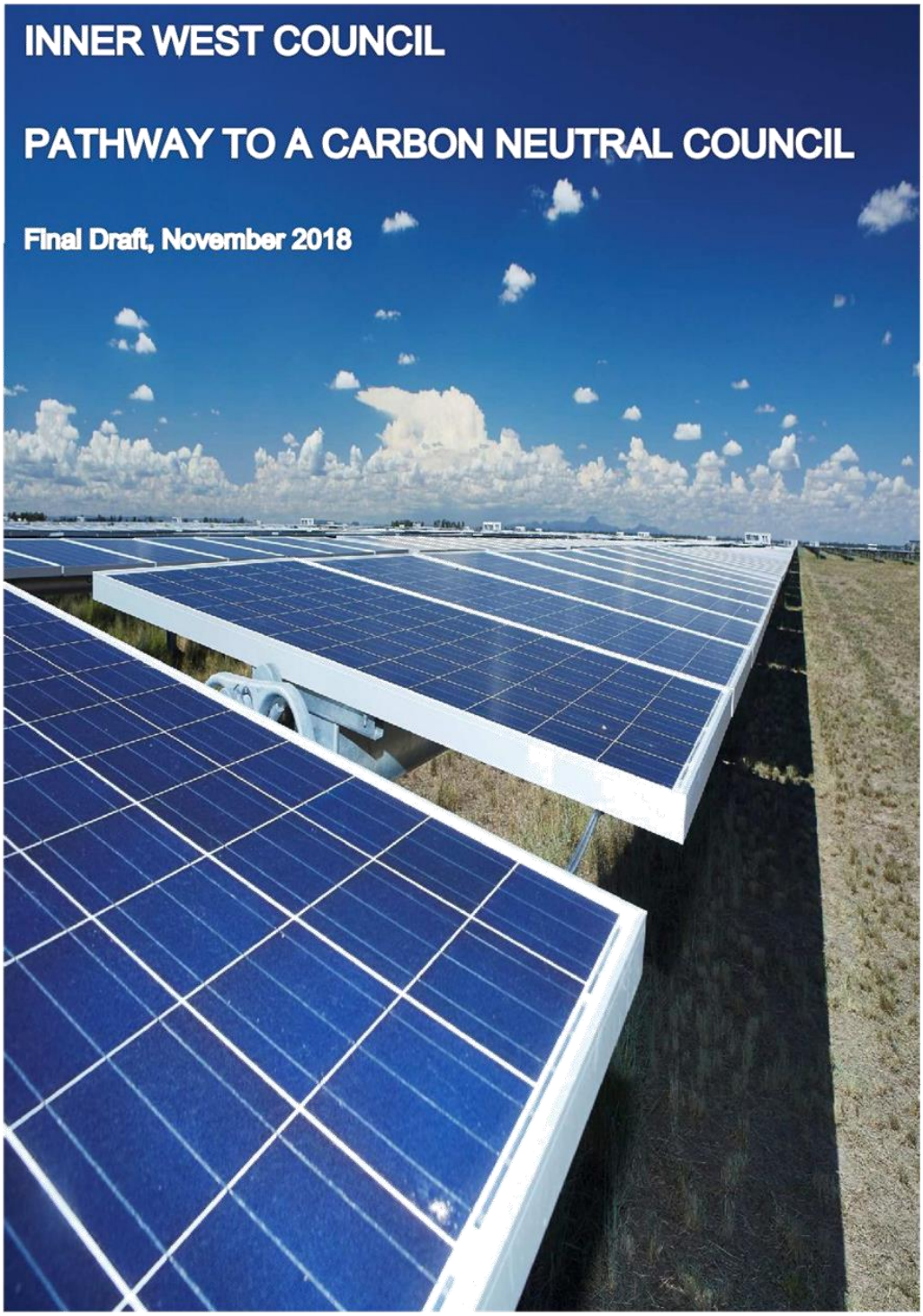
Item 14



Attachment 2

Contents

WHY A CARBON NEUTRAL PATHWAY?

In the first Community Strategic Plan – ***Our Inner West 2036***, Inner West Council set a strategic objective to be a zero emissions community that owns its own clean energy.

