (i.e. manually read meter data invoiced at a later date), the data in FY 2018/19 may be incomplete

Pathway to the target

We considered a number of emissions reduction pathways and timeframes in the process of setting targets. The figure below outlines the areas where emissions reduction need to be made for council operations. In the action plan we list the specific actions and timeframes for each of these as well as the potential emissions reductions.

Corporate pathway



- Grid decarbonisation is estimated to account for 26% of abatement. If abatement targets at this level (100%) were set, then lower grid abatement than expected would represent a modest risk to Council achieving its target.
- Assumes that new renewable energy PPAs can be entered into from FY23, covering 100% of Council's electricity before 2030.
- It is also assumed that by this time electric vehicles covering the range of functions performed by Council's fleet are widely used, with most vehicles being electric by this time.
- Residual emissions from fleet are assumed to be abated via the purchase of carbon offsets.

Figure 14: 100% abatement scenario: net zero emissions pathway for Council
Source: 100% Renewables Consultancy

What is our new Corporate Target?

City of Canada Bay Corporate target: *net-zero emissions by 2030*

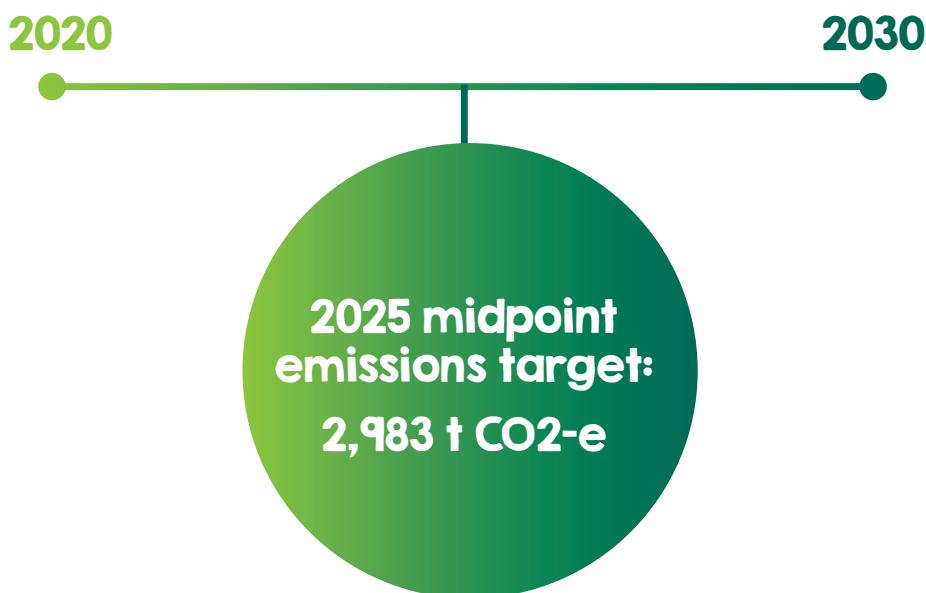


Figure 15



Corporate Action Plan

City of Canada Bay corporate emission reduction opportunities

Over 60 emission reduction opportunities were identified from consultations with key Council personnel and site visits. This section summarises these actions, including site, action type and description and expected emissions reduction potential. Actions are categorised as follows:



Energy efficiency through upgrades to building, sports field lighting, air conditioning systems and hot water, as well as operations and maintenance procedures



Fleet emissions reduction measures such as incentives to increase the number of hybrid vehicles, trialling electric vehicles and developing future fleet transition plans



Sport field lighting



Sustainable Procurement policies that apply to all purchases of equipment that impact on energy use



Street lighting upgrades to LED technology via accelerated bulk replacement programs



Buying renewable energy via power purchase agreements (PPA), building on the first PPA for 20% of Council's electricity starting in July 2019

Our corporate emissions reduction pathway will be achieved by implementing these 60+ initiatives over time, from FY2020-30. Timings are indicative and may be changed to reflect needs during the development of each subsequent Operational Plan and 4-year Delivery Program.

Monitoring and measuring

The delivery of these initiatives will be tracked as part of Council's internal quarterly emissions reporting cycle. We measure our emissions via an online environmental data management platform that lets us track progress and impact of implemented emissions reduction projects and to report quarterly on Council operations. We will report to the community each year on the initiatives that have been implemented and how we are tracking towards our corporate emissions reduction target.