Further to this, over 2018/2019 Inner West Council resolved to:

- become leaders in the area of renewable energy,
- become carbon neutral at the earliest possible date
- source 100% of Council's electricity needs from renewable power

The following targets were adopted by Council:

- 100% carbon neutral Council
- 100% renewable energy for Council operations

DEVELOPMENT OF THE PATHWAY

Inner West Council's *Pathway to a Carbon Neutral Council* (the Pathway) sets out Council's planned actions to achieve carbon neutrality and 100% renewable electricity. The Pathway applies only to Council's own activities.

This is a working document that guides Council's carbon reduction work over the medium term. It will be updated annually and as research is conducted and projects are completed.

The Pathway, once endorsed, will inform the Inner West Council's Climate and Renewables Strategy, to be developed in early 2019.

The Pathway is based upon technical advice and input from:

- the technical report by consultants *100% Renewables*
- peer review by UNSW (Dr. Mark Diesendorf) and
- consultation with Council staff

CARBON NEUTRAL AND 100% RENEWABLE

Carbon neutral and 100% renewable are separate but related goals.

Carbon neutrality is summarized below:

- An organisation is "carbon neutral" when its net carbon emissions are equal to zero. The organisation removes as much carbon dioxide and other greenhouse gases from the atmosphere as it emits.

- Being 100% carbon neutral does not necessarily mean that an organisation is 100% renewable. For example, the organisation may use non-renewable power (such as coal) and purchase carbon offsets to neutralise the emissions.

100% renewable is summarized below:

- An organisation is "100% renewable" when its energy supply is sourced entirely from renewable sources.

- Renewable electricity comes from a source that will not deplete. Examples include solar power, wind power, hydroelectricity, tidal power and biofuels (e.g. burning landfill gas to generate electricity).

- "100% renewable" generally refers to renewable *electricity*. Council's long-term objective is to transition all fuels to renewables (including petrol, diesel and natural gas). However noting the general usage of the term and the fact that the timeframe for transition from petrol, diesel and natural gas is unpredictable, this report recommends adoption of a near-term target for 100% renewable *electricity*.

- Most, but not all, renewable electricity sources are carbon neutral (for example, biofuels generate carbon when combusted). Being 100% renewable does not necessarily mean that an organisation is carbon neutral, as it will still generate carbon from other sources such as its purchasing or waste.

For the purpose of the Pathway, these goals are related, as a key element of Council's program is to reduce carbon by transitioning existing carbon-based electricity to carbon-neutral renewable electricity sources such as solar.

COUNCIL'S CARBON FOOTPRINT

The amount of carbon and other greenhouse gases generated by Council's operations is approximately 22 kilotonnes of carbon dioxide equivalent each year[1]. This is equivalent to the electricity use in around 6,000[2] Inner West households each year.

The main sources of carbon from Council's operations are shown in Figure 1.

Approximately three quarters of Council's carbon footprint is from electricity used in street lights and Council facilities. Emissions from fuel (petrol and diesel) used by the fleet contribute 11%, followed by natural gas at 10%. The residual 6% is from a range of minor sources.