Priority Area I: Energy efficiency



Action number	Location	Action area	Action	Annual Emission Reduction	Time for delivery								
					t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
1.1	Five Dock Library	HVAC	Adjust air conditioning time controls to be more closely aligned with library opening hours	58			→						
1.2	City Services Depot	Night demand	Reduce energy demand at night time by an average of 10 kW	33			→						
1.3	Civic Centre	Night demand	Reduce the current average 22kW of night time demand by 4.5 kW	20			→						
1.4	Five Dock Leisure Centre	Night demand	Reduce energy demand at night time which varies from 12-32 kW	19			→						
1.5	St Lukes Hockey	Night demand	Reduce night demand from lights being left on after training	6			→						
1.6	Civic Centre	HVAC	Review air conditioning temperature controls	6			→						
1.7	Concord Community Centre	HVAC	Review control and instructions for use of HVAC systems	4			→						
1.8	Cabarita Pool	Appliances	Shut down appliances such as fridges and hot water units at end of pool season	3			→						
1.9	Drummoyne Pool	Appliances	Shut down appliances such as fridges and hot water units at end of pool season	2			→						
1.10	HR Cottage	Lighting	Replace all lights with LED	2			→						
1.11	Victoria Avenue Childcare Centre	Heating	Turn off / remove outdoor electric heating elements	1			→						
1.12	Five Dock Leisure Centre	HVAC	Remove wall-mounted bar heaters in the creche and utilise existing split system air condition	1			→						
1.13	Cabarita Pool	Heat Pump	Implement electric heat pumps to provide pool heating by replacing existing gas heating	99			→						
1.14	Drummoyne Pool	Heat Pump	Implement electric heat pumps to provide pool heating by replacing existing gas boilers	51			→						
1.15	The Connection	Night demand	Reduce energy demand at night time which varies between 14-30+ kW	10			→						



Priority Area I: Energy efficiency



Action number	Location	Action area	Action	Annual Emission Reduction	Time for delivery								
					t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
1.16	Five Dock Leisure Centre	Hot Water	Replace female amenities HW system with heat pump on failure	3				→					
1.17	Historical Museum Wellbank St	Lighting	Replace all lights with LED and link lighting operations to the alarm	1				→					
1.18	All sites	IT Systems	Investigate off site storage of servers from all sites	NA				→					
1.19	Civic Centre	Lighting	Replace all lights with LED	20					→				
1.20	Five Dock Leisure Centre	Lighting	Upgrade gym and court lighting to LED high bays	12					→				
1.21	Five Dock Leisure Centre	Lighting	Upgrade centre T8/5 lighting to LED	9				→					
1.22	City Services Depot	Lighting	Replace all lights with LED	9				→					
1.23	Victoria Avenue Childcare Centre	Lighting	Review outside lighting and options to upgrade to LED and/or install or optimise time controls	8				→					
1.24	Victoria Avenue Childcare Centre	Lighting	Replace all lights with LED and lighting controls	6				→					
1.25	Five Dock Leisure Centre	Lighting	Upgrade amenities lighting to LED	3				→					
1.26	Concord Library	Lighting	Replace carpark lights and atrium up lights with LED	3				→					
1.27	Rangers Cottage	Lighting	Replace all lights with LED	1				→					
1.28	Five Dock Library	Lighting	Upgrade rear study and remaining Heritage study room lights to LED	1				→					
1.29	Rhodes Recreation Centre	Design	Have influence in the design for new facilities and promote energy efficiency	NA					→				
1.30	Appliances	Operation & Removal	Rationalise the number of appliances in use and change operating practices (esp. at end of sports seasons), removing unnecessary appliances, adding timers for hot water devices and turning appliances off at the wall when not in use	65					→				
1.31	Concord Library	HVAC	Investigate options to reduce heat gain on the north facing glazing	5						→			
1.32	Cabarita Pool	Lighting	Replace all lights with LED	5						→			
1.33	Drummoyne Pool	Lighting	Upgrade remaining lights to LED	2						→			



Priority Area 2: Sports field lighting



Action number	Location	Action	Annual Emission Reduction	Time for delivery								
				t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
2.1	Sporting Field Lighting	Upgrade sporting field lights to LED	174				→					
2.2	Drummoyne Oval	Upgrade sporting field lights to LED	17							→		

Table 2



Priority Area 3: Street lighting



Action number	Location	Action	Annual Emission Reduction	Time for delivery								
				t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
3.1	Street Lights across LGA	Replace 2,491 street lights with LEDs (around 36% of all lights)	669		→							
3.2	Rhodes Foreshore	Upgrade public lighting to LEDs with lighting controls	2		→							
3.3	Street Lights across LGA	Replace remaining lights with LED and smart controls	1200							→		

Table 3





Priority Area 4: Generating Renewable Energy



Action number	Location	Action	Annual Emission Reduction	Time for delivery								
				t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
4.1	Concord Library	60 kW solar PV was recently implemented	68									
4.2	Civic Centre	50 kW solar PV was recently implemented	53									
4.3	The Connection	Install 76 kW more solar PV	91									
4.4	Redevelopment of Concord Oval (ROCO)	Implement 99 kW solar PV when designing and building ROCO	106									
4.5	Drummoyne Pool	Implement 45 kW of solar PV on the roof of the main building	48									
4.6	City Services Depot	Install additional 25 kW of solar PV on the depot depending on new energy demand and future demand	27									
4.7	Cintra Park Water Treatment Plant	Assess future potential for PV following WestConnex works completion	Up to 26									
4.8	Rangers Cottage	Install a 5 kW PV array on the tiled roof	5									
4.9	HR Cottage	Install a 4.5 kW PV array on the north facing roof	5									
4.10	Victoria Avenue Childcare Centre	Install 10-20 kW solar PV on the roof of the school above the ground floor CCC	16									
4.11	Five Dock Leisure Centre	Install a 60 kW PV array on the north facing gym or court roof	64									
4.12	Cabarita Pool	Implement 60 kW of solar PV on the roof of the plant room, amenities block and community rooms	64									
4.13	Drummoyne Oval	Install a small 10 kW PV array on the Pavilion roof	11									