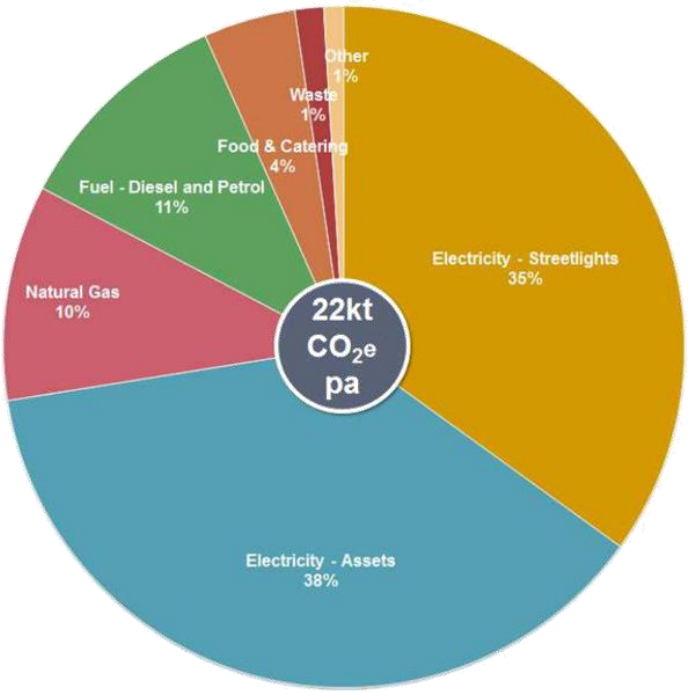


Figure 1: IWC carbon footprint

As electricity represents almost three-quarters of the carbon footprint, it is a key focus of the carbon neutral pathway. Electricity will be transitioned to renewable, carbon-neutral sources such as solar or wind as part of this Pathway.

[1] 22ktCO2e p.a. based on NCOS (calculated on Scope 1, 2 and 3) for FY17, as calculated by *100% Renewables*
[2] 5,736 average Inner West households using approximately 12kWh/d

CARBON NEUTRAL PATHWAY

The carbon neutral pathway includes the following actions:

1. Building and lighting energy efficiency and energy avoidance
2. On-site renewable energy (solar)
3. Off-site renewable energy
4. Transition to a sustainable fleet
5. Phase out of natural gas
6. Sustainable procurement
7. Waste management and recycling
8. Purchase offsets

The anticipated carbon neutral pathway is illustrated in Figure 2 below. This assumes that offsetting commences in 2025/2026, that projects are rolled out as tabulated below, and that the assumptions appended to this document hold.

The following sections provide more detail on the projects that will deliver carbon neutrality.

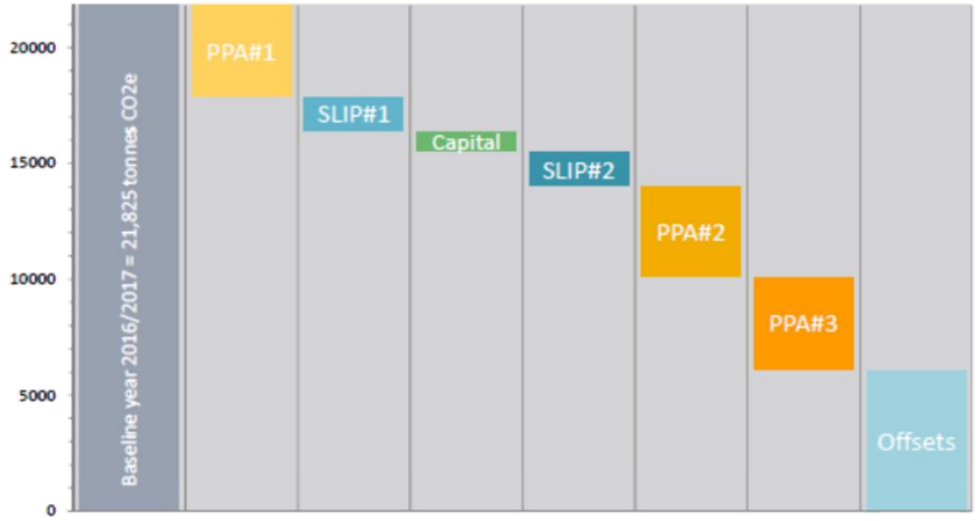


Figure 2: Proposed carbon neutral pathway

Project	Assumptions
PPA (#1)	Offsite solar from Moree solar farm from FY19
SLIP (#1)	Efficiency in residential street lights in FY20 and FY21
Capital works	Onsite rooftop solar and energy efficiency projects
SLIP (#2)	Efficiency in main road street lights in FY23 (yet to be planned/funded)
PPA (#2)	Additional offsite renewable power from FY23 (at least 25%)
PPA (#3)	Supply of remaining renewable power, from FY26
Offsets	Offsetting residual carbon from FY26 onwards

* SLIP = Street Lighting Improvement Program PPA = Power Purchase Agreement

Energy Efficiency in Buildings

Projects for energy efficiency in Council's buildings have been identified. The projects are spread across Council's higher energy-using facilities such as libraries, child care centres, depots and service centres. The short-listed projects are provided at the end of this document. Implementation of these projects will be scheduled from 2019/2020 and projects will be programmed over the next four years as part of the IWC capital program.