Table 4



Priority Area 5: Fleet



Action number	Location	Action	Annual Emission Reduction	Time for delivery								
				t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
5.1	Fleet	Target incentives to lift the proportion of hybrid vehicles in Council's fleet	42				→					
5.2	Fleet	Consider a medium term target to increase EV fleet	4-40				→					
5.3	Fleet	Implement an EV trial for a passenger vehicle	1 to 5				→					
5.4	Fleet	Develop a fleet transition strategy and plan	0				→					

Table 5



Priority Area 6: Sustainable Procurement



Action number	Location	Action	Annual Emission Reduction	Time for delivery								
				t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
6.1	Whole of Council	Adopt a Sustainable Procurement Policy based on updated guidelines for local government (2017)	NA		→							
6.2	Whole of Council	Incorporate Sustainable Procurement requirements in specifications and project briefs for all commonly sourced services and equipment	NA		→							
6.3	Whole of Council	Seek low emissions outcomes through the development of a Sustainable Buildings Policy and early engagement with Major Projects Team in the design and specifications phase	NA		→							
6.4	Whole of Council	Develop specifications and briefs with facilities maintenance to seek low emissions outcomes	NA		→							

Table 6



Priority Area 7: Buying Renewable Energy



Action number	Work Area	Action	Annual Emission Reduction	Time for delivery								
				t CO2-e	2019	2020	2021	2022	2023	2024	2025	2026
7.1	Whole of Council	Source 20% of Council's energy from renewable energy from July 1 2019	923		→							
7.2	Whole of Council	Implement further renewable energy power purchase agreements to increase purchasing towards 100% renewables	4369				→					
7.3	Whole of Council	Purchase carbon offsets to reach net zero carbon emissions (after 2030 if required)	0									

Table 7

5. Journey to our community target

History

While Council has never set an emissions reduction target for the City of Canada Bay Community before, we have a long history of working in partnership with community members to reduce their environmental impact and emissions over many years. These initiatives are summarised in Figure 16 below.



Figure 16: Community history of emissions reduction

Community emissions profile

A framework to report on all major greenhouse gas emissions sources at a local area level has been developed via Resilient Sydney². A summary of the Resilient Sydney emissions profile for the City of Canada Bay local government area is provided below. Community emissions include the following sources:

Scope 1: Emissions from natural gas consumption in the local government area (LGA) and transportation within the LGA.

Scope 2: Electricity use in the LGA.

Scope 3: Transmission and distribution losses of grid-supplied electricity, upstream natural gas emissions, waste disposal.

**City of Canada Bay
emissions:
772,220 t CO2-e**

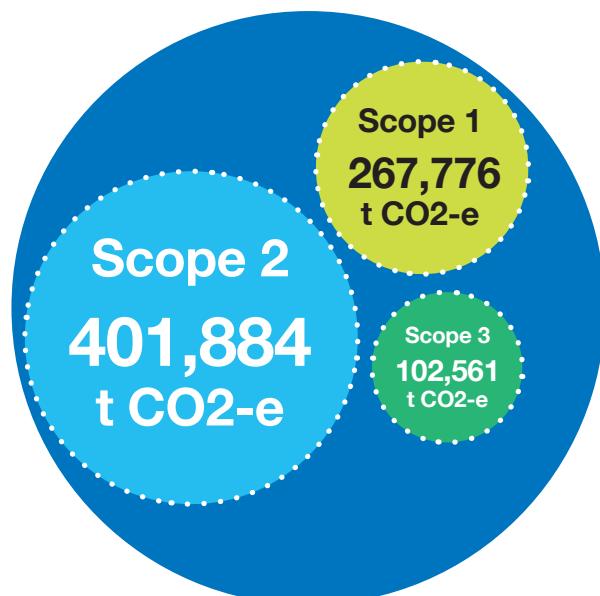


Figure 17: Community emissions profile

Under this model, the City of Canada Bay community greenhouse gas emissions in FY2016–17 were 772,220 tonnes of carbon dioxide equivalent (t CO2-e). Most of these emissions came from stationary energy consumption (electricity and natural gas). This is followed by transport emissions and emissions from waste, as can be seen in Figure 18 below:

The graph below shows the contribution of emissions sources to the community carbon footprint.