In addition to physical upgrades, Council-wide energy avoidance and efficiency will be pursued through internal staff education programs, energy monitoring and reporting, and ongoing internal support from Council sustainability staff.

Some of the energy efficiency projects identified involve complex upgrades of major plant (such as air conditioning). Essentially, ageing major plant is replaced with more efficient models at the end of plant life. As these projects occur over the long term, they are not included in the building energy efficiency program, but will be rolled into the long-term capital project plan where feasible. These projects typically slightly increase the upfront cost of a capital upgrade. The additional cost is generally quickly recovered through energy savings. Examples of major plant capital upgrades are provided at the end of this document.

Energy Efficiency in Street Lighting

Street lighting makes up 35% of Council's carbon footprint. Council pays for the power and maintenance of most street lights in the Inner West. Both power and maintenance are provided by Ausgrid under contract.

Council has been negotiating with Ausgrid to accelerate replacement of existing lights with more efficient technology. Negotiation has been undertaken in association with other councils under the umbrella of the Southern Sydney Regional Organisation of Councils (SSROC) through a project known as the "Street Lighting Improvement Program" (SLIP).

There are two phases of the project:

- SLIP #1 - lighting upgrades for residential roads
- SLIP #2 - lighting upgrades for main roads

SLIP#1 for residential roads is programmed for 2019/2020 and 2020/2021 and will replace pre-2009 luminaires with Light Emitting Diode (LED) lights.

SLIP#2 for the main roads is less advanced, and details are currently being discussed between SSROC, Ausgrid and the councils. For the purposes of this Pathway, implementation of SLIP#2 is listed for 2022/2023.

Onsite Renewable Energy (Solar)

Around 30 Council facilities are currently equipped with solar arrays, and there is potential to expand.

A short list of solar projects has been identified for Council's facilities that have higher day-time energy use. These include pools, libraries, child care centres, depots and service centres. The short-listed projects are provided at the end of this document.

Implementation of these projects will be scheduled from 2019/2020 and each project will be programmed over the next four years as part of the IWC capital program.

Offsite Renewable Energy

Renewable power will need to be procured from large-scale renewable power projects outside the LGA. This will supplement Council's rooftop solar generation.

From 1 July 2019, Inner West Council will be supplied with over 4 million kilowatt-hours[3] of renewable energy from Moree Solar Farm. This is approximately equivalent to Council's current daytime electricity consumption.

The solar supply will reduce Council's carbon emissions by almost 4,000 tonnes (CO_2e) every year. This is equivalent to almost 1,000 Inner West households' annual electricity-generated carbon.

Figure 3: Moree solar farm

The Moree solar farm supply is expected to convert around 25% of Council's electricity to renewables. Additional sources will be required in the future to achieve the 100% renewable goal.

Council staff will commence work on a second renewables contract. This will come into place when the current retail electricity contract expires on 1 July 2022, and will aim to increase renewable electricity supply to around 50%. It is likely a third source will be required to convert 100% of Council's electricity to renewables.

Transition to a Sustainable Fleet

Fuel use represents almost 11% of Council's carbon footprint. Council uses petrol (including ethanol blends) and diesel (including biodiesel blends). Percentage use is shown in Figure 4.

Fuel is primarily used in Council's vehicle fleet, which includes heavy vehicles (e.g. road plant, garbage trucks) and light vehicles (e.g. passenger cars). A small proportion of fuel is used in hand-held equipment.