Community emissions by source

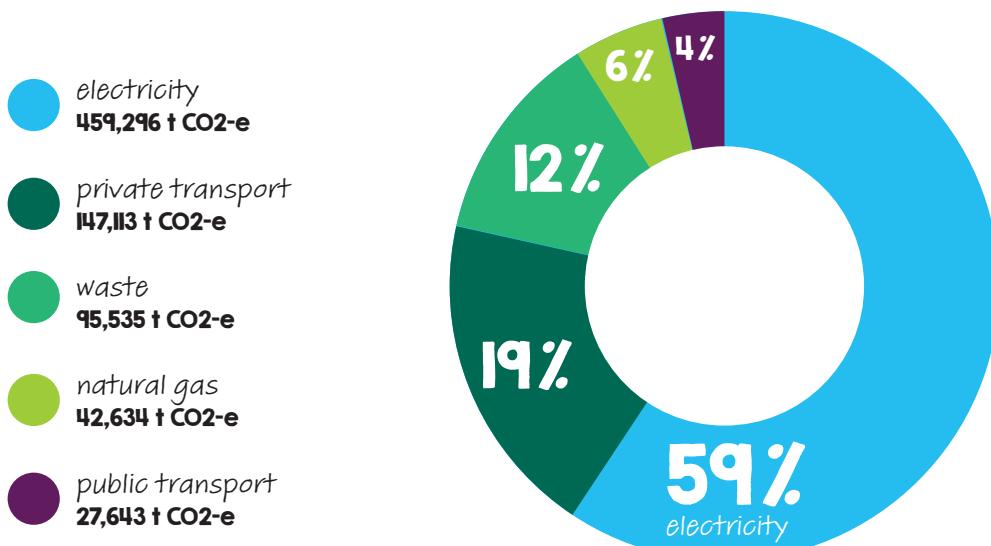


Figure 18: Community Emissions by Source

This breakdown of emissions sources along with abatement opportunities within each sector was used to inform the community emissions actions outlined in the action plan below.

²Resilient Sydney (an initiative of 100 Resilient Cities) is a collaboration of the metropolitan Councils of Sydney, and as part of this carbon emissions baselines for each council have been developed that are largely GPC-aligned. This relies on a combination of publicly available data sources at LGA-level, as well as modelling of other data sources from higher levels down to LGA-level allocation of emissions.

Pathway to the target

Community pathway

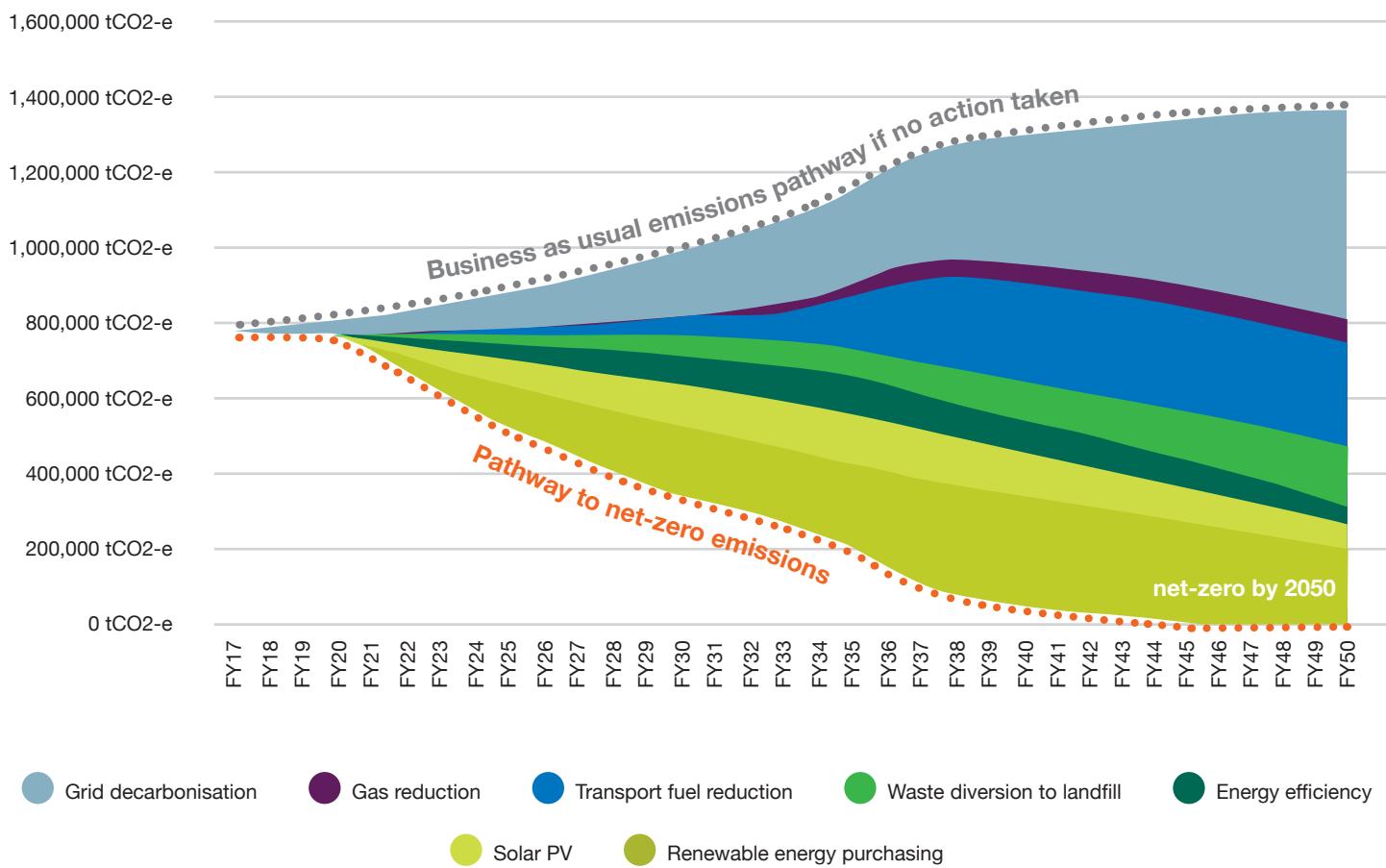


Figure 19: Community pathway to net zero emissions by 2050

Source: 100% Renewables Consultancy

To achieve the pathway to net-zero emissions by 2050 as illustrated above, the community will be called upon to support a wide range of actions. Some examples are listed below:

- More than 1,700 solar PV systems on residential homes/strata per year at 6 kW each, and nearly 105 business PV systems at an average of 15 kW each per year
- Larger businesses are assumed to purchase renewables in the short term, with smaller businesses and houses switching to renewables as they become cheaper
- More than 46,000 vehicles and all new vehicles in the LGA are electric by 2050, or hydrogen-powered where H₂ is made with renewables
- 470 solar hot water systems per year (or other measure with similar abatement such as heat pumps)
- Most lights in the LGA are LED, and 25-40% of air conditioners and other appliances are energy efficient
- Promote opportunities to utilise fuels with lower emissions to more than 930 residences and 24 businesses
- All public transport is powered with electricity from renewables by state and private operators, and
- Grid decarbonisation will deliver more than a 553 kt CO₂-e reduction in LGA emissions in 2050 compared with today's emissions intensity applied to BAU energy demand.

What is our new Community target?

City of Canada Bay community target: net-zero emissions by 2050

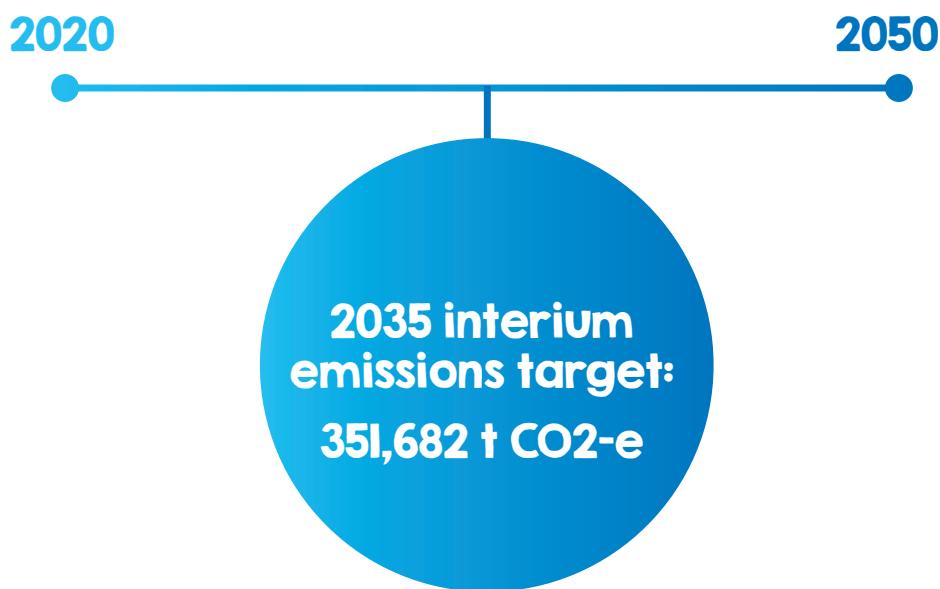


Figure 20



Community Action Plan

How Council can work with the community to deliver emissions reduction

Council is a key stakeholder in the community, and it is our role to both lead by doing and to help the community respond to climate change. When preparing the community action plan we were strongly influenced by the input provided during the consultation process: responses from surveys, ideas and feedback from the two community workshops and workshops held with council staff and the Environmental Advisory Committee.

Council's ability to influence the community in implementing the action plan will be determined by:

- Resources and an understanding of what measures work best
- Funding for community actions,
- Any mandate to act on climate as provided by the Community Strategic Plan.

With this context, and taking science-based as well as the community's recommendations into account, this section outlines actions that Council will look to pursue in the coming years. This will mostly be in the next Delivery Program cycle, and individual actions and focus areas will be determined from year to year depending on community needs, Council's resources and changes in policy that call for new or changed direction in Council's activities.

The action plan below is organised into seven priority areas:

Action plan priority areas



Grid decarbonisation

The main objective regarding grid decarbonisation is to keep abreast of changing trends, lobby effectively and use trends to inform future revisions to Council's community climate change plans and targets.



Sustainable transport

Recommended actions in this study refer to measures that can help to reduce climate change impacts of transport and are a subset of the adopted Local Movement Strategy.



Buying clean energy

Council aims to provide the residential and business community with the most current information about the renewable energy market, to help accelerate the transition to clean energy. Council is aware that changing to renewable energy supply may be one of the most cost-effective ways for the City of Canada Bay community to reduce its emissions over the long term.



Waste Management

Council is undertaking a broader waste strategy review and action plan development, including the challenges and options relating to waste disposal. The actions highlighted here reflect the community's feedback on local waste management solutions that can form part of a wider strategy. These will be considered in the development of Council's waste strategy, and responsibilities, timeframes and targets or metrics will be addressed in the waste strategy.



Generating renewable energy

Council's local renewable energy generation target is to triple the amount of solar PV capacity in Canada Bay by 2025 through its support initiatives and the community's response to climate change. This equates to a further 17 MW of solar PV capacity across all sectors of the community, as monitored and reported by the Clean Energy Regulator (CER).



Council as a leader

Council has made significant progress in recent years to reduce emissions in its operations, and implementation of the actions in Section 5 will see emissions fall more rapidly in coming years. Through actions in its operations, target-setting, resourcing of Council operations and community abatement action plans, and through its collaborative efforts with other local councils, The City of Canada Bay will demonstrate leadership and show that ambitious, deep cuts in greenhouse gas emissions are feasible and cost-effective.



Energy Efficiency

Council has two overarching climate related targets for energy efficiency. Firstly, to achieve changes to the BASIX requirements that will see future new single and multi-unit residential developments achieve a significantly higher level of energy efficiency. Secondly, Council aims to see sustained reductions in the amount of stationary energy (electricity and natural gas) consumed per resident and per business in The City of Canada Bay, as monitored via annual reporting by utilities.



Priority Area 1: Grid decarbonisation



Action number	Action	Action category	Timeframe	Target or metric
1.1	Council will periodically update the community's emissions using a consistent GPC-aligned method, so that future emissions in the community can be tracked and reported. This will capture the impact of grid decarbonisation and allow Council to adjust any of its forecasts to reflect changes in this.	Strategy	Annually	Reporting of the LGA's carbon footprint to the community
1.2	Where applicable Council will respond to or engage with – directly or via SSROC for example – advocacy to State and Commonwealth governments regarding clean energy policies that can provide investment certainty, lead to more renewable energy and reduce energy costs to the community.	Advocacy / Lobbying	As applicable	Submissions to the state and federal governments

Table 8



Priority Area 2: Buying clean energy



Action number	Action	Action category	Timeframe	Target or metric
2.1	<p>Develop and implement a community engagement strategy to educate and inform the community on opportunities to buy clean energy. This may include:</p> <ul style="list-style-type: none"> Developing information relevant to businesses and households Holding information sessions and workshops on buying clean energy, and Links to online resources on opportunities in renewable energy sourcing, such as peer to peer energy trading, power purchase agreements and GreenPower®. 	Education, training, workshops	From 2019-20 and integrated into ongoing workshop planning	<p>Number of workshop participants</p> <p>Number of follow-through purchases of clean energy via survey</p>
2.2	Engage with renewable energy buyers' organisations, so that the community is abreast of latest developments and emerging opportunities for large and small energy users to access affordable clean energy.	Strategy	From 2019-20	Membership of and/or engagement with renewable energy buyers' organisation(s)
2.3	<p>Assess the potential for opportunities to develop or share renewable electricity generated locally at small and mid-scale, including:</p> <ul style="list-style-type: none"> Solar on Council owned land, peer-to-peer energy trading, microgrids etc, and Collaboration with state government (e.g. DPIE) and suppliers of innovative solutions enabling local renewable energy sourcing. 	Strategy & Collaboration	From 2020-21	Development of one or more local energy sharing trials or projects
2.4	Engage with advocacy to State or Commonwealth governments regarding clean energy policies and regulatory changes that can make renewable energy more accessible to the community.	Advocacy / Lobbying	As applicable	Submissions to the state and federal governments

Table 9



Priority Area 3: Generating renewable energy

7 AFFORDABLE AND CLEAN ENERGY



17 PARTNERSHIPS FOR THE GOALS



Action number	Action	Action category	Timeframe	Target or metric
3.1	Council will provide support to local community groups seeking to develop community energy projects. This may include the provision of or links to information, meeting spaces for local volunteers, planning assistance and technical support.	Collaboration	Ongoing	Council will provide appropriate support to community group(s) wanting to develop solar projects
3.2	<p>Council will continue to provide up-to-date online information resources, and develop and run regular workshops on solar energy generation (e.g. via Our Energy Future), covering:</p> <ul style="list-style-type: none"> • Houses • Solar for renters & landlords • Strata • Business • Battery storage, and • Emerging solar technologies. <p>Information sessions, helping residents map and assess their business case for solar / batteries, guidance on seeking and evaluating quotes and warranties, Virtual Power Plants, and supplier expos will all be considered.</p>	Strategy	From 2019-20	<p>Number of session attendees.</p> <p>Follow up to gauge implementation by local residents and business.</p>
3.3	Council will engage with strata committees of multi-residential dwellings to help develop an understanding of the renewable energy and storage opportunities in strata. This will include adding to current online resources and giving consideration to targeted information sessions.	Education, training, workshops	From 2020	<p>Number of session attendees.</p> <p>Follow up to gauge implementation by strata committees.</p>
3.4	Council will update its Sustainable business online resources to include State, Federal government and other relevant support and initiatives aimed at helping business to implement renewable energy solutions.	Education, training, workshops	From 2020	Development of new resources and links for business. Periodic refresh of online content.
3.5	City of Canada Bay has engaged with the Solar my School program, and will work with this program and Ausgrid's Power2U - Solar and LED Lighting Incentive project to help schools in Canada Bay to develop and implement solar PV systems.	Collaboration	Since 2019	Number of schools with solar PV, and total installed solar PV capacity.
3.6	Council will support organisations such as childcare centres (via Sustainable Childcare Network), charities, other not-for-profits and low income houses to access solar PV and battery storage, and will consider appropriate financial or technical support to assist.	Collaboration, Financial / other incentives	From 2020	Number of organisations and low income homes with solar PV, and total installed solar PV capacity.
3.7	Council will evaluate solar PV mapping tools that may be useful to residents and businesses to understand their solar PV potential, and consider integrating this into Council's solar and sustainability resources.	Collaboration, Education, training, workshops	From 2020	Availability of mapping services for the community to assess their solar PV potential.