There are a number of fleet-related carbon reduction initiatives already in place including:

- B20 biodiesel in some heavy vehicles (B20 is standard diesel blended with up to 20% renewable fuel manufactured from vegetable oil, animal fats or recycled grease)
- Car leaseback policy with incentives for more efficient vehicles (e.g. hybrids) and bans on inefficient vehicles (e.g. 8 cylinder vehicles)
- Operation of a bicycle fleet for staff during the workday (around 13 electric and standard bikes)
- Membership of car-share schemes in lieu of operational vehicles

[3] 4,127,000 kWh pa

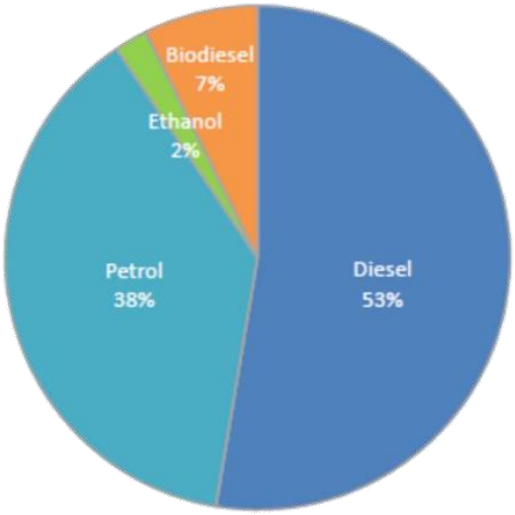


Figure 4: Proportion of fuels currently used by Council

Short-term actions towards a low-carbon fleet will include:

- review lower-emissions vehicle incentives to assess potential for improvement
- increase the percent of B20 across the diesel fleet (dependent on reliable fuel supply)
- review incentives for bicycles, car share and Opal cards for staff

The next major step is anticipated to be a transition to electric vehicles (EVs) as these become cost-effective and can be charged with a renewable source[4].

Passenger EVs are currently available but are more expensive than standard passenger cars and charging infrastructure is not yet fully developed. However these barriers are expected to reduce in the near future. Heavy vehicle EVs are less developed, and are at a trial stage. Hydrogen vehicles are also of interest but are not expected to contribute to Council's carbon neutral pathway in the near term

Council will plan for transition to a sustainable fleet through:

- familiarizing staff with EVs to improve acceptance
- identifying additional policy incentives for EVs and hybrids in the passenger fleet
- identifying potential buying groups for passenger EVs
- working with stakeholders such as the NRMA and the Electric Vehicle Association of Australia to understand changing markets and technologies
- working with other sections of Council on encouraging EVs in the community where beneficial
- assessing the costs and operational impacts of a longer-term transition to heavy vehicle EVs
- reviewing the status of emerging technologies such as hydrogen

[4] Electric vehicles are only carbon-neutral if they are charged from carbon-neutral energy sources. When charged from the standard grid in NSW, electric vehicles typically have lower emissions than the average internal combustion engine vehicle however not by a significant amount.

Council also uses minor amounts of petrol in equipment such as leaf-blowers. Opportunities to transition to low-carbon electrical tools will be explored, noting that emissions from these sources are minor.

Phase out Natural Gas

Around 10% of Council's carbon emissions relate to natural gas use.

As shown in Figure 5, almost 90% of the natural gas is used in the co-generation plants at Leichhardt Park (LPAC) and Annette Kellerman (AKAC) aquatic centres. Co-generation plants provide heating for the pools and reduce power consumption by using waste heat, therefore reducing carbon emissions.

Petersham Service Centre (PSC) and Ashfield Civic Centre (ACC) use some natural gas, mainly for space heating via boilers. Very minor quantities of natural gas is used across various buildings for water heating, space heating or stoves, which in aggregate represents around 6% of natural gas use.

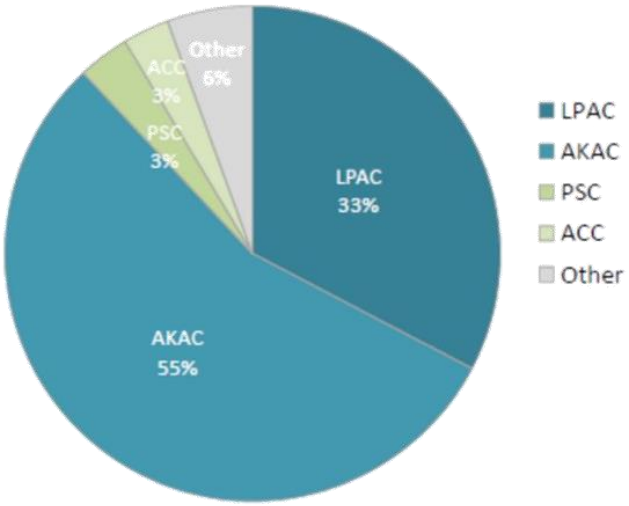


Figure 5: Council's current natural gas use

The cogeneration systems at LPAC and AKAC have an expected lifetime of at least 10+ years, and it is recommended that:

- the current cogeneration systems remain in place to deliver value to Council and provide ongoing energy efficiency
- when the cogeneration units are due for retirement in 10+ years' time, pool heating options should be re-evaluated and potentially electrified, provided Council's electricity is renewable and low-carbon

The heating systems at PSC and AAC are ageing and upgrades would potentially reduce gas consumption by a small amount. These are complex upgrades of major plant and will be rolled into the long-term capital project plan where feasible.

Further opportunities to reduce natural gas are limited.

Substantial opportunities to reduce natural gas consumption are all beyond the timeframe of the current pathway, but will be considered in the long term Building Asset Management Plan.

Sustainable Procurement

Sustainability (including carbon impact) is already incorporated into purchasing decisions for many goods and services. This is typically undertaken at the quotation or tendering stage.

Nevertheless, some of Council's carbon footprint arises from the purchase of goods such as food and paper. This has been estimated at around 6% of our carbon emissions.

Emissions from purchasing are challenging to quantify as the supply chain can be unclear, and the rules allow exclusion of some activities that may be more significant for a Council than other organisations (e.g. contractors).

A joint team of Procurement and Sustainability staff has been established to assess opportunities for further increasing the sustainability of Council's procurement practices. A program of work will be developed for rollout from 2019 onwards. This work will align with the Sustainable Procurement Policy which was being finalized as at November 2018.

Waste Management and Recycling

The remainder of Council's carbon footprint arises from the disposal of our own waste, which constitutes only 1% of our carbon emissions.

Council already recycles and composts in some locations. However noting the long-term goal of a zero waste community, Council will investigate options for further reducing its own waste, especially through source reduction.

A program of work will be developed for rollout from 2019 onwards. This will align with Council's broader zero waste strategy which is currently in development.

Purchase Offsets

Even after undertaking various actions to reduce carbon emissions, it is normal for organisations to find that there is still some residual carbon that cannot be eliminated.

To reach carbon neutrality, Council will need to invest in carbon offset projects, which can be used to eliminate Council's residual carbon footprint after all other on-ground, tangible measures have been exhausted.

Carbon offsets allow an organisation to claim the carbon reduction from a project undertaken by another organisation. The undertaking organisation sells the rights to the carbon reduction and cannot claim it against their own carbon targets. There is an international and local market for carbon offsets. The market has been criticised in the past for providing offsets of dubious value, and as a result certification schemes have been set up with clear rules and audit processes.

The timing of the purchase of carbon offsets is dependent on the target date for 100% carbon neutrality, which is subject to a decision by Council.

CARBON NEUTRAL AND RENEWABLE TARGETS

Proposed Targets

Staff have proposed the target dates below for Council consideration. These target dates seek to achieve carbon neutrality and a switch to fully renewable electricity as quickly as possible while reducing reliance on carbon offsetting:

- 100% Carbon Neutral by December 2025
- 100% Renewable Electricity by December 2025

Monitoring

The status of actions to progress the Pathway and targets will be monitored and reported through Council's Operational Plan and Delivery Program.

PATHWAY ASSUMPTIONS

Modelling undertaken by Council staff and consultants *100% Renewables* assumes that:

- Base energy consumption will remain largely the same at almost 17,000 MWh pa. This means that any new builds or major refurbishments will not significantly increase Council's energy consumption. For example, Ashfield Aquatic Centre is expected to use the same amount of energy after the rebuild, based on advice from IWC Major Projects.
- The electricity grid will be supplied by an increasing proportion of renewable power independent of Council's actions. This will reduce the carbon intensity of the electricity grid over time. The assumption is based on 100% Renewables advice of an annual fall of around 0.01 on the current 0.96 kg CO2-e/kWh NSW Grid pro-rated GHG intensity for scope 3 emissions.
- Carbon from non-electricity sources will remain largely the same through to 2025-2026. Minor changes will arise from preliminary work on transition to electric vehicles etc.
- Costs will escalate annually as follows: electricity prices 2.5% pa; operation and maintenance costs 2.5% pa; offset costs 2.5% pa.
- The Power Purchase Agreements (PPAs) are cost-neutral. This means that the supply of renewable power plus Large Generation Certificates is the same cost as standard grid power.
- PPA#1 commences in FY19 at 25% of current consumption, PPA#2 commences in FY23 at another 25% and PPA#3 commences in FY26 for the remainder.
- The Federal Large Generation Certificate scheme continues to operate over FY20 to FY26 at the current level (relevant to PPA projects).
- The Street Light Improvement Project (SLIP) is rolled out in two phases as follows: SLIP #1 (residential) over two years in FY20 and FY21, and has already been fully funded by Council. SLIP #2 (main roads) over 1 year in FY23, and Council will identify a funding source prior to this.
- Capital works will be rolled out over three years FY20, FY21, FY22 and will deliver the savings calculated by the *100% Renewables* technical report.
- The NSW Energy Savings Scheme continues to operate over FY20 to FY26 at the current rebate level (relevant to SLIP and capital works projects).
- The Federal Small Technology Certificate scheme continues to operate over FY20 to FY23 at the current level (relevant to capital works projects).
- Offsets will be purchased from FY26 onwards for residual carbon after the projects above have been delivered.

CARBON NEUTRAL CAPITAL WORKS SHORT-LIST Subject to Detailed Design		
Site	**Location**	**Projects**
Annandale Child Care Centre	47A Trafalgar Street, Annandale, NSW 2038	Energy efficiency - lighting
Annandale Neighbourhood Centre	79 Johnston Street, Annandale, NSW 2038	Energy efficiency – lighting
Ashfield Aquatic Centre	Elizabeth Street, Ashfield NSW 2131	Generation - solar
Ashfield Civic Centre	260 Liverpool Road, Ashfield NSW 2131	Energy efficiency - HVAC
Ashfield Civic Centre	260 Liverpool Road, Ashfield NSW 2131	Energy efficiency - lighting
Ashfield Civic Centre	260 Liverpool Road, Ashfield NSW 2131	Generation - solar
Balmain Depot	35 Llewellyn St, Balmain, NSW, 2041	Energy efficiency - lighting
Balmain Library	370 Darling Street, Balmain, NSW 2041	Energy efficiency - HVAC
Balmain Library	370 Darling Street, Balmain, NSW 2041	Energy efficiency - lighting
Brown St Basement Carpark	Basement, 17 The Esplanade Ashfield NSW 2131	Energy efficiency - lighting
Deborah Little ELC	1 Macarthur Parade, Dulwich Hill, NSW 2203	Energy efficiency - lighting
Deborah Little ELC	1 Macarthur Parade, Dulwich Hill, NSW 2203	Generation - solar
Enmore Road ELC	305 Enmore Road Enmore NSW 2042	Energy efficiency - lighting
Enmore Road ELC	305 Enmore Road Enmore NSW 2042	Generation - solar
Foster St Family Day Care	22 Foster St, Leichhardt, NSW 2040	Energy efficiency - lighting
Foster St Family Day Care	22 Foster St, Leichhardt, NSW 2040	Generation - solar
Haberfield Library	78-80 Dalhousie Street, Haberfield, NSW 2045	Generation - solar
Hannaford Centre	608 Darling Street, Rozelle, NSW 2039	Energy efficiency - lighting
Jimmy Little Community Centre	19 Cecily St, Lilyfield NSW 2040	Energy efficiency - lighting
Leichhardt Children's Centre	19 Leichhardt St, Leichhardt NSW 2040	Energy efficiency - lighting
Leichhardt Children's Centre	19 Leichhardt St, Leichhardt NSW 2040	Generation - solar
Leichhardt Depot	229 Catherine Street, Leichhardt NSW 2040	Energy efficiency - lighting
Leichhardt Library	Piazza Level, Italian Forum, 23 Norton Street, Leichhardt	Energy efficiency - lighting
Leichhardt Oval #1	Leichhardt Oval #1, Mary Street, Lilyfield NSW 2040	Generation - solar
Leichhardt Service Centre	7-15 Wetherill Street, Leichhardt NSW 2040	Energy efficiency - HVAC

CARBON NEUTRAL CAPITAL WORKS SHORT-LIST Subject to Detailed Design		
Site	**Location**	**Projects**
Leichhardt Service Centre	7-15 Wetherill Street, Leichhardt NSW 2040	Energy efficiency - lighting
Leichhardt Service Centre	7-15 Wetherill Street, Leichhardt NSW 2040	Generation - solar
Marrickville Town Hall	303 Marrickville Rd, Marrickville NSW 2204	Energy efficiency - lighting
Marrickville Town Hall	303 Marrickville Rd, Marrickville NSW 2204	Generation - solar
May Murray Child Care Centre	35 Premier Street, Marrickville, NSW 2204	Energy efficiency - lighting
May Murray Child Care Centre	35 Premier Street, Marrickville, NSW 2204	Generation - solar
Mervyn Fletcher House	81 Dalhousie Street, Haberfield NSW 2045	Energy efficiency - lighting
Mervyn Fletcher House	81 Dalhousie Street, Haberfield NSW 2045	Generation - solar
Petersham Service Centre	2-14 Fisher Street, Petersham NSW 2049	Energy efficiency - HVAC
Petersham Service Centre	2-14 Fisher Street, Petersham NSW 2049	Energy efficiency - lighting
Petersham Service Centre	2-14 Fisher Street, Petersham NSW 2049	Generation - solar
Petersham Town Hall	107 Crystal Street, Petersham, NSW 2049	Energy efficiency - lighting
Petersham Town Hall	107 Crystal Street, Petersham, NSW 2049	Generation - solar
St Peters Depot	15-17 Unwins Bridge Rd, Sydenham, NSW 2044	Energy efficiency - HVAC
St Peters Depot	15-17 Unwins Bridge Rd, Sydenham, NSW 2044	Energy efficiency - lighting
St Peters Depot	15-17 Unwins Bridge Rd, Sydenham, NSW 2044	Generation - solar
Stanmore Library	Stanmore Reserve, Douglas Street, Stanmore NSW 2048	Energy efficiency - lighting
Sydenham / St Peter's Library	39 Unwins Bridge Road, Sydenham NSW 2044	Energy efficiency - lighting
Sydenham / St Peter's Library	39 Unwins Bridge Road, Sydenham NSW 2044	Generation - solar
Tempe – Robyn Webster building	Holbeach Ave, Tempe NSW 2044	Energy efficiency - lighting
Tillman Park Early Learning Centre	79 Unwins Bridge Road, Tempe NSW 2044	Energy efficiency - lighting
Tom Foster Community Centre	1-13 Darley Street, Newtown, NSW 2042	Energy efficiency - lighting

CARBON NEUTRAL - MAJOR PLANT CAPITAL UPGRADES Subject to Equipment Replacement at end of life		
Annette Kellerman Aquatic Centre	Enmore Park, Black Street, Marrickville	Replace cogeneration plant
Leichhardt Park Aquatic Centre	Mary Street, Lilyfield NSW 2040	Replace cogeneration plant
Leichhardt Library	Piazza Level, Italian Forum, 23 Norton Street, Leichhardt	Energy-efficient packaged HVAC system(s)
Haberfield Library	78-80 Dalhousie Street, Haberfield, NSW 2045	Energy-efficient packaged HVAC system
Ashfield Civic Centre	260 Liverpool Road, Ashfield NSW 2131	Energy efficient chiller
Leichhardt Oval #1	Leichhardt Oval #1, Mary Street, Lilyfield NSW 2040	LED floodlighting at end of life replacement
Petersham Service Centre	2-14 Fisher Street, Petersham NSW 2049	Replace HVAC system
Other	Likely to be numerous other opportunities over time, will depend on finalised Building Asset Management Plan	Various