Table 10



Priority Area 4: Energy Efficiency



Action number	Action	Action category	Timeframe	Target or metric
4.1	Council will review and periodically continue to update its information resources relating to energy efficiency in houses, apartments and business, for example including links to the NSW Department of Planning, Industry and Environment (DPIE)'s Energy Saver Program resources.	Education, training, workshops	Ongoing	Currency of online resources.
4.2	Water heating is a significant proportion of home heating. Council will include information resources and links that can help residents (and small business) select low or zero-emissions hot water heating systems, e.g. via DPIE.	Education, training, workshops	Ongoing	Currency of online resources.
4.3	Council will update its Sustainable business online resources to include State, Federal government and other relevant support and initiatives aimed at helping business to implement energy efficiency solutions.	Education, training, workshops	From 2020	Development of new resources and links for business. Periodic refresh of online content.
4.4	Council will continue to work with other local government stakeholders to continue to lobby and advocate for a BASIX + standard for new developments that will see the energy (and water) performance of new homes significantly improve in future.	Advocacy/Lobbying	Ongoing	Submissions to the state government. Business case for a BASIX + standard.
4.5	Council will develop a program which includes workshops and initiatives to increase residential energy efficiency. These will complement online information resources, and provide support services such as audits, covering: Houses, strata, NABERS for strata, water heating, home heating and cooling, appliances and lighting.	Education, training, workshops. Financial/ other incentives	Ongoing	Number of session attendees and audits booked. Follow-up to gauge implementation by attendees.

Table 11



Priority Area 5: Sustainable transport



Action number	Action	Action category	Timeframe	Target or metric
5.1	Council will continue to develop and improve its Bike Plan via the development of infrastructure to facilitate a range of benefits to the community, including reduced climate impact due to more active transport trips.	Infrastructure / services	Ongoing	Kilometres of bike pathways in the local community.
5.2	Council will continue to work with neighbouring councils and Bike Share proponents to provide cycling opportunities in the community (complying with the Inner Sydney Bike Share Guidelines).	Collaboration	Ongoing	Number of share bikes in the Canada Bay community.
5.3	Council will develop an electric vehicle (EV) charging infrastructure plan for Council-owned facilities/car parks. Council will seek to have public charge points powered with renewable energy.	Infrastructure / services	From 2020	Number of Council-owned EV charge points in the Canada Bay community.
5.4	Council will provide information and assistance to local businesses and residents seeking to install EV infrastructure for private and for public use, including as part of new developments.	Education, training, workshops Planning	From 2020	Number of non-Council EV charge points in the Canada Bay community.
5.5	Council will continue to collaborate with organisations to provide car share options to the community as it grows.	Collaboration	Ongoing	Number of active car share spots in the Canada Bay community.
5.6	Council will develop and update information resources for the community on emissions reduction opportunities for transport, including demand reduction, cycling, car share, benefits of public transport, low-emissions vehicles, electric and hybrid vehicles and potential future transport trends.	Education, training, workshops	From 2020	Number of session attendees.
5.7	Council will continue to advocate and lobby the State Government for greater access to public transport in and around the City of Canada Bay.	Advocacy / Lobbying	Ongoing	Submissions to / engagement with state government.

Table 12



There are relatively few electric vehicles (EV) in use at this time, with just 0.3% of vehicle sales in Australia in 2018 being electric. However, trends in sales of EVs are increasing, more states including NSW are seeing rollouts of rapid DC charge networks, and cities and towns are seeing increasing EV infrastructure rolled out that will support charging on-street, in shopping centres, in carparks, as well as in homes and businesses.

A network of around 40 DC charge stations is being rolled out by NRMA in NSW. The ACT Government has committed to transition all of its passenger fleet to EV within the next few years. As such there is a case for Council to assess and implement measures that will facilitate this transition and provide fuel supply security to drivers of EVs in and through the local government area.



Priority Area 6: Waste Management



Action number	Action	Action category
6.1	Develop and/or support local organics composting solutions at household, strata and in businesses/business precincts.	Infrastructure/services
6.2	Develop and/or support/promote soft plastics collection points in the community.	Infrastructure/services
6.3	Provide information and education to residents on re-use, recycling, composting, plastics reduction and other measures the community can implement to reduce their waste footprint.	Education, training, workshops
6.4	Provide information, education to local businesses on re-use, recycling, composting, plastics reduction and other measures the business community can implement to reduce their waste footprint.	Education, training, workshops

Table 13



Priority Area 7: Council as a leader



Action number	Action	Action category	Timeframe	Target or metric
7.1	Council will review the benefits of joining local government focused leadership initiatives such as the Cities Power Partnership.	Lead by example	2020	Council to become a member of the CPP or similar initiative.
7.2	Council will allocate staff resources to manage and implement the actions listed within this Emissions Reduction Action Plan.	Lead by example	Ongoing within Operational Plans & Delivery Program	Number of actions Implemented.
7.3	Council will provide regular staff education events and newsletters that focus on climate change actions in the community.	Lead by example	Ongoing	Number of staff education sessions delivered.
7.4	Council will include climate change in its biannual Sustainability Awards, for individuals and businesses making deep emissions cuts.	Recognition and awards	Ongoing from next Sustainability Awards	Award presentations.

Table 14

6. Glossary of terms and acronyms

BAU Business As Usual.

Baseline A hypothetical scenario for what GHG emissions would have been in the absence of emission reduction activities.

Climate Change A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Climate Change Adaptation The ability to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences.

Climate Change Mitigation Any action taken to permanently eliminate or reduce the long-term risk and hazards of climate change to human life and property.

CO₂ equivalent (CO₂-e) The universal unit of measurement to indicate the global warming potential (GWP) of each of the six greenhouse gases, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.

Direct GHG emissions Emissions from sources that are owned or controlled by the reporting company.

Emissions The release of GHG into the atmosphere.

GAP Greenhouse Action Plan.

GPC The Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) is an accounting and reporting standard for measuring greenhouse gas emissions.

Grid Decarbonisation Electricity in the grid comes from a variety of power plants that are either powered by renewables or fossil fuels. Currently, around 80% of Australia's electricity is produced from fossil-fuelled power plants, which makes the grid highly carbon-intensive. With more and more utility-scale renewable energy projects feeding electricity into the grid, the grid decarbonises over time. This means that emissions associated with electricity consumption decline over time.

Greenhouse gases (GHG) Are the six gases listed in the Kyoto Protocol: carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF₆).

GHG source Any physical unit or process which releases GHG into the atmosphere.

Global Warming Potential (GWP) A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO₂.

Indirect GHG emissions Emissions that are a consequence of the operations of the reporting company, but occur at sources owned or controlled by another company.



6. Glossary of terms and acronyms

Intergovernmental Panel on Climate Change (IPCC)

International body of climate change scientists. The role of the IPCC is to assess the scientific, technical and socio-economic information relevant to the understanding of the risk of human-induced climate change.

Inventory A quantified list of an organization's GHG emissions and sources.

Kyoto Protocol A protocol to the United Nations Framework Convention on Climate Change (UNFCCC), which commits its Parties by setting internationally binding emission reduction targets.

Its first commitment period started in 2008 and ended in 2012. The second commitment period runs from 1 January 2013 to 31 December 2020 and signatory countries are committed to reduce GHG emissions by at least 18 percent below 1990 levels during this period.

kWh Kilowatt hours is a unit of energy equal to 1000 watt hours or 3.6 megajoules.

LGA Local Government Area.

Net zero Net zero carbon footprint, refers to achieving net zero carbon dioxide emissions by balancing carbon emissions with carbon removal (often through carbon offsetting) or eliminating the carbon emissions completely.

PPA Canada Bay Council has committed to purchasing 20% of Council's total electricity usage from renewable energy, commencing 1 July 2019 till 31 December 2030.

Ppm Parts per million.

PV Photovoltaics is the conversion of light into electricity using semiconducting materials. A PV power system is designed to supply usable solar power by means of photovoltaics. Solar panels (the semiconducting materials) absorb and convert sunlight into electricity.

Resilient Sydney Over 1000 global cities are part of the 100 resilient Cities Program. Resilient Sydney is a local government led program, delivering a cooperative and collaborative leadership model for change to better manage risks, and benefit communities, of metropolitan Sydney.

Renewable energy Energy taken from sources that are inexhaustible, e.g. wind, water, solar, geothermal energy, and biofuels.

Scope Defines the operational boundaries in relation to indirect and direct GHG emissions.

Scope 1 inventory A reporting organisation's direct GHG emissions.

Scope 2 inventory A reporting organisation's emissions associated with the generation of electricity, heating/cooling, or steam purchased for own consumption.

Scope 3 inventory A reporting organisation's indirect emissions other than those covered in scope 2.

SSROC Southern Sydney Regional Organisation of Councils.

UNFCCC United Nations Framework Convention on Climate Change Signed in 1992 at the Rio Earth Summit, the UNFCCC is a milestone Convention on Climate Change Convention on Climate Change treaty that provides an overall framework for international efforts to mitigate climate change. The Kyoto Protocol is a protocol to the UNFCCC.

7. References

1. City of Canada Bay Council Emissions Pathway Study, 14 October 2019. 100% Renewables Consultancy
2. City of Canada Bay Community Emissions Pathway Study, 14 October 2019. 100% Renewables Consultancy
3. City of Canada Bay Greenhouse Action Plan 2014 www.canadabay.nsw.gov.au/council/sustainable-council/Strategies-Policies
4. City of Canada Bay Community strategic Plan www.canadabay.nsw.gov.au/council/vision-and-projects/your-future-2030
5. C40 Cities for www.c40.org/
6. ID Community Canada Bay Population Forecast forecast.id.com.au/canada-bay
7. Local Government Act 1993 www.legislation.nsw.gov.au
8. NSW Climate Change Policy Framework www.environment.nsw.gov.au/topics/climate-change/policy-framework
9. UN Sustainable Development Goals www.un.org/sustainabledevelopment/development-agenda/
10. UN Sustainable Development Goals www.un.org/sustainabledevelopment/climatechange/
11. IPCC Report www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml

