Sydney2030/Green/Global/Connected

CITY OF SYDNEY 2030

Environmental Action 2016 – 2021

Strategy and Action Plan

March 2017

city of villages

Contents

In this strategy and action plan, the organisation, or the City of Sydney, is referred to as 'the City'.

The local government area is referred to as 'the city' or 'the local area'.

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A message from the Lord Mayor

Together, we can reduce our city's environmental impact and adapt to be resilient to the impacts and challenges of a changing climate.

At the end of last year I attended the sixth biennial C40 Mayors Summit in Mexico City. At the Summit we considered new research that highlighted the desperate urgency of action on climate change and the sheer scale of the challenge we all face, especially city leaders.

What is clear is that the next four years are crucial and will determine whether the world meets the ambition of the Paris Agreement to limit global temperature rise to less than 2˚C, and to drive efforts to limit the temperature increase even further to 1.5˚C. Incremental steps are no longer adequate – we need to dramatically increase action. It is incumbent on wealthy cities like ours, which have the resources and capabilities to accelerate action, to do twice as much in half the time.

This strategy and action plan focusses on defining actions to 2021 on the way to achieving 2030 environmental targets. **By 2021, the City will reduce emissions in its operations by 44 per cent from 2006 levels and move to 50 per cent renewable energy.** And across the local government area, we have set targets for 50 per cent renewables by 2030, 70 per cent reduction in 2006 greenhouse gas emissions levels by 2030 and net zero emissions by 2050.

We have a strong track record. The City's operations became carbon neutral in 2007 and we were the first government in Australia certified as such in 2011. **Since 2006, our organisation's greenhouse gas emissions have reduced by 25 per cent and emissions across our local government area have reduced by 17 per cent amid strong growth in population and worker numbers — with a 36 per cent reduction in 'carbon intensity'.**

The strategy and action plan is not just about greenhouse gas emissions. Together with our community we are working to divert waste from landfill, protect and recycle our valuable drinking water supplies, enhance our urban environment and ecology and keep our city green and cool.

The strong actions we have committed to in this strategy and action plan will also bring significant social, cultural and economic benefits to the city and our community. Managing our city's impact on the environment and adapting to climate change is a crucial part of making our city more resilient.

In 2007-08, we consulted with our city's residents, workers, students, business operators, industry associations, community organisations and visitors to develop *Sustainable Sydney 2030*, our comprehensive plan for creating a green, global and connected city.

People told us they wanted strong environmental leadership. They wanted a city with beautiful parks and green spaces, where riding a bike is safe and the streets are walkable and not clogged with congested traffic. They wanted a city that used energy and water efficiently and produced less waste.

We listened. *Sustainable Sydney 2030* sets the vision for a city where people want to live, work and spend time.

Almost a decade later, technology is moving fast. Energy saving LED streetlights, which we pioneered in Australia, are now the norm. Batteries are becoming more cost effective and the efficiency of building service equipment is constantly improving. Our contribution to major infrastructure projects, including light rail along George Street, is transforming our city. We are also partnering with Sydney's leading commercial building owners through the Better Buildings Partnership and the CitySwitch program to reduce emissions in the city's commercial sector.

Around the city we are creating a Liveable Green Network of walking and cycling routes with clear wayfinding for people of all ages and abilities. Our Smart Green Apartments program and Green Villages website are also helping owners and residents save water and energy and reduce waste. We have planted thousands of new trees and our community helps keep our city green and cool through community gardens, Landcare and Bushcare groups. There are now over 30,000 members of car sharing schemes in our local government area.

We divert 69 per cent of the city's residential waste each year from landfill. We also help our many residents that live in apartment buildings manage their waste better, by upgrading their bin rooms. This is just a fraction of the City of Sydney's work, alongside our partners and community, to reduce our environmental impact and improve the city.

Environmental Action 2016 – 2021 takes the insights, data and actions from our suite of environmental strategies and master plans, and commits to strong actions on energy, water, climate adaptation, waste, transport and greening over the next five years.

The City of Sydney needs to work with other levels of government, private industry and the community to make this change – so I strongly appreciate the advice we have received from our high level external reference group in developing this strategy and action plan. Thank you to the Better Buildings Partnership, Institute of Public Works Engineering Australia, Energy Efficiency Council, Facilities Management Australia, Green Building Council of Australia, Jemena, NSW Department of Industry, NSW Department of Planning & Environment, NSW Office of Environment and Heritage, Property Council Australia, Sydney Water, and Transport for NSW.

We can't ignore the evidence and impacts of climate change. By 2070, our city could be up to 3˚C hotter with more extreme, frequent and longer heatwaves. This is the biggest challenge we face today and into the future. A business-as-usual approach is not an option – we must step up and take bolder action at a faster rate.

Together, we can reduce our city's environmental impact and take on the challenges of a changing climate.

Lord Mayor Clover Moore
City of Sydney

02 Strategy and action snapshot

About the strategy and action plan

Sustainable Sydney 2030 outlined the aspiration of our community and businesses for our local government area to be an environmental leader on a global scale. To guide the implementation of *Sustainable Sydney 2030*, the City developed a series of environmental master plans and strategies between 2008 and 2015.

This strategy and action plan combines the insights and data from these documents. We outline our progress to date, and approach to achieving our bold *Sustainable Sydney 2030* targets. We address the areas of impact in six chapters:

– Low-carbon city
– Water sensitive city
– Climate resilient city
– Zero waste city
– Active and connected city
– Green and cool city

The strategy details how we will deliver against targets set for our own operations. It also explains how we will influence and collaborate with others to contribute towards the achievement of targets for the local government area.

This strategy is supported by a comprehensive action plan that will help us deliver on our goals. The action plan communicates how we aim to improve our operational and local area environmental performance from 2016 to 2021. During this five year period, the action plan (included in Appendix 1) will be reviewed and adjusted annually as technology progresses, regulatory reforms occur, we continue to learn and stakeholder feedback is continuously incorporated.

Our vision

Together with the people living, working and visiting our global city, and with other government entities, the City of Sydney will reduce carbon pollution and boost use of renewable energy to become a low-carbon city.

Our city's waste will be diverted from landfill, recycled and recovered as a valuable resource.

Our potable water resources will be preserved and supplemented with alternative water sources. Our waterways will be less polluted and alternative water resources, such as stormwater, captured to keep our city green and cool and help our urban canopy grow.

Our city will be connected with green links, supporting thriving biodiversity and resilient urban ecology. An integrated transport system will move people efficiently with a safe network of walking and cycling paths and new public transport corridors. Air quality will be improved with cleaner vehicles and car sharing schemes will reduce traffic congestion.

Buildings in our city will showcase innovative solutions to deliver outstanding environmental performance. The City will work with building developers, owners and tenants to raise environmental standards across all sectors of the built environment.

We will adapt to be resilient to the impacts of a changing climate. Our city will be globally recognised as an environmental leader and will continue to be one of the world's most liveable cities.

CityTalks events bring people together to discuss significant ideas with global thinkers

Our role as influencers and collaborators

In this strategy we detail progress against ambitious targets in two key areas – our own operations and our local government area.

Within our own operations, where we have control we aim to lead by example. We will continue to embed environmental sustainability in our buildings, infrastructure, public domain and fleet. We will pilot new technologies and continue to transparently report our environmental performance.

We have also set ambitious environmental targets for our local government area. Our influential role as a city government helps us shape our local area's environmental performance, but our control is limited. To achieve our local area targets, we continue to call on strong collaboration from all levels of government, the private sector and the community.

In the local government area the City is:

- **Encouraging the private sector** through delivery of targeted environmental programs, raising environmental standards through policy and planning controls and offering incentives for improved environmental performance
- **Galvanising community action** by delivering grants for innovation, educational programs, consultation and community infrastructure to support environmental behaviour
- **Advocating for change** through research, partnerships, submissions and information sharing
- **Acting as thought leaders** by connecting Sydney with leading thinkers through our City Talks program, global collaborations such as C40 Cities and 100 Resilient Cities and many local partnerships including the Cooperative Research Centre for Low Carbon Living.

By continuing to act together we can minimise our impact and adapt to changes, so our city is resilient for the future.

Our growing city

Our local area covers 26.15 sqm and is a vital economic hub and tourism gateway for Australia. It is home to more than 20,000 businesses and 210,000 residents and supports 1.2 million residents, workers, visitors and students every day. Our local area represents approximately seven per cent of the national economy and 22 per cent of the NSW gross regional product.

Significant growth is forecast for the city from 2014-30. This continued growth will have a substantial impact on the environment if we choose a business-as-usual approach. This is why the City has set environmental targets for the local area and works proactively with businesses and the community to improve environmental performance.

Area	2007	2012	2031	Growth – 2007 to 2012	Expected growth – 2012 to 2031
Population	169,056	187,690[1]	273,500[2]	11.0 per cent	46 per cent
Employment	385,421	437,727[3]	557,760[4]	13.6 per cent	27 per cent
Number of dwellings	93,932	102,410[5]	155,950[6]	9.0 per cent	52 per cent

[1] ABS Estimated Regional Population Growth Cat. No. 3218.0
[2] 2014 NSW Population Projections by LGA published by the Department of Planning and Environment
[3] City of Sydney Council, 2012 FES Summary Report – Local Government Area
[4] Projection Estimate from City of Sydney based on capacity and demand study
[5] 2007- Data from 2007 FES Summary Report; 2012 data from City of Sydney 2012 Housing Audit
[6] 2014 NSW Population Projections by LGA published by the Department of Planning and Environment

City of Sydney operations

In 2014, the City set interim environmental performance targets for its own operations to be achieved by 31 December 2016. This section details anticipated results against these targets and sets new environmental targets to be achieved by mid-2021.

Our operations have experienced considerable growth since 2008 and we have delivered enhanced services to our community while reducing our environmental impact.

Low-carbon city

December 2016 targets	Progress
26 per cent reduction in emissions from 2006 baseline	**Certified carbon neutral since 2011** **Achieved 25 per cent reduction in emissions by mid 2016** by: – Retrofitting 45 of our major buildings with energy savings measures; reducing their emissions by 25 per cent – Replacing 6,604 City of Sydney-owned street and park lights with energy efficient light emitting diode (LED) lights, reducing their emissions by 40 per cent
5 per cent of electricity from renewable energy sources	**Achieved 3 per cent of electricity from local renewable energy sources** by: – Installing 40 solar power and solar hot water systems on our properties This target will be achieved over the next few years by installing more solar power, including on assets currently under construction such as the Green Square Aquatic Centre.

June 2021 targets

– 44 per cent reduction in greenhouse gas emissions by end June 2021, based on 2006 levels

– 50 per cent of electricity from renewable sources by end June 2021[7]

What we will do next

– Continue efficiency retrofits of our most resource-intensive buildings

– Install additional solar power and solar hot water systems on our buildings, and supplement this with renewable energy generated outside the local area

– Identify opportunities to utilise batteries to store solar power

– Commence operation of the trigeneration system at Town Hall House and complete the installation of cogeneration systems at our major aquatic centres

– Advocate for street lights in the city owned by Ausgrid to be fitted with LED lamps

2030 targets

– 70 per cent reduction in greenhouse gas emissions by 2030 based on 2006 levels

[7] The renewable electricity target incorporates renewable electricity both within the grid and classified as additional to the grid

Water sensitive city

December 2016 targets	Progress
– Zero increase in potable water use from 2006 baseline	**On average, annual potable water use has remained below the 2006 baseline,** however recent years have seen water use rise slightly above the baseline. – The City is committed to increasing efficiency and use of recycled water so that potable water use falls below the baseline in future reporting periods.
– Annual potable water use of 180L/m^2 of irrigated open space	Since 2006 the amount of open space we irrigate has grown by 52 per cent. The most recent reporting period saw irrigation efficiency fall slightly below the target level, however measures currently in place should see the target achieved in future reporting periods.

June 2021 targets

- Zero increase in potable water use by end June 2021 from 2006 baseline, achieved through water efficiency and recycled water
- Annual potable water use of 180L/m^2 of irrigated open space

What we will do next

- Install smart meters to detect and fix leaks in our parks and properties
- Connect more of our parks and buildings to alternative water supplies, such as rainwater, treated stormwater and recycled wastewater
- Retrofit our high water-using properties with water efficient fixtures and fittings

2030 targets

- Zero increase in potable water use by 2030 from 2006 baseline, achieved through water efficiency and recycled water

Climate resilient city

Progress

We are actively adapting to our changing climate by:

- Planting trees and landscaping to cool our city, with **11,000 new street trees planted since 2005**
- Conducting floodplain management studies and preparing plans for several of the city's major catchments
- Protecting our outdoor staff during extreme weather events

What we will do next

- Develop a Heatwave Response Plan aligned with the NSW State Heatwave Sub Plan
- Complete the installation of trunk stormwater pipes to reduce flood risk in the Green Square area and Ashmore Estate
- Update construction works technical specifications to factor climate change into design and materials selection

Zero waste city

December 2016 targets	Progress
– 54 per cent annual resource recovery of waste from City of Sydney managed properties	**Currently achieving annual recovery levels of 35 per cent** by: – Separating recyclables from our buildings by source; including paper, cardboard, plastic containers, e-waste and printer cartridges The City has recently completed an organisation wide review into the way in which it collects, reports and verifies recycling and landfill diversion performance data, to significantly improve the accuracy and transparency of our reporting. The review highlighted issues with the accuracy of landfill diversion data from our contractors. Under revised reporting protocols, the landfill diversion rate from City properties is estimated to be 35 per cent. The City is committed to improved reporting processes and implementing solutions for increased recycling performance of the waste it manages
– 98 per cent annual resource recovery of maintenance, construction, demolition waste from City of Sydney managed assets	**Achieving annual recovery levels of 99 per cent** by: – Composting green waste collected from our parks for re-use on site – Sending construction and demolition waste from City-managed infrastructure and maintenance projects to a local recycling centre for recovery and reprocessing

June 2021 targets

– 50 per cent resource recovery of waste from City parks, streets and public places by end June 2021

– 70 per cent resource recovery of waste from City managed properties by end June 2021

– 80 per cent resource recovery of construction and demolition waste generated and managed by City operations by end June 2021

What we will do next

– Undertake waste audits and improve waste management practices across all City operations

– Integrate resource recovery targets into waste service contracts for City operations

Active and connected city

December 2016 targets	Progress
– Zero increase in fleet emissions from 2014 baseline by 2016	**Achieved zero increase in fleet emissions in FY15/16 through:** – Delivery of eco-driver training to our staff – Inclusion of electric vehicles in our fleet – Staff travel policies that prioritise use of active transport (walking and cycling) and public transport where possible

June 2021 targets

– Zero increase in fleet emissions from 2014 baseline by end June 2021

What we will do next

– Continue to engage employees in eco-driver training and promote active transport

– Investigate options for using hydrogen fuel cell powered vehicles

– Trial new electric vehicles to deliver services to our community

Harmony Park is watered by rainwater captured from nearby roofs

Green and cool city

Progress

- Planted 11,000 new street trees since 2005 and **installed over 57,000 square metres of landscaping throughout the city's streets**
- Planted 13,466 plants across bush restoration sites along Johnston's Creek and in Sydney Park since 2015
- **Upgraded 57 small parks and installed 154 raingardens since 2009**

Future targets

- Plant 700 new street trees each year until 2021
- Tree species diversity will not consist of more than 40 per cent for any particular plant family, 30 per cent for any genus or 10 per cent for any one species by 2021
- Plant 50,000 new trees and shrubs in City parks and street gardens each year until 2021
- Habitat sites in the city are protected and the area of bush restoration sites is increased by 100 per cent by 2023 from a 2012 baseline of 4.2 hectares
- Indigenous fauna species diversity, abundance and distribution is maintained or increased by 2023 based on a 2012 baseline
- A progressive increase in the number of habitat features for priority fauna species is established along potential habitat linkages by 2023

What we will do next

- Obtain updated data on canopy cover and develop a strategy for the next stage of increased urban canopy towards the 2030 target
- Plant trees and habitat vegetation to support biodiversity
- Continue to maintain our parks to best-practice standards

2030 targets

- The average total canopy cover is increased by 50 per cent by 2030 (from 15 to 23 per cent of the local government area), and increased by 75 per cent by 2050 (to 27 per cent), from a 2008 baseline

The BotanyCope residential apartment building installed a solar power system with support from the City's Environmental Performance Innovation Grants

To reach the local area targets, we need strong collaboration from all levels of government, the private sector and the community.

The local government area

Through *Sustainable Sydney 2030* and our subsequent research work, we set ambitious targets for 2030 for the environmental performance of the local government area. The City's research sets out a potential pathway to reach these targets, but the City alone does not have control over whether the targets are achieved.

The City of Sydney delivers many initiatives to support our community and businesses. But to reach the local area targets, we need leadership, commitment and collaboration from all levels of government, the private sector and the community.

Low-carbon city

Progress

- **Local area emissions reduced by 17 per cent** by mid-2015 as a result of energy efficiency initiatives, increasing local renewable energy generation and renewable energy delivered through the centralised electricity network
- Around **4,163 kW of solar PV installed** in the local government area, including 873 dwellings and numerous large installations on commercial properties
- **The carbon intensity (tonnes of carbon per $GDP) of our local government area has fallen by 36 per cent since 2006,** reflecting strong economic growth while emissions have reduced
- The Better Buildings Partnership, owners of more than half the commercial floorspace in the city centre, has collectively reduced annual emissions by 45 per cent

Future targets

- 70 per cent reduction in greenhouse gas emissions by 2030 based on 2006 levels
- 50 per cent of electricity demand met by renewable sources by 2030[8]
- Net zero emissions by 2050

What we will do to support and influence

- Create a net zero challenge to facilitate Sydney's first net zero buildings
- Deliver an energy retrofit program for residential apartment buildings
- Advocate for changes to state and federal policy and regulation
- Continue delivery of energy efficiency programs and grants that support residents and businesses
- Encourage energy efficiency, low-carbon and renewable energy through our planning controls
- Invest up to $10 million to accelerate the uptake of renewable energy by our local businesses and residents, with preference for local sources where feasible

[8] The renewable electricity target incorporates renewable electricity both within the grid and classified as additional to the grid

Water sensitive city

Progress

- The local government area's annual potable water consumption has risen slightly above the 2006 baseline in recent years as a result of population growth, and the removal of state government-imposed water restrictions.
- City of Sydney's **Smart Green Business program has engaged 620 businesses who are collectively saving over 1 gigalitre** of drinking water annually through water efficiency measures
- The City is delivering **precinct-scale stormwater harvesting schemes at Green Square Town Centre and Sydney Park, to reduce potable water use and remove pollution from stormwater**
- Wastewater recycling schemes run by private water utilities have been installed in new developments at Barangaroo and Central Park

Future targets

- Zero increase in potable water use by 2030 from 2006 baseline, achieved through water efficiency and recycled water
- 50 per cent reduction in the annual solid pollution load discharged to waterways via stormwater by 2030
- 15 per cent reduction in annual nutrient load discharged to waterways via stormwater by 2030

What we will do to support and influence

- Investigate a market mechanism for a private water utility to deliver recycled water at Greater Green Square
- Work with the NSW Government to provide recycled water pipes along the George Street light rail corridor
- Continue delivery of programs and grants that support residents and businesses to save potable water
- Advocate for water recycling infrastructure to be included in urban renewal projects and for water pricing that supports efficiency and alternative water sources

Climate resilient city

Progress

- **Collaboration amongst emergency services to support our community to cope with heat stress and flooding during extreme weather events**
- Local governments are working together to address sea level rise

What we will do to support and influence

- Continue to collaborate with the NSW state government and non-government organisations to support the community during extreme weather events
- Advocate for a consistent NSW state planning framework to address sea level rise and storm surge
- Advocate for revision of engineering and building standards to make buildings more resilient

Zero waste city

Progress

- **69 per cent of residential waste is diverted from landfill** by reprocessing recyclables and composting food and garden waste
- Upgraded 1,670 residential apartment building waste and recycling facilities since 2010
- With the Better Buildings Partnership, the City is working to improve commercial sector monitoring and management of waste generation and recycling recovery
- **419 tonnes of e-waste diverted from landfill** since 2008

Future targets

- 70 per cent recycling and recovery of residential waste from the local government area by end June 2021
- 70 per cent recycling and recovery of commercial and industrial waste from the local government area by end June 2021
- 80 per cent recycling and recovery of construction and demolition waste from the local government area by end June 2021

What we will do to support and influence

- Consult with businesses, workers and residents to better understand the challenges associated with waste
- Develop a Waste Strategy to deliver a globally recognised approach that converts waste from the city into a valuable resource
- Continue to support the Better Buildings Partnership in ensuring the Operational Waste and Refurbishment Waste guidelines are adopted by industry and a new benchmark in data quality and reporting is established

Active and connected city

Progress

- **12.5 km of new traffic-separated cycle-ways** in the local area, funded by the City
- As at 2011, 29 per cent of trips to work in the local government area were by walking, 37 per cent by public transport, 4 per cent by bicycle and 30 per cent by car[9]
- **650 on-street parking spaces dedicated to car share vehicles,** with over 30,000 car share members among the city's residents and businesses
- The Liveable Green Network is creating a connected network of high quality walking and cycling routes through the city with wayfinding and tactile signage

Future targets

- 33 per cent of trips to work during the AM peak undertaken by walking by 2030, by city residents
- 10 per cent of total trips made in the city are undertaken by bicycle by 2030
- 80 per cent of trips to work during the AM peak are undertaken by public transport by 2030, by city residents and those travelling to Central Sydney from elsewhere
- 30 per cent of city residents who drive [with an unrestricted drivers licence] are members of a car sharing scheme by 2030

What we will do to support and influence

- Support the transformation of George Street into a people-friendly thoroughfare with clear wayfinding and greater accessibility
- Work with the NSW Government to bring light rail to Green Square and complete the local walking and cycling network
- Complete the ten high-priority regional cycling routes
- Continue to advocate for Federal Government funding for the Inner Sydney regional bike network
- Investigate the feasibility of a public bike hire scheme
- Continue education and awareness campaigns to promote walking, cycling and car sharing

[9] Source - 2011 Journey to Work data from the five yearly Census conducted by the Australian Bureau of Statistics

Bourke Street community garden received a matching grant from the City

Green and cool city

Progress

- The City supports 19 community gardens, five Landcare groups, three community footpath verge gardens and one community composting group
- Launched a Green Roofs and Walls policy and guidelines; **130 green roofs and walls now in place**

Future targets

- The average total canopy cover is increased by 50 per cent by 2030 (from 15 to 23 per cent of the local government area), and increased by 75 per cent by 2050 (to 27 per cent), from a 2008 baseline

What we will do to support and influence

- Establish guidelines for the provision of landscaping and open space in new developments
- Establish a City Farm in Sydney Park for food production, farmers markets, community participation, education, innovation and collaboration

A leading environmental performer

Sydney is globally respected for its environmental performance and is recognised on a number of global indices, including:

- The Cities 100 index, developed by C40 and leading international think tank Sustainia, lists Sydney for its climate change response
- The Economist Intelligence Unit placed Sydney in the top 10 world cities in 2012 and 2013
- The PricewaterhouseCoopers Cities of Opportunity index ranked Sydney ninth out of 30 cities in 2014 and it topped the sustainability and natural environment categories

03 Guide for excellence in new building design

Background

The Paris agreement to limit global average temperature increase to 1.5˚C means that all sectors of the economy, including buildings, need to achieve net zero emissions by 2050. 70 per cent of global carbon emissions are generated by cities, with buildings contributing the majority of those emissions. We risk locking in emissions-intensive buildings through business-as-usual design; whereas smart and efficient design can help to deliver net zero buildings[10].

The National Construction Code, local and state planning controls will need to progressively foreshadow appropriate and sustainable changes that will deliver net zero buildings by 2050.

The Australian Sustainable Built Environment Council (ASBEC) has calculated that by 2030, proven and commercially viable energy efficiency and distributed energy improvements in buildings could deliver at least half of the national energy productivity target (a 40 per cent improvement in energy productivity between 2015 and 2030) and more than one quarter of the national emissions reduction target (26-28 per cent on 2005 levels by 2030)[11].

In our local government area, buildings are responsible for around 80 per cent of the greenhouse gas emissions. As Sydney continues to grow, it's increasingly important to build efficient buildings to avoid more building-related emissions, as well as increased water use and waste generation. This Strategy's ambitious targets cannot be achieved with a business as usual approach to designing, constructing and operating new buildings

The city has many examples of innovative buildings that reach high standards of environmental performance, while creating healthy, attractive places for people to live or work. But these buildings are not representative of standard building stock. We need to create a framework that supports industry innovation beyond minimum standards and helps meet our ambitious targets.

Intention of this guide

This guide provides details of the environmental benchmarks and design features that are leading-edge practice for our local area in 2017.

These benchmarks are higher than compliance requirements. They are not planning requirements and are not mandatory. These benchmarks show how buildings are delivering excellent environmental performance. Mandatory standards for development are contained in the Sydney Local Environmental Plan and the Development Control Plan.

This guidance may be considered when proponents are seeking to enter into a voluntary planning agreement with the City, or where a design excellence competition will be undertaken.

Developers are encouraged to discuss these opportunities with the City at the earliest stages of their development proposals.

We know that building performance is improving over time as industry leaders find new ways to respond to environmental challenges. The City regularly reviews this guidance and will provide updates as required.

[10] The decisions we make today will shape tomorrow
[11] *Low Carbon, High Performance,* Australian Sustainable Built Environment Council (ASBEC), 2016

City of Sydney guidance on voluntary standards for excellence in environmental performance in new buildings (as at 2017)

Energy and emissions

Benchmark options

Residential development
- Single dwellings: BASIX 60 or higher
- Apartments 2-3 storeys: BASIX 50 or higher
- Apartments 4-5 storeys: BASIX 50 or higher
- Apartments 6+ storeys: BASIX 40 or higher
- Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher

Commercial office
- NABERS Energy Commitment: 6 Stars
- Premium office – Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher
- Non-premium office – Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher

Hotels and serviced apartments
- Materially exceed BCA Section J – demonstrated by engineering consultants report
- Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher
- Gold star LEED certificate (build and construct)
- Best Practice Earthcheck (planning and design)
- NABERS Energy Commitment (when available)

Retail
- Materially exceed BCA Section J – demonstrated by engineering consultants report
- Shopping centres: Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher

Design features to assist in achieving excellence in building performance

- Thermally efficient building design and shell
- Maximise natural ventilation opportunities, exceed SEPP 65 rule of thumb for 70 per cent cross ventilated apartments
- Highest efficiency appliances as indicated by the federal government's energy rating scheme

Light emitting diode (LED) lighting technology
- Onsite renewable energy generation (especially photovoltaics)

Solar or heat pump water heating
- On site low carbon energy generation (cogeneration or trigeneration)
- High performance glazing
- External shading (adjustable options) to glazing
- Building management control systems
- Highly energy efficient common area equipment space heating/cooling (HVAC), car park ventilation

Water efficiency

Benchmark options

Residential development, all dwelling types
- BASIX 50
- BASIX 60 where recycled water is available
- Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher

Commercial office
- Designed to meet Sydney Water Good Practice standard (proposals without cooling towers: 0.47 kL/m^2/year; proposals with cooling towers: 0.84 kL/m^2/year)
- Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher

Hotels and serviced apartments
- With cooling tower and laundry: 0.43 kL/m2/year
- Without cooling tower and laundry: 0.17 kL/m2/year
- Green Star: Certified rating under a current version of Design & As Built – 5 Star or higher
- Gold star LEED certificate (build and construct)
- Best Practice Earthcheck (planning and design)
- NABERS Energy Commitment (when available)

Retail
- Designed to meet Sydney Water Good Practice standard (shopping centres: 1.35 kL/m^2/year; supermarkets: 2.79 kL/m^2/year)
- Shopping centres: Green Star: 5 Star or higher

Design features to assist in achieving excellence in building performance

- Highest efficiency fittings (taps, showerheads, toilet cisterns, urinals) using WELS Star ratings
- On site water capture and re-use, or connection to precinct-scale recycled water scheme where available
- Well designed and controlled cooling towers
- Highest efficiency whitegoods (especially laundry): WELS 4 Star or higher

Number 1 Bligh Street's innovative sustainability features include blackwater recycling, trigeneration, solar power and highly efficient double-skin façade

Materials and resource recovery

Design features to assist in achieving excellence in building performance

Timber products – Use of re-used or certified timber according to Green Building Council of Australia Responsible Building Materials 20.2A and 20.2B[12]

Concrete products – More than 30 per cent replacement of Portland cement with supplementary cementitious materials[13]

Aggregates reduction – Replacement of virgin coarse and sand aggregate as per Section 19B.1.3 Green Star Design & As Built v1.1[14]

Organics recovery – Provision for on-site composting of kitchen and garden waste

Landscaping, biodiversity and community garden

Design features to assist in achieving excellence in building performance

- Design for low water demand and drought resilience
- Employ water sensitive urban design techniques
- Select low water demand plant species
- Protect existing healthy trees in accordance with AS 4970
- Plant well located canopy trees that provide summer shade and light in winter
- Supply of quality tree stock in accordance with AS 2303
- Select local provenance, hardy and resilient plant species
- Engage with local Bushcare groups for plant stock/advice
- Avoid disturbing existing soil profiles in areas designated for landscaping
- Create spaces for community gardens - community gardens are 'enablers' creating social connection opportunities for residents, neighbours, businesses
- Select residential development plants from BASIX to assist BASIX Water score

[12] Green Star Design and As Built v1.1

[13] Includes fly ash, ground granulated blast furnace slag, and amorphous silica. They are defined in AS 3582.1 – 1998, AS 3582.2-2001, AS/NZS 3582.3 - 2002.

[14] Acceptable types of alternative coarse and fine aggregate are listed in the Cement Concrete and Aggregate Australia publications: Use of Recycled Aggregates in Construction and Guide to the Specification and Use of Manufactured Sand in Concrete.

Examples of excellence

Australian buildings are already reaching high standards of environmental performance. The following examples demonstrate that achievement of these high benchmarks is feasible.

Residential
One Central Park, Sydney.

Residential building that achieved a 5 Star Green Star - Multi Unit As Built certified rating. Features include trigeneration, water recycling plant and extensive green walls watered by recycled water.

centralparksydney.com

Retail
St George branch, Barangaroo, Sydney.

Retail fitout that achieved a 6 Star Green Star – Interiors certified rating through use of building materials with a reduced environmental impact over their entire lifecycle, reduced internal air pollutants, reduced water and energy consumption, and inclusion of innovative options for community usage of the space.

new.gbca.org.au

Hotel
Alto Hotel on Bourke, Melbourne.

Boutique hotel that has achieved EarthCheck Gold Certification and NABERS Energy 6 Star rating, through initiatives including energy efficient fittings, purchase of 100% renewable energy, use of rainwater and an electric car share vehicle available on-site.

altohotel.com.au

Office
1 Bligh Street, Sydney.

Commercial office building that achieved 6 Star Green Star Office Design certified rating and 5 Star NABERS Energy rating. The building's innovative sustainability features include blackwater recycling, trigeneration, and an energy efficient double-skin glass façade.

1bligh.com.au

The residential tower at One Central Park features a trigeneration system, water recycling plant and green walls irrigated with recycled water

Office
Sirius, Woden, ACT.

Commercial office building that increased from a 5 Star Green Star – Office Design certified rating to a 6 Star Green Star – Performance certified rating, through strong collaboration between Mirvac and the major tenant, the Department of Health. It also achieved a 6 Star NABERS Energy rating without Green Power.

mirvac.com

Office fit out
dsquared Consulting office fitout, Adelaide.

This small business achieved a 5 Star Green Star – Interiors certified rating and a 5.5 Star NABERS Energy rating, through selection of a central location to minimise transport impacts, energy efficiency initiatives and reuse and recycling of previous fitout materials.

new.gbca.org.au

04 Low-carbon city

Cities contribute around 70 per cent of the world's carbon emissions and can play a significant role in creating a net zero future.

Background

Australia's greenhouse gas emissions per person rank among the highest in Organisation for Economic Co-operation and Development (OECD) countries. Our reliance on coal-fired electricity is a major reason. This electricity source has high carbon emissions and is a major contributor to climate change. Like most Australian cities, Sydney relies on a centralised energy network supplied by mostly coal-fired electricity.

Following the United Nations Conference on Climate Change, or COP21, in Paris in 2015, global leaders agreed to keep a global temperature rise this century well below 2˚C and to drive efforts to limit the temperature increase even further to 1.5˚C above pre-industrial levels. Emissions will need to reach 'net zero' by 2050, which means firstly reducing emissions, then offsetting any remaining emissions.

To achieve net zero, Australia will need to reduce its carbon intensity. The federal government set a target to reduce emissions by between 26 and 28 per cent on 2005 levels by 2030. This is unlikely to be sufficient to reach net zero by 2050. Significant action is needed to decarbonise Australia's electricity supply and improve the performance of our buildings.

Cities contribute around 70 per cent of the world's carbon emissions and can play a significant role in creating a net zero future. Recent research by C40[15] indicates that one third of the emissions remaining to reach a 2˚C global temperature limit may be determined by urban policy decisions made before 2020.

In *Sustainable Sydney 2030,* we set a 2030 target to reduce emissions both across the city and in our operations by 70 per cent below 2006 levels. In this strategy, we have strengthened our renewable energy targets for both our own operations and in our local government area.

Our ambitious plans across the city and our own operations will help us to use less energy and improve energy efficiency, comfort and productivity.

Issues and opportunities

Energy efficiency: Existing buildings contribute around 80 per cent of our city's emissions. As a first step, improving energy efficiency, or using less energy to achieve the same output, in new and existing buildings makes good financial and environmental sense. Energy bills and emissions will be lowered at the same time. Within the built environment, there is already strong leadership, but efficiency needs to become standard practice. Large opportunities to reduce emissions are still untapped from those taking little, or no, action. The City is developing sector sustainability plans that identify further opportunities for reducing emissions within high-priority sectors of the city's built environment.

[15] http://www.c40.org/blog_posts/one-third-of-the-world-s-remaining-safe-carbon-budget-could-be-determined-by-urban-policy-decisions-in-the-next-five-years

Solar panels installed on the roof of Redfern Park

Renewable energy: In 2015, around 15 per cent of Australia's electricity generation was from renewable sources. The federal government has set a 2020 Renewable Energy Target (RET) for at least 33,000 gigawatt hours of electricity to be produced from renewable sources. This is estimated to be about 23-24 per cent of total electricity demand. Renewable energy, such as solar energy, produces no emissions. The cost of installing renewable technology is falling and market uptake increasing – more than 15 per cent of Australian households now have solar panels.

Progressive businesses in our city are achieving great results from local renewable energy generation projects. However, renewable energy generation at building-scale alone is insufficient to reach our city's renewable energy target. To maximise local generation opportunities, buildings need to be able to share power locally.

Under the current National Electricity Rules, full network charges are still payable if a building with solar power sends surplus power to the building next door. This rule fails to reward the savings a building has made by not using the long-distance electricity network of poles and wires. The City is lobbying for regulatory changes to the National Electricity Rules to improve financial returns for local generators. The results would have a positive effect on the uptake of building and district-scale renewable energy generation across Australia.

Community renewable energy: Community owned, locally sited renewable energy generation, provides another opportunity within our local area. Community renewable energy includes some form of control by community owners of the project. Through our Environmental Innovation grants, the City has supported proponents of community renewable energy projects.

The City is also exploring opportunities to facilitate renewable energy generation projects outside our city. This type of project would be additional to the amount of renewable energy supplied through the federal government's renewable energy target. Opportunities may include aggregated power purchase agreements, encouraging the use of GreenPower or direct investment in projects.

Bicentennial Park is an example of our City-owned street and park lights using energy efficient light emitting diode (LED) lights

Energy storage: Storing locally generated energy in batteries is a rapidly evolving area of the market. Batteries can store energy generated during the day from solar power systems for use in the evening or early morning. Until now, batteries have been too expensive for most homes and businesses, but some energy companies have now launched more affordable solar battery storage systems. The City is looking at opportunities for energy storage on our properties and to support its uptake across the city.

Low-carbon technology: Cogeneration and trigeneration are forms of low-carbon technology with opportunities at building, precinct or city-scale to reduce emissions. A cogeneration system generates electricity locally and the waste heat is used to supply heating and hot water. Waste heat can also be converted into cooling via a heat-driven chiller system (trigeneration).

Current electricity rules make the roll out of precinct thermal systems in existing areas of the city financially unfeasible. Hence, our focus is on much smaller opportunities within our own properties (e.g. aquatic centres) and advocating for its consideration in urban development areas, where feasible. The City also support efforts to overcome the current barriers for adding renewable gas to the gas grid, the dominant fuel source for co/trigeneration, and for trading energy locally (which also supports local renewables).

District energy: Urban redevelopment within the city provides a unique opportunity to consider the inclusion of district energy solutions that can have reduced carbon emissions compared with single buildings connected to the national grid. District solutions may include 'mini-grids' that facilitate local renewables being used across multiple buildings (e.g. the City is building a mini-grid to connect community buildings in Green Square). District solutions may also allow for the distribution of thermal energy and recycled water such as in Central Park.

Green Square Town Centre local low-carbon energy: *We will be installing a cogeneration unit and large solar system at the Green Square Aquatic Centre that will provide low carbon electricity and heating to the centre. The City is also building its own 'private wire network' – a local electricity distribution network that will reduce power costs and allow the City to share electricity between its buildings at the South Sydney Hospital Site, the Drying Green and the Aquatic Centre and Gunyama Park. A key benefit of the network is that it will allow the City to share low-carbon (from cogeneration) and renewable energy (from solar PV) between its buildings.*

Since 2006, emissions from our own organisation have reduced by 25 per cent.

An Australian Government Initiative

City of Sydney operations

What we are doing

Since 2006, emissions from our own organisation have reduced by 25 per cent, at the same time as we have delivered more services to a growing population. To continue to reduce emissions in the short-term, we can improve our energy efficiency. Over the long-term, our energy generation must change to be from renewable and low-carbon sources.

We have already made progress to reduce our emissions. Within our own operations we have:

- Achieved annual carbon neutral certification since 2011
- Retrofitted 45 of our major buildings with energy savings measures, reducing their emissions by 25 per cent
- Reduced the emissions from 6,604 City-owned street and park lights by 40 per cent, by replacing them with energy efficient light emitting diode (LED) lights
- Installed solar PV on 28 sites, solar hot water on 12 sites; with another 10 further sites pending installation
- Installed trigeneration at Sydney Town Hall and Town Hall House and started planning for installation of trigeneration or cogeneration at aquatic centres

Our operational targets

Sustainable Sydney 2030 established targets and objectives for energy use and greenhouse gas reductions within our own organisation. Emission reduction targets are absolute targets and do not include offsets.

The renewable electricity target incorporates renewable electricity both within the grid and classified as additional to the grid, such as on-site generation or GreenPower.

Greenhouse gas emissions

- 44 per cent reduction in greenhouse gas emissions by end June 2021, based on 2006 levels
- 70 per cent reduction in greenhouse gas emissions by 2030 based on 2006 levels

Renewable energy

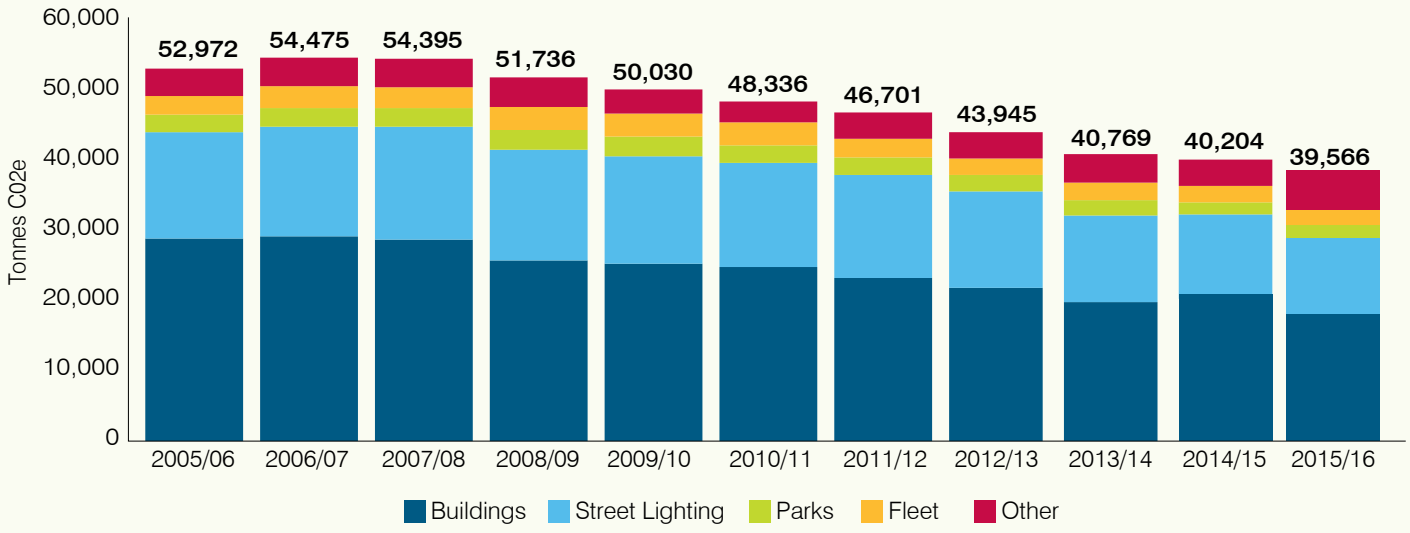
- 50 per cent of electricity demand met by renewable sources by end June 2021

Surry Hills Library and Community Centre is energy efficient and recycles rainwater to irrigate the green roof and adjacent park

How we are tracking

Chart 1[16] tracks our actual annual operational emissions by category.

Chart 1: City of Sydney operations greenhouse gas emissions



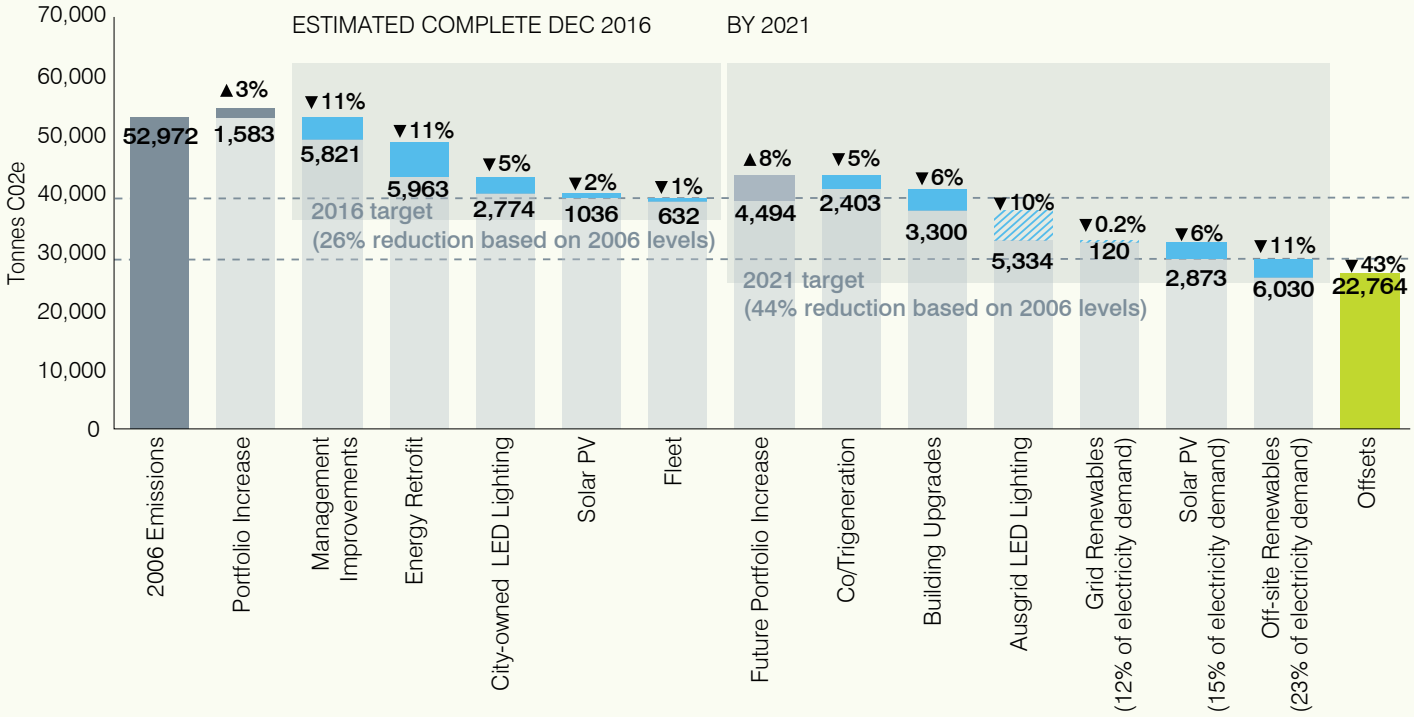
[16] Detailed assumptions for charts are in Appendix 2

How we will get there

As at end-June 2016, the City has a verified emissions reduction of 25 per cent. Chart 2 shows the initiatives that the City has undertaken and the estimated reductions that will be achieved by December 2016. There is a 6-month lag in calculation of emissions reductions due to data availability. Chart 2 also shows the estimated contributions of the initiatives we will implement across our operational portfolio to reduce our emissions by at least 44 per cent by 2021. We will maintain our certified carbon neutral status each year through the purchase of verified offsets for those emissions we cannot eliminate, as we have since 2007.

A full list of assumptions for Chart 2 is included in Appendix 2. Key points related to the chart are listed below.

Chart 2: City of Sydney operations greenhouse gas emissions target to 2021
Estimated contribution of initiatives



Complete

- Portfolio change (+3 per cent) includes removal of some assets e.g Lawson Square and Domain Parking Station; and addition of others including: Ian Thorpe Aquatic Centre, 343 George Street, Mountain Street, Surry Hills Community Centre
- Management improvements (-11 per cent) shows emissions reductions achieved outside of the major efficiency initiatives. This includes improved energy measurement and monitoring, behaviour changes, small works, and the influence of annual weather changes

By 2021

- Future portfolio (+8 per cent) increase assumes the construction of new childcare centres, Green Square sites, pedestrian lighting and other projects
- Co/Trigeneration (-5 per cent) - reductions will be accomplished through the operation of co/trigeneration facilities at Town Hall House, Cook and Phillip Park Aquatic Centre and Ian Thorpe Aquatic Centre
- Building upgrades (-6 per cent) reflects estimated savings from efficiency upgrades in the most resource intensive properties
- Ausgrid LED lighting (-10 per cent) - The City pays for the electricity used by all street lighting in the local government area, however some of these lights are owned by Ausgrid. We will advocate for Ausgrid to upgrade all its street lighting to more efficient LED bulbs. This element is shown as striped to indicate it is not within the City's control
- The contribution of grid renewables (-0.2 per cent) is calculated on the assumption that the current government's Renewable Energy Target of 33,000 gigawatt hours by 2020 will be achieved, however unless brown coal is removed from the grid total emissions are unlikely to reduce
- Solar PV (-6 per cent) on our own properties can deliver 15 per cent of electricity demand if battery storage provides a cost effective solution and the City can take advantage of virtual net metering between our sites
- Off-site renewables (-11 per cent) can be purchased by the City through the GreenPower scheme or directly from a renewable project

The local government area

Progress to date

Despite substantial growth in population and employment, emissions from the local government area have reduced by 19 per cent since 2006. The City has implemented programs to support our residents and businesses in becoming more efficient and to increase the uptake of low-carbon and renewable energy. We are working with Sydney's leading commercial building owners through the Better Buildings Partnership (BBP). In the year ending 30 June 2015, members of the BBP had collectively reduced their emissions by 45 per cent from their 2006 baseline, saving $30 million in avoided electricity costs since 2006.

Within our city are some flagship private sector precinct-scale projects that contribute to emission reductions:

– Barangaroo aims to be the first climate positive precinct in the world, with initiatives including local generation of enough solar renewable energy to service all public areas and the off-site generation of enough renewable energy to power around 5,000 homes
– Central Park's on-site central thermal plant and trigreneration facility provides efficient, low-emission domestic hot water and thermal energy for space heating and cooling across the precinct

What others are doing

Achieving a low-carbon future for our city requires other levels of government to play their part. Key roles and responsibilities include:

The **federal government** has the authority to set national targets for emissions reduction and renewable energy generation, and to drive emissions reduction through market mechanisms such as a price on carbon.

It also sets standards for building energy efficiency through the National Construction Code, in conjunction with the states and territories. The Federal Government established the Commercial Building Disclosure Scheme, which drives energy efficiency improvements in the office sector by requiring disclosure of the energy efficiency of commercial office space to be disclosed at sale or lease. Through the National Energy Productivity Plan, the federal government has a target to improve Australia's energy productivity by 40 per cent between 2015 and 2030; in order to improve competitiveness and reduce energy costs and greenhouse gas emissions.

In November 2016 the **NSW state government** released a new climate change policy framework, with long term objectives for NSW to achieve net zero emissions by 2050, and become more resilient to a changing climate. Following consultation on the policy framework, the NSW government will develop action plans in the areas of advanced energy, energy efficiency and climate adaptation. We anticipate that this will provide many opportunities to help the City achieve its low-carbon future. It influences the environmental performance of buildings through the NSW Building Sustainability Index (BASIX) and the National Australian Built Environment Rating System (NABERS).

If a major urban renewal project within the local government area is declared state significant, the NSW Minister for Planning is the planning authority and thus determines the environmental performance of the development.

The Better Buildings Partnership: *Launched in June 2011, the Better Buildings Partnership recognised by the Global Real Estate Sustainability Benchmark (GRESB) as 'a key influencer in global trends'. Some BBP members were highlighted by the Dow Jones Sustainability Index and GRESB as global leaders in sustainable fund performance. The BBP was recognised as 'Innovator of the Year' for its green leasing work at the 2014 Banksia Awards.*

Local government area targets

Greenhouse gas emissions	– 70 per cent reduction in greenhouse gas emissions by 2030 based on 2006 levels – Net zero emissions by 2050
Renewable energy	– 50 per cent of electricity demand met by renewable sources by 2030[17]

Federal and state targets

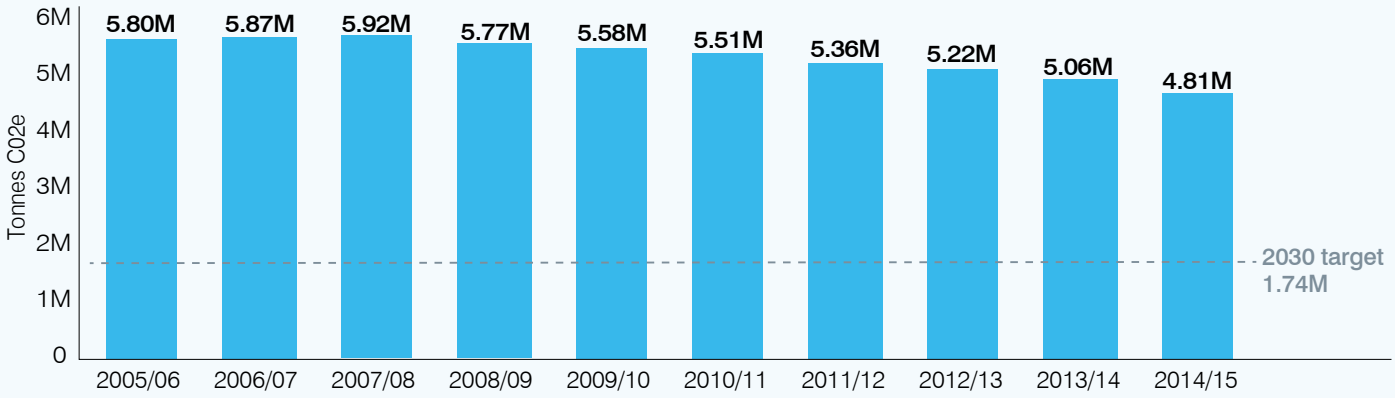
Federal government	– Greenhouse gas emissions reduction: 26-28 per cent from 2005 levels by 2030[18] – Renewable energy target: 33,000 Gigawatt-hour (GWh) of Australia's electricity comes from renewable sources by 2020. This is equivalent to around 23-24 per cent of electricity demand[19] – 40 per cent improvement in energy productivity by 2030[20]
NSW state government	– Greenhouse gas emissions reduction: Achieve net zero emissions by 2050 – Energy efficiency: Achieve 16,000 GWh in energy savings per year by 2020[21]

How the local government area is tracking

Chart 3 tracks actual emissions from the local government area. By mid-2015 (latest available data), emissions had reduced by 17 per cent.

In 2017 we updated the way we report on local area emissions, in order to become compliant with the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC) – the new international benchmark for reporting city emissions. Differences between the methodology previously used by the City and the GPC mean that there has been an adjustment to the data reported in previous years including the baseline.

Chart 3: Local government area greenhouse gas emissions



[17] The renewable electricity target incorporates renewable electricity both within the grid and classified as additional to the grid
[18] http://www.environment.gov.au/climate-change/publications/factsheet-australias-2030-climate-change-target
[19] http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target
[20] https://scer.govspace.gov.au/files/2015/12/National-Energy-Productivity-Plan-release-version-FINAL.pdf
[21] http://www.environment.nsw.gov.au/resources/energyefficiencyindustry/130588-energy-efficiency-action-plan.pdf

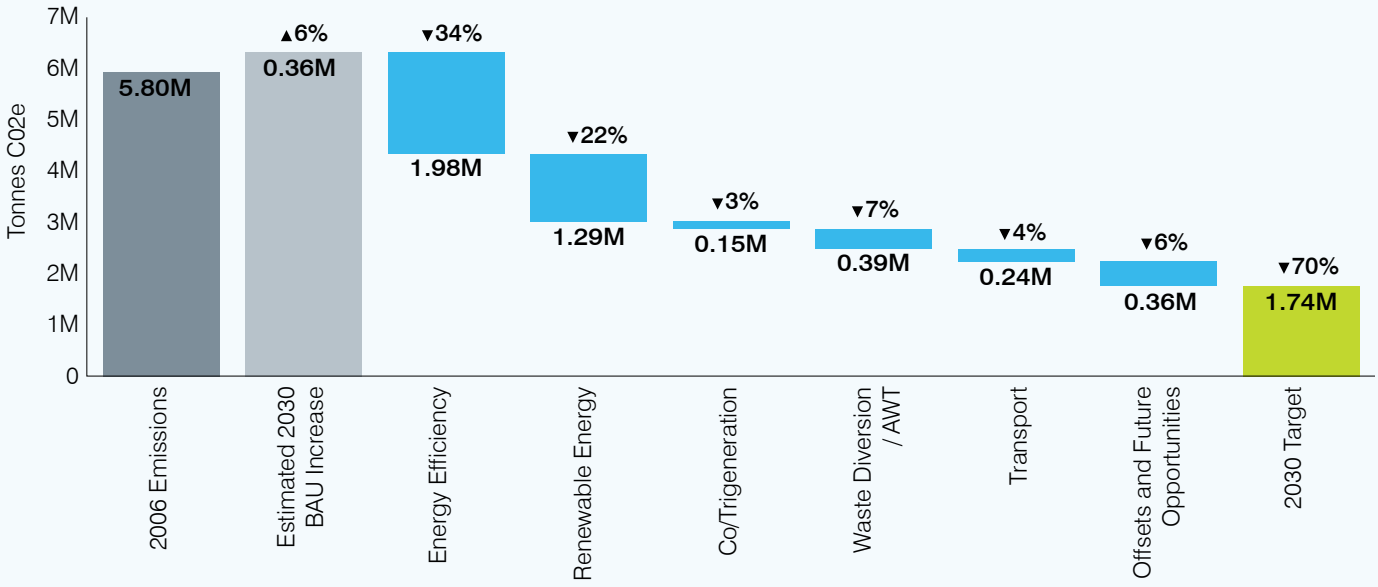
Local government area pathway to emissions reduction

Chart 4 shows the estimated contributions of the initiatives we expect could lead to reduction of the city's emissions by 70 per cent by 2030. The City of Sydney will take a range of actions to drive these initiatives, however city-wide emissions are dependent upon a number of factors outside the City's control.

Appendix 2 provides a set of detailed assumptions for Chart 4. Key points include:

– Energy efficiency (-34 per cent) calculated on the basis of existing and new state and federal government policies and programs
– Renewable energy (-22 per cent) reflects 50 per cent of electricity being provided by renewable sources
– Co/trigeneration (-3 per cent) is based on historic average installation rates
– Waste diversion/AWT (-7 per cent) reflects savings from avoided landfill emissions
– Transport (-4 per cent) emissions reductions would be realised by use of vehicles with lower emissions intensity, and by changing the mode split to move away from car travel and towards public transport and walking and cycling
– Offsets and future opportunities (-6 per cent) includes savings that could be made from transport, waste, renewable energy, energy efficiency, regulatory and/or technological improvements, or other opportunities. Offsets could be purchased by those entities generating emissions

Chart 4: Local government area greenhouse gas emissions target
Estimated contribution of initiatives



By 2021, the city and our own operations will use energy more efficiently and opportunities to generate local renewable and low-carbon energy will have been progressed.

Outcomes and actions

By 2021, the local government area and our own operations should use energy more efficiently and opportunities to generate local renewable and low-carbon energy have been progressed. Overall, greenhouse gas emissions should be significantly reduced.

The following are outcomes we want to see by 2021 and the types of actions the City will take to drive these outcomes directly where we have control, and through advocacy and partnership where we do not.

Outcome: The City's properties showcase energy efficiency and local renewable and low carbon energy generation.

The types of actions the City will take are to:

- Continue efficiency retrofits in City-managed properties, and improve management and reporting systems
- Install solar, renewable energy, low carbon (trigeneration) systems and energy storage infrastructure at City properties

Outcome: The City's planning and regulatory controls promote energy efficiency and local renewable and low carbon energy generation.

The City will:

- Investigate the introduction of NABERS Energy Commitment Agreements for new commercial office buildings and major commercial office refurbishments over 500 sqm or 1000 sqm
- Encourage energy efficiency and renewable energy through design excellence competitions, voluntary planning agreements and other planning instruments such Development Control Plans (DCP) and Local Environmental Plans (LEP)
- Identify ways to support improved compliance with environmental conditions during design and construction

Outcome: Our residents and businesses are empowered to proactively reduce energy use and greenhouse gas emissions.

We will work collaboratively to:

- Identify actions to help owners and tenants improve energy performance in specific sectors
- Promote the uptake of energy efficiency and renewable energy opportunities

Outcome: More efficient operational performance of existing buildings.

Our work will:

- Develop and deliver an energy focused retrofit program for apartments
- Help address key barriers to action in improving environmental performance through the City's environmental performance grants programs

Solar panels provide green energy to Sydney Town Hall

Outcome: Exemplar net zero carbon buildings or precincts are under development in the city.

We will:

– Create a net zero challenge to facilitate Sydney's first net zero buildings
– Develop a net zero carbon buildings roadmap

Outcome: Early adoption of innovative energy technologies and delivery methods is increased.

We will:

– Invest up to $10 million to accelerate the uptake of renewable energy by our local businesses and residents, with a preference for local sources where feasible
– Provide grants to support the adoption of new environmental innovations in the local market
– Advocate for incentives that encourage developments to go beyond minimum energy performance

Outcome: State and federal policy and regulation supports energy efficiency and local renewable and low-carbon energy generation.

We will advocate for changes that will:

– Reward local generators for reducing the future costs for electricity networks
– Allow local electricity consumers to directly purchase power from local generators
– Increase minimum environmental standards in building codes
– Introduce mandatory ratings disclosure for residential apartment building energy performance
– Extend the Commercial Building Disclosure program to more building types and to a lower threshold
– Establish a price on carbon and a higher national renewable energy target

For a comprehensive list of actions the City will take to reduce emissions, please see Appendix 1: Action Plan.

Relevant links

– Sustainable Sydney 2030
– Energy Efficiency Master Plan – improving energy productivity: 2015-2030
– Residential Apartment Sustainability Plan: 2015
– Decentralised Energy Master Plan - Renewable Energy: 2012-2030
– Decentralised Energy Master Plan – Trigeneration: 2010-2030

05 Water sensitive city

To keep our cities cool, we need to keep them green and to do so, we need water.

Background

Water is crucial to the social, economic and environmental wellbeing and survival of our city. The predicted impacts of climate change are expected to intensify Australia's drought, heat and flood cycles. Our city's forecast population growth to 2030 will increase the use of our green public spaces, placing pressure on these spaces to remain green and our waterways to stay clean.

Cities are often warmer than rural areas because vegetation is replaced with hard structures, such as roads, footpaths and buildings; this is known as the urban heat island effect. To keep our cities cool, we need to keep them green and to do so, we need water.

Past climatic conditions have caused the city serious water security concerns. The predicted impacts of climate change and population growth will strain our potable water (treated water that is safe enough for consumption) supplies, with potable water demand estimated to be 30 per cent higher in 2030 than in 2006. We must conserve our valuable water resources to accommodate these impacts. Alternative water resources must increase to drought-proof our city and keep it green and cool.

The City is transforming to be a water sensitive city that is resilient, cool, green and productive. Our water management approach to meet these targets involves:

- Using less water through changes in behaviour and using water efficient fixtures and fittings
- Capturing alternative water sources to recycle and use for non-potable purposes
- Reducing stormwater pollution, minimising local flood risk, enhancing greening and urban cooling through retrofitting the stormwater management network with raingardens, wetlands, swales and gross pollutant traps

Our approach will drought-proof our city to ensure we can use water when it is hot and dry. Our waterway health will be improved and non-potable water supplies will be safe-guarded for use in the next century and beyond.

Green Square Town Centre water reuse project:
In 2013, the City contracted Flow Systems to design, construct, operate, and maintain the Green Square Water Reuse project for up to 10 years. The project will extract stormwater from the proposed trunk drainage system, delivered by the City and Sydney Water. A recycled water treatment plant and pump station will be constructed at the former South Sydney Hospital site. The project will deliver up to 320 million litres of recycled stormwater annually to new buildings and open spaces in the Green Square Town Centre. Valuable potable water will be saved and open spaces will be green and drought resistant through the use of this alternative supply of water. By re-using stormwater, this scheme will also prevent stormwater pollution entering the Alexandra canal and ultimately the Cooks River.

Raingardens filter pollution from stormwater, minimise local flood risk and keep our city green and cool

Issues and opportunities

Conserving valuable potable water: Our large and remote dams capture and treat rainwater to drinking water standards, but we only need half of this for potable purposes. The rest is used for non-potable purposes, such as toilet flushing, air-conditioning cooling towers and irrigation of our parks and gardens. Installing water efficiency measures, such as smart meters to detect leaks, more efficient irrigation systems and water efficient fixtures and fittings can save water.

Stormwater management: The city has one of the oldest sewerage and stormwater drainage infrastructures in Australia. Traditionally large pipes and channels remove excess stormwater from the city to minimise flooding risk and damage. The stormwater enters our waterways with large amounts of litter, other pollutants and nutrients. By incorporating stormwater management systems such as raingardens into our streets and parks, stormwater is slowed down and filtered, reducing pollution entering our waterways.

Alternative and recycled water resources: Stormwater harvesting and wastewater recycling present enormous opportunities for the City to save potable water and improve waterway health. Most stormwater and wastewater from the city is discharged to the ocean, rivers or Sydney Harbour. Unlike most water sources, wastewater is produced every day in our city's homes and businesses and does not rely on rainfall. It can be captured and treated to provide our future communities with a continuous water source. This approach reduces demand on the centralised water supply and may reduce the need for major water and wastewater network investment in the future to meet increased demand.

Keeping our city green, cool and resilient: Using stormwater and wastewater as alternative water resources will keep our parks green during droughts and reduce the urban heat island effect by keeping our city cooler. Our city will remain attractive to visitors and residents and our community's health and wellbeing will be enriched.

Responding to the risk of increased flooding as a result of climate change is addressed in chapter 6: Climate resilient city.

Pirrama Park won a Green Flag award for design and sustainability

City of Sydney operations

What we are doing

The City is already working on projects to keep our city cool and green and our waterways clean. We are:

– Installing smart meters to detect and fix leaks in our parks and properties
– Connecting our parks and buildings to alternative water supplies, such as harvested stormwater and rainwater
– Upgrading park irrigation systems to be more efficient
– Retrofitting our high water-using properties with water efficient fixtures and fittings
– Incorporating raingardens and swales during streetscapes and open space upgrade projects

Our operational targets

Our 2021 target across our own operations is to maintain 2006 potable water consumption levels. We plan to achieve this by using water more efficiently and unlocking recycled or alternative water sources.

Water consumption

– Zero increase in potable water use by end June 2021 from 2006 baseline, achieved through water efficiency and recycled water
– Annual potable water use of 180L/m^2 of irrigated open space

Central Park's stunning green walls are irrigated by water recycled on-site by a private water utility

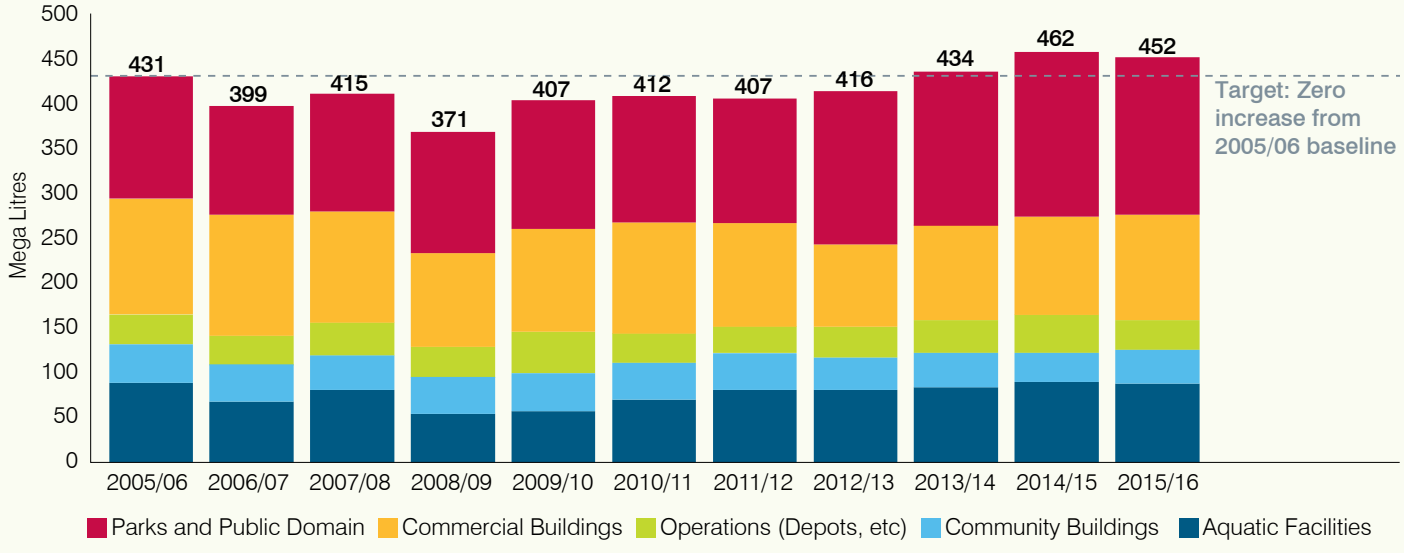
How we are tracking

Chart 5[22] shows annual potable water consumption by category for our own operations against our target to see a zero increase from the 2005/06 baseline. On average, annual water consumption has been below the baseline. Recent reporting periods saw water use rise above the baseline due to a water leak at a depot, establishing new plants in the Sydney Park wetland system and periods of low rainfall requiring more water for irrigation of our parks.

The 2015/16 period saw a reduction in consumption and we estimate further reductions will be realised in the forthcoming reporting period.

This chart has been updated to reflect improvements in our data management processes, which have resulted in an increase in reported consumption in all periods including the baseline. Refer to Appendix 2 for further information.

Chart 5: City of Sydney operations potable water use



[22] Detailed assumptions for charts are in Appendix 2

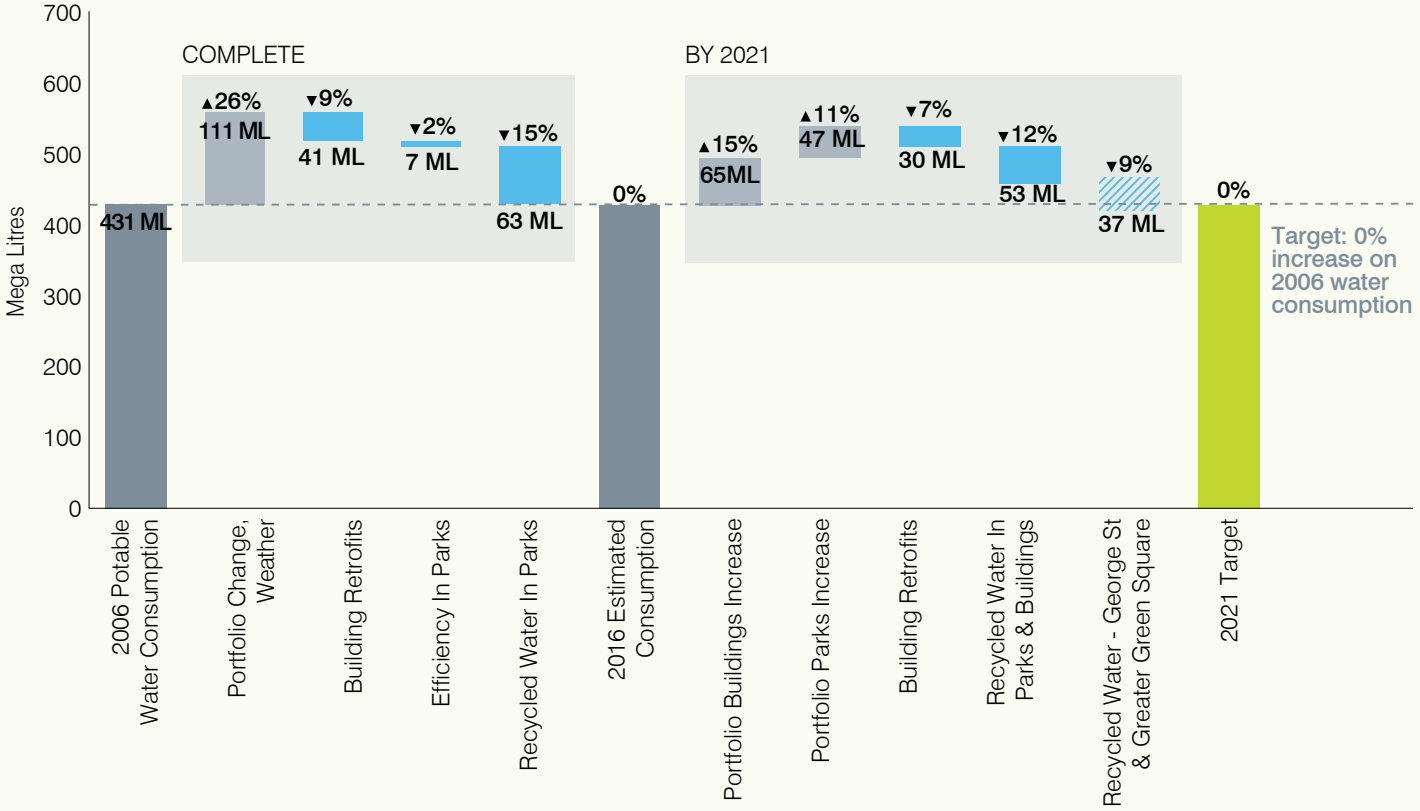
How we will get there

Chart 6 shows the estimated contributions of the initiatives we plan to implement across our operational portfolio to meet our target to maintain our potable water use at 2006 levels. The 'Complete' section illustrates estimated savings from initiatives as at 31 December 2016. Data for the period from July to December 2016 has been estimated, and based on this estimate we are on track to meet our interim target of zero increase in potable water use from 2006 baseline by December 2016. There is a six month lag in availability of actual consumption data.

Detailed assumptions for Chart 6 are provided in Appendix 2. Key points related to achievement of the 2021 target are:

- Looking toward 2021, the City will be required to increase service delivery as the population of our local area grows. This will see an increase in water demand from our portfolio of buildings (+15 per cent) and from new parks (+11 per cent)
- Building retrofits (-7 per cent) reflects estimated savings from retrofits of the City's most resource-intensive properties
- Recycled water in parks and buildings (-12 per cent) estimates the savings that could be achieved from identified future City stormwater harvesting schemes including Green Square Town Centre
- Recycled water schemes along George Street and in Greater Green Square (-9 per cent) could achieve significant reduction in potable water demand for the City, but are highly dependent upon the support of the state government and the private sector

Chart 6: City of Sydney operations potable water use target
Estimated contribution of initiatives



The local government area

Progress

We are supporting businesses and residents to save water and use alternative water sources:

- 620 businesses engaged in our Smart Green Business program are collectively saving over 1 gigalitre (GL) of potable water annually through water efficiency measures
- Green Square Town Centre is delivering a large precinct-scale recycled water project
- Private water utilities have installed wastewater recycling schemes in urban renewal areas, such as Barangaroo and Central Park

Although strong progress has been made, there are more opportunities to be unlocked and explored to become a truly water sensitive city.

What others are doing

There are a number **NSW government** entities that have a significant influence over water outcomes in our local area:

- Water NSW – Catchment management and raw water supply
- Metropolitan Water Directorate – Water planning for greater Sydney and the lower Hunter including the Water Industry Competition Act
- Sydney Water – Provides water, wastewater and trunk stormwater services
- IPART – Determines Sydney Water pricing, regulates the Water Industry Competition Act
- Environmental Protection Authority – Environmental regulation and licencing
- Department of Planning and Environment – Determines water efficiency standards in new buildings through the BASIX tool
- If a major urban renewal project within the local government area is declared state significant, the NSW Minister for Planning is the planning authority and thus determines the environmental performance of the development

Private utilities can offer water, wastewater and stormwater services to residential and business customers, under the Water Industry Competition Act. They are often the owners and/or operators of building and precinct-scale recycled water schemes.

Local government area targets

Water consumption	– Zero increase in potable water use by 2030 from 2006 baseline, achieved through water efficiency and recycled water
Stormwater quality	– 50 per cent reduction in the annual solid pollution load discharged to waterways via stormwater by 2030 – 15 per cent reduction in annual nutrient load discharged to waterways via stormwater by 2030

State targets

NSW state government	– Use of recycled water in Sydney: 70 billion litres a year by 2015, 12 per cent of water demand[23] – Water efficiency programs: saving 145 billion litres a year by 2015, 24 per cent of Sydney's water needs[24]

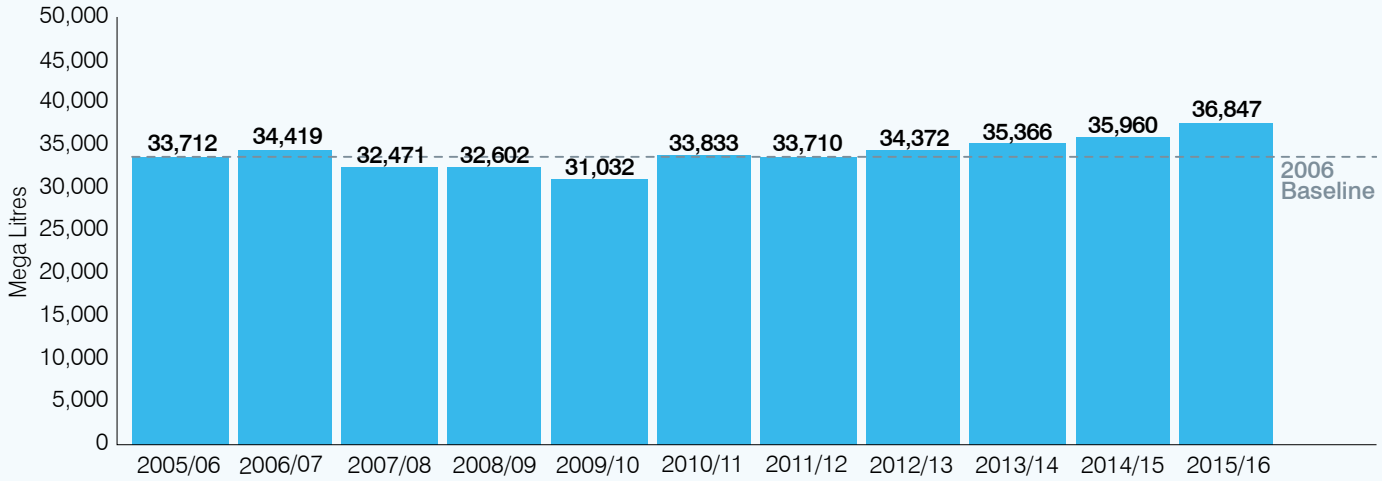
[23] http://www.metrowater.nsw.gov.au/planning-sydney/recycling/recycled-water-targets
[24] http://www.metrowater.nsw.gov.au/planning-sydney/water-efficiency/water-efficiency-targets

Sydney Park's wetlands manages water runoff, filters pollutants and increases rainwater permeation to reduce flood risk

How the local government area is tracking

Chart 7[25] shows annual potable water consumption across the city against our 2006 baseline, during which time the city's population has grown at least 11 per cent. The removal of state government-imposed water restrictions and increased growth in the local area have resulted in annual consumption rising above the baseline in recent years.

Chart 7: Local government area potable water use



[25] Detailed assumptions for charts are in Appendix 2

Local government area pathway to potable water use target

Water efficiency programs, environmental performance grants and recycled water schemes will continue to relieve pressure on our potable water supplies. However, our increasing population and the need to keep our city green and cool means we need to use more water, though it does not all need to be potable water.

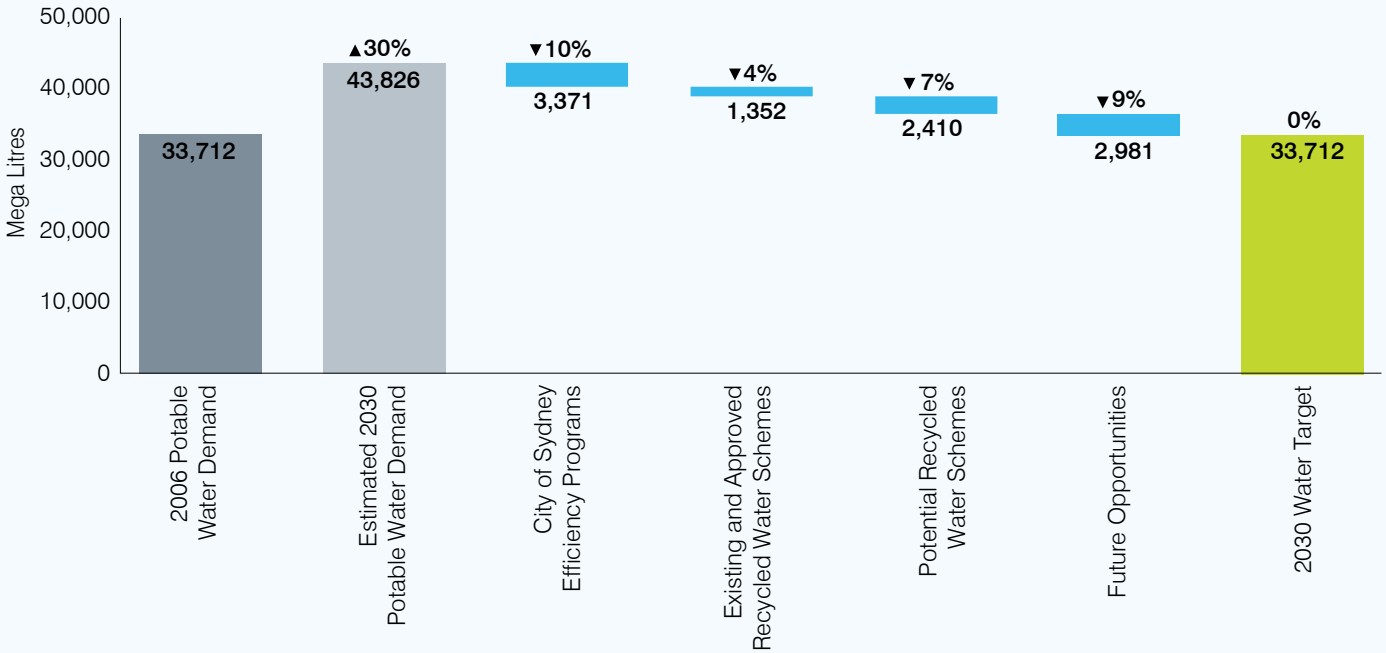
Chart 8 shows the estimated contributions of the initiatives we believe could minimise the amount of potable water consumed in the local government area by 2030, despite the growth that the area will see in that time. The City of Sydney will take a range of actions to drive these outcomes, however city-wide water consumption is influenced by a number of factors outside the City's control.

A full set of assumptions for Chart 8 are provided in Appendix 2. Key points are highlighted below:

– City of Sydney efficiency programs (-10 per cent) help residents and business to reduce water consumption
– Existing and approved recycled water schemes (-4 per cent) savings are calculated on the basis that all these schemes are operating at full capacity
– Potential recycled water schemes (-7 per cent) reflects opportunities for additional recycled water infrastructure, for example the potential to include recycled water schemes in urban renewal areas that are redeveloped by the NSW state government

Even if all identified opportunities for recycled water infrastructure are implemented, 2030 potable water use across the city will most likely exceed 2006 levels by around nine per cent. The City will need to work with Sydney Water, as well as other government entities and the private sector to identify opportunities for water conservation, recycling and alternative water supply to safeguard potable water supply and meet the predicted increased demand on water supplies.

Chart 8: Local government area potable water use target
Estimated contribution of initiatives



Outcomes and actions

The following are outcomes we want to see by 2021 and the types of actions the City will take to drive these outcomes – directly where we have control, and through advocacy and partnership where we do not.

Outcome: The City's assets are water efficient and incorporate water sensitive urban design features and recycled water infrastructure.

The types of actions the City will take are to:

– Adopt water efficiency measures in design and operation of City buildings and parks
– Identify opportunities to connect City buildings and parks to alternative water supplies
– Retrofit the city's stormwater network with gross pollutant traps, raingardens, swales and wetlands

Outcome: The City's planning and regulatory controls promote water efficiency, water recycling and improved stormwater quality.

We will:

– Facilitate water efficiency and recycled water use through design excellence competitions, voluntary planning agreements and other planning instruments, such as Development Control Plans (DCP) and Local Environmental Plans (LEP)
– Identify ways to support improved compliance with environmental conditions during design and construction

Outcome: Our community and businesses are empowered to use water wisely.

Our actions will:

– Provide environmental performance grants that are targeted to help address key barriers to improving water efficiency
– Identify actions to help owners and tenants improve water efficiency in specific sectors
– Engage the community on the importance of a water sensitive city

Outcome: Accelerated market adoption of innovative water recycling technologies and business models.

We will work to:

– Facilitate recycled water projects in established areas
– Encourage water sensitive precincts and water recycling in public and private urban renewal areas
– Promote Environmental Upgrade Agreements or other appropriate funding mechanisms for water efficiency, dual plumbing and recycled water projects

Outcome: State and federal regulation supports water efficiency, water recycling and improved stormwater quality.

We will advocate for:

– Higher BASIX targets that encourage greater efficiency and more recycled water projects in residential buildings
– Water pricing that supports efficiency and the viability of alternative water sources
– Integrated urban water management by improving Sydney Water's stormwater and sewage overflow impacts on waterways and the ocean

For a comprehensive list of actions the City will take to become a water sensitive city, please see Appendix 1: Action Plan.

Relevant links

– Decentralised Water Master Plan: 2012-2030

Sydney Park Water Reuse Scheme: *Sydney Park harvests and cleans pollutants from 50 million litres of stormwater annually. This clean water source supports surrounding wetlands, which supply water for irrigation back to the park. Sydney Park also has the potential to supply recycled water to the local area. A recent upgrade will allow around 850 million litres of stormwater to be captured and cleaned annually, with at least 50 million litres re-used within the park.*

06 Climate resilient city

Our city is expected to be three times more prone to heatwaves; and extreme storm or flash flooding events will be twice as likely by 2070.

Background

Our *Adapting for Climate Change* strategy (adopted in 2015) looks to 2070 to assess, and adapt to, the risks posed by climate change for the city. This *Environmental Sustainability Strategy* focusses on near-term climate adaptation outcomes and actions.

Australia's climate has become warmer since national records began in 1910, with the average surface air temperature now warmer by 0.9˚C. As a result, we have already seen local evidence of the effects of climate change.

Our city is expected to be three times more prone to heatwaves; and extreme storm or flash flooding events will be twice as likely by 2070.

Alongside the recent COP21 global agreement to limit global temperature rise to less than 2˚C, the City has committed to the Paris Pledge for Action and the Paris City Hall Declaration to achieve climate stability. Both commitments demonstrate strong global political agreement for a climate resilient economy. We are also part of the C40 Cities Climate Leadership Group.

This chapter is focused on adaptation, with mitigation strategies covered in other chapters. The adaptation initiatives included here are those things the City will do to help both our own organisation, and the local government area, adapt to climate change. We have identified the likely climatic changes and the resulting impacts to help prioritise our responses. Our strategy sets out what we need to do and how our thinking and planning must change over the coming decades. As the responses are broad and long-term in nature they do not lend themselves to targets as used in climate mitigation policy development.

Issues and risks

Increasing heat: Projections are for Sydney's average temperatures to increase and the hottest days to become hotter and more frequent. The impacts will strain energy and transport infrastructure systems and increase air pollution and community health problems.

C40 Cities Climate Leadership Group: *Created and led by cities, the C40 Cities Climate Leadership Group (C40) represents more than 80 global cities, 500 million people and one-quarter of the global economy. C40 focusses on driving urban action to reduce emissions and climate risks, while increasing the health, wellbeing and economic opportunities of cities. The City is an active member in the C40 Climate Change Risk Assessment Network that exchanges ways to build more resilient cities.*

Changing rainfall patterns and drought conditions: Sydney's rainfall pattern will continue to have dry periods and wet spells, but also increases in more intense storms, posing flooding risks. Increased drought conditions will place pressure on the city's public open spaces to stay green.

Increased bushfire conditions and declining air quality: Conditions that contribute to bushfires may increase and, though our local area is not at direct risk from bushfires, the smoke will cause poor air quality. This will lead to respiratory difficulties and potential hospitalisation of residents.

Rising sea levels: Events where a king tide, storm surge and wind and wave effects occur, known as inundation events, are likely to increase as sea levels rise. Although this is a longer-term risk for our city, we are working with other local governments to address this, and other, coastal management issues.

Increased social impacts: Climate change presents a wide range of risks that may impact our community. Our day-to-day thinking must include climate adaptation principles as we plan for, and provide, services and infrastructure to our community, being mindful of the increased impact on vulnerable and disadvantaged members of our community.

The City's aquatic facilities provide relief during extreme heat

What we are doing

The City is already actively adapting to climate change. Within our own operations and the city, we have already:

– Planted 11,017 new street trees since 2005 and installed 57,752 square metres of landscaping throughout the city's streets since 2008
– Conducted floodplain management studies and prepared plans for several of the city's major water catchment areas
– Made significant investments in stormwater management infrastructure to mitigate local flooding

This strategy outlines near-term initiatives to adapt to the identified risks posed by a changing climate.

What others are doing

In December 2015, the federal government released a National Climate Resilience and Adaptation Strategy, which sets out how Australia is managing climate risks for the benefit of the community, economy and environment. It identifies a set of principles to guide effective adaptation practice and resilience building, and outlines the government's vision for the future.

The NSW government's AdaptNSW website provides a wealth of information on the impacts of climate change in NSW and the actions that the NSW state government is taking to help the community adapt. AdaptNSW uses the outputs from the NARClim climate model to provide regionally-specific data on which to base decisions. This model was also used to sense-check the City's adaptation planning.

Outcomes and actions

Together with residents, workers and visitors, we will adapt to make our city more resilient to a changing climate, while maintaining the wellbeing and prosperity of our global city. This section communicates the outcomes we want to see and the types of actions and initiatives we will take to adapt to climate change.

Outcome: Sydney's residents, workers, visitors and ecology will be healthy and productive. Vital infrastructure will be resilient during periods of extreme heat.

To support the community to become more resilient, we will:

– Develop a heatwave response plan aligned with the NSW state heatwave sub-plan
– Raise awareness and understanding of heatwaves, air pollution, bushfires and other climate-related events
– Work with energy companies to assess the trigger points and extent of potential vulnerability of the cty's energy supply

Outcome: The City will be prepared for a future with less overall rainfall, while also being ready to deal with heavy rainfall, flooding and storms when they occur.

To adapt to changing weather conditions, we will:

– Assess the vulnerability of our properties to extreme weather and flood risk
– Work with emergency services to plan, prioritise and coordinate responses
– Incorporate existing challenges and predicted changes into land use planning, control and infrastructure design

Green Square flood management: *The Green Square redevelopment site was formerly a wetland, prone to flooding. To transform the site into a new town centre, a major new residential, retail and cultural hub, a flood risk adaptation solution was necessary. The Green Square Trunk Stormwater Project, co-funded by the City and Sydney Water, has installed a 2.5 kilometre stormwater pipe to reduce flood hazard and flood depth in the area.*

Outcome: The Sydney community will be prepared for, and aware of, how to respond in periods of bushfire and poor air quality.

To reduce the impacts, we will:

– Contribute to the emergency response to poor air quality events from bushfires and educate the community about related health risks

Outcome: The City will be aware of the risks posed by rising sea level and will coordinate its response with the NSW state government, land and infrastructure owners and residents in coming decades.

To plan for impacts from rising sea level, we will:

– Develop a sea level rise adaptation action plan for at-risk foreshore areas and assets
– Assess sea level rise and storm surge impacts on planning and flooding standards
– Advocate for a consistent NSW state planning framework to address sea level rise and storm surge

Outcome: The City will be prepared for the likely impacts of the changing climate and will provide a coordinated response with our community, businesses and other levels of government.

To prepare, we will:

– Incorporate climate adaptation into our future decision-making and collaborate with utilities and local businesses to adapt
– Advocate for revision of engineering and building standards to make buildings more resilient
– Partner with leading government agencies to coordinate inter-agency responses

For a comprehensive list of actions the City will take to adapt to the impacts of climate change, please see the Appendix 1: Action Plan.

Relevant links

– Adapting for climate change – a long term strategy for the City of Sydney: 2015-2070

07 Zero waste city

We want to throw away less and do more with what we throw out.

Background

The City is responsible for collecting and managing around 75,000 tonnes of waste annually from more than 100,000 households[26], as well as City-managed assets, parks and public places. By 2030, residential waste is forecast to grow to nearly 80,000 tonnes annually.

Businesses are responsible for collecting their own commercial and industrial waste and produce around 267,000 tonnes of waste annually, or 80 per cent of the city's total waste. By 2030, waste from this sector is forecast to grow to 307,000 tonnes annually[27].

Sustainable Sydney 2030 set the objective that waste from the city be managed as a valuable resource and the environmental impacts of its generation and disposal be minimised.

The City will continue to focus on improved management of waste within its own operations. We will also work with the city's residents and businesses to encourage waste re-use, recycling and recovery of energy from the waste we generate. In short, we want to throw away less and do more with what we throw out.

Waste awards: *The City won the top award for 'Excellence in Energy, Water and Waste Efficiency – Waste and Recycling' at the 2015 Green Globe Awards. A Local Government NSW Resource Recovery Award at the 2015 Local Government Excellence in the Environment Awards was also achieved. Both awards recognised the City's Zero Waste program to drive behaviour change and the uptake of the City's resource recovery services.*

Issues and risks

Environmental impacts of landfill: The environmental impact of sending waste to landfill is significant. Landfill sites generate methane, a greenhouse gas that is 25 times more potent than carbon dioxide. Emissions from waste account for 5 per cent of the total emissions from our local area.

Limited landfill capacity: Although we are recycling more, our growing population will increase the amount of waste we generate, not all of which is currently recyclable. Residential and commercial development growth also places restrictions on suitable land for new waste infrastructure. Sydney is rapidly running out of local landfill capacity. Due to competing land priorities in the metropolitan area, waste treatment infrastructure is built further away from where the waste is produced.

Increased housing density: Residential apartments make up 75 per cent of households in the city. Many of these households have competing demands for space, particularly storage allocation for waste and recycling, which can contribute to illegal dumping of unwanted items. Where no storage is available, mobile garbage bins are often left on the footpath. These bins, and illegal dumping, cause obstructions, odour issues and contribute to perceptions of an area being unsafe.

Where recycling services are available, contamination of recycling streams is an ongoing problem in apartments, causing some recyclable materials to enter landfill.

[26] As at end 2015

[27] Commercial and industrial waste figures are 2012 estimates from the City's Advanced Waste Treatment Master Plan. No mechanism currently exists for collation of commercial waste tonnage data at a local government level.

The City holds quarterly e-waste recycling events for residents to recycle batteries, light bulbs and mobile phones

E-waste recycling: *Australians generate more than 140,000 tonnes of electronic waste (e-waste) annually with most of it sent to landfill. This places more pressure on limited landfill capacity and this waste stream contains hazardous toxic materials. The City's quarterly e-waste recycling events for residents have diverted 419 tonnes of e-waste from landfill since 2008 and recycled 98 per cent of all material recovered. Since 2013, our library and community centre recycling stations have recycled 3.5 tonnes of household batteries, light bulbs and mobile phones.*

Understanding behaviour and improving waste data: The City provides recycling services to households, but not commercial and industrial premises, the biggest producers of waste volumes in the city. Tracking of waste quantities and recycling rates from this sector is difficult because it is managed by many independent waste operators.

Accessing better quality waste data, to track and monitor our city's different waste streams to their final destination, presents an opportunity for the City. By understanding the lifecycle of the city's waste, we can better understand behaviours and introduce measures that minimise waste, avoid landfill and recover valuable resources.

Economic benefits from resource recovery: Sending waste to landfill has the least economic and environmental benefit. While waste disposal costs continue to increase, recycling certain materials has a market value.

Separating recyclables for reprocessing into new products presents great opportunities. To maximise total resource recovery, and minimise waste entering landfill, the City needs to investigate solutions for advanced waste treatment (AWT) of the remaining items.

AWT facilities typically capture any missed recyclables for processing and garden and food waste for composting, with the remaining waste sent to landfill. Some AWT facilities can also turn the remaining waste into a valuable energy resource.

Such a solution would provide an alternative energy resource and help the City to avoid emissions from waste sent to landfill. It would also make a contribution to our 2030 target of reducing emissions by 70 per cent.

City of Sydney operations

What we are doing

– Separating recyclables from our buildings by source; including paper, cardboard, plastic containers and printer cartridges
– Composting green waste collected from our parks for re-use on site
– Sending construction and demolition waste from City of Sydney managed infrastructure and maintenance projects to a local recycling centre for reuse, recovery and reprocessing

Our operational targets

Sustainable Sydney 2030 communicated objectives for treating waste as a valuable resource. This strategy adopts targets to 2021 for our own operations

Recycling and resource recovery

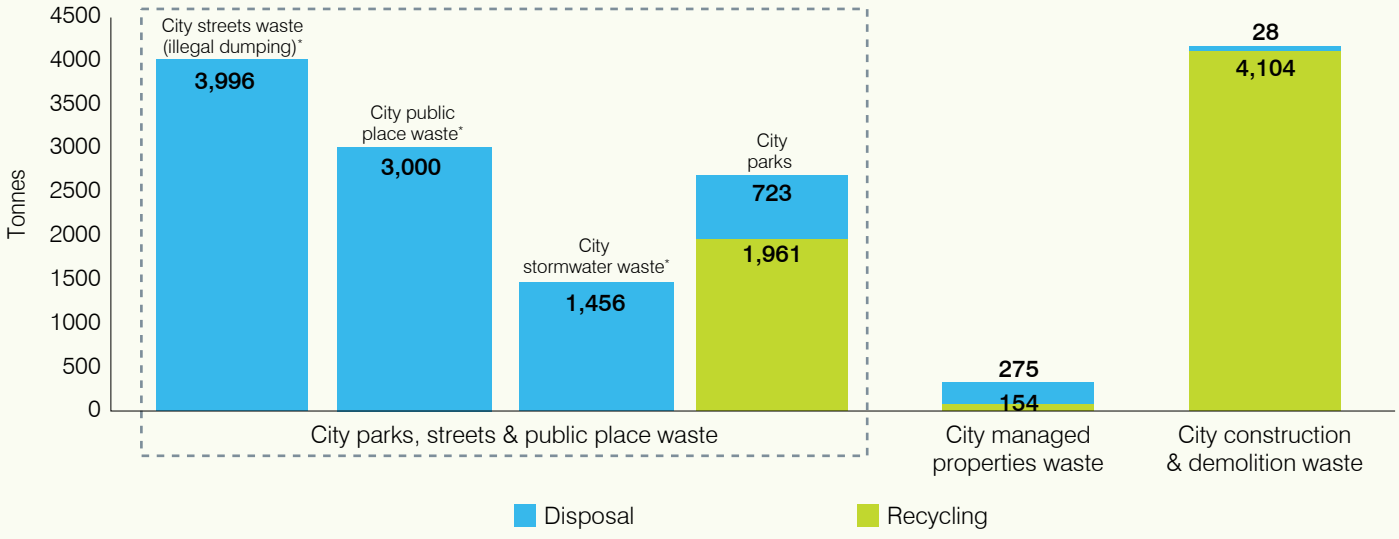
– 50 per cent resource recovery of waste from City parks, streets and public places by end June 2021
– 70 per cent resource recovery of waste from City managed properties by end June 2021
– 80 per cent resource recovery of construction and demolition waste generated and managed by City operations by end June 2021

How we are tracking

The City has recently completed an organisation wide review into the way in which it collects, reports and verifies recycling and landfill diversion performance data, to significantly improve accuracy and transparency of our reporting. The review identified issues with the accuracy of waste data from our contractors and also additional waste streams and volumes not previously accounted for. As a result the overall resource recovery rate is now estimated at 35 per cent for waste from City-managed properties.

Chart 9[28] shows the current management of the waste streams identified as part of the review, including the additional waste streams (marked with an asterisk). The City is committed to implementing solutions for improved recycling performance of these additional streams.

Chart 9: City of Sydney Operations Resource Recovery (2015/16)



[28] Detailed assumptions for charts are in Appendix 2

Greenhouse emissions from waste account for five per cent of the total emissions from our local area.

The local government area

Progress to date

The City is already focused on avoidance and recycling measures to reduce the amount of waste sent to landfill from the city:

- We divert up to 69 per cent of residential waste annually from landfill by reprocessing recyclables and composting food and garden waste
- Since 2011, all of our city's domestic waste has been processed at advanced waste treatment facilities, ensuring that no domestic waste is sent directly to landfill
- The City has upgraded 1,670 residential apartment building bin rooms since 2010 to improve waste management and recycling
- As a member of the Better Buildings Partnership, the City is working to improve commercial sector monitoring and management of waste generation and recycling recovery

These initiatives help to avoid much of our city's waste entering landfill and to recover valuable materials for recycling.

What others are doing

Achieving a zero waste future for our city requires other levels of government to continue to play their part and deliver solutions to issues that go beyond local government boundaries. A summary of key federal and state waste initiatives is provided here:

The **federal government** devolves much of waste management to the state and territory governments. National legislation for waste is generally limited to a number of select areas including: tracking controlled wastes between States and Territories, environmental reporting for greenhouse gas, energy, packaging and product stewardship.

The **NSW state government** has produced a Waste Avoidance and Resource Recovery Strategy (WARR Strategy) 2014-21. The state targets aim to drive the efficient use of resources, reduce the environmental impact of waste and improve the well-being of the NSW environment, community and economy using the following mechanisms:

- NSW Waste and Environment levy – the levy is a key economic instrument used in NSW to drive waste avoidance and resource recovery. Licensed waste management facilities in NSW are required to pay a waste levy for each tonne of waste received for disposal at a landfill. The levy can be used to drive the uptake of AWT solutions.
- Waste less, Recycle More funding initiative - a $465.7 million, five year program to assist with development of new and upgraded waste infrastructure, community recycling centres, business recycling, market development and tackling illegal dumping and litter. Local governments can apply for funding.

Local government area targets

Recycling and resource recovery

- 70 per cent recycling and recovery of commercial and industrial waste from the city by end June 2021
- 70 per cent recycling and recovery of residential waste from the city by end June 2021
- 80 per cent recycling and recovery of construction and demolition waste from the city by end June 2021

State targets

NSW state government

- Reduce the rate of waste generation per capita
- Increase recycling rates for municipal solid waste (MSW) from 52 per cent (in 2010–11) to 70 per cent by 2021
- Increase recycling rates for commercial and industrial (C&I) waste from 57 per cent (in 2010–11) to 70 per cent by 2021
- Increase recycling rates for construction and demolition (C&D) waste from 75 per cent (in 2010–11) to 80 per cent by 2021[29]

[29] All targets from http://www.epa.nsw.gov.au/wastestrategy/warr.htm

The City is encouraging residents to be active in community composting to reduce this waste stream from entering landfill

How the local government area is tracking

Chart 10[30] shows recycling levels in 2015 across the city against the targets we have set for 2021 and the NSW state government's targets.

The City does not have control over the collection and disposal of commercial and industrial waste. Waste generators make their own arrangements for collection and disposal of waste, and thus determine how waste is treated and what level of resource recovery is achieved. The City has a number of programs in place to support commercial and industrial businesses to improve resource recovery.

Chart 10: Local government area resource recovery targets

[30] Detailed assumptions for charts are in Appendix 2

Outcomes and actions

The following are outcomes we want to see by 2021 and the types of actions the City will take to drive these outcomes directly where we have control, and through advocacy and partnership where we do not.

A comprehensive list of waste actions will be defined in the forthcoming Waste Strategy.

Outcome: Best practice waste avoidance and recycling practices are commonplace in City-managed assets.

Types of actions will include:

– Auditing waste behaviour across City-managed assets to identify waste avoidance, recycling and targeted waste education opportunities
– Consistent use of Australian standards for recycling containers and clear signage throughout our properties to reduce recycling stream contamination

Outcome: Improved monitoring, reporting and verification of waste data.

Initiatives may include:

– Developing a central reporting framework for waste from the City's operations and properties and undertaking a verification study to improve our confidence in waste data

Outcome: Best practice waste avoidance and recycling practices are commonplace in residential waste services.

Types of actions will include:

– Expanding residential recycling services to increase the recovery of items such as electronics and bulky waste
– Benchmarking waste management performance of residences in the city against best practice in similar cities

Outcome: Reduced environmental impacts from waste and improved amenity on the city's streets through innovative waste storage and collection solutions.

We will investigate:

– Improved planning guidance for design of waste management spaces within new residential and commercial buildings
– Options to improve waste collection efficiency and reduce associated traffic and environmental impacts

Outcome: Construction, demolition, commercial and industrial activities within the city meet the NSW state government recycling targets.

We will focus on:

– Improving the integrity and collection of waste data from construction, demolition, commercial and industrial activities within the city
– Facilitating opportunities for businesses to optimise the use of waste materials and minimise waste going to landfill
– Advocating for manufacturers and retailers to be more responsible for their end-of-life products
– Using our planning instruments to drive better outcomes for construction, demolition, commercial and industrial waste

Outcome: The City has secured a long-term solution to treat non-recyclable waste using advanced waste treatment technologies.

To achieve this, we will work towards:

– Reviewing and updating the City's waste treatment contracts to avoid any waste going directly to landfill
– Working with other Councils to explore alternative waste treatment solutions
– Encouraging businesses to consider alternative solutions to landfill of non-recyclable waste when purchasing waste treatment services

Outcome: Increased availability and capacity of waste treatment infrastructure in the Sydney Metropolitan Area.

We will:

– Collaborate with the NSW state government to estimate the waste treatment capacity required to manage waste generated in the city
– Advocate to the NSW state government on the importance of planning for future waste and resource management facilities

Outcome: Improved monitoring, reporting and verification of waste data.

Initiatives may include:

– Continuing to support the BBP in ensuring the Operational Waste Guidelines are adopted by industry and a new benchmark in data quality and reporting is established
– Increasing reporting requirements as part of our revised residential waste collection and processing contracts
– Advocating for increased reporting requirements from waste facilities so that data is made publically available

Relevant links

– Advanced Waste Treatment Master Plan: 2013-2030

08 Active and connected city

The City is committed to promoting the most sustainable modes of transport for residents, workers and visitors.

Background

During the development of *Sustainable Sydney 2030,* we were told by the community that our city's transport system was a concern. *Sustainable Sydney 2030* set out a vision for the city that included a major emphasis on transport.

The City is committed to promoting the most sustainable modes of transport for residents, workers and visitors. We are improving walking and cycling conditions and facilitating car sharing. We are also working with the NSW state government to transform our city centre, to accommodate major public transport infrastructure and services, including City to South East light rail and Sydney metro.

The City also recognises the importance of balancing all transport options with the commercial and delivery needs of businesses in the city.

Sustainable Sydney 2030 focuses on the combined economic, social and environmental impacts associated with transport. This strategy looks specifically at the environmental challenges and opportunities linked to transport, such as energy use (liquid fuel), fuel security, emissions and air quality. The Transport chapter of this strategy sets 2030 targets to reflect the time required to achieve change in the transport system.

Issues and opportunities

Increasing transport emissions and declining air quality: While electricity-based emissions from our local government area have declined in recent years, transport sector emissions have remained static, and now contribute an increased percentage of total emissions. Increased diesel use for passenger vehicles, delivery vans and small trucks contributes to declining local air quality.

By world standards, Australia has clean air. However, increasing population and resulting demands on transport services, means some pollutants can still exceed current air quality standards[31]. Vehicle emissions contain a range of pollutants harmful to human and ecological health. Australia's Environment Ministers have agreed to work towards establishing a National Clean Air Agreement[32] to improve air quality and address the impacts on human health and the environment.

Inner-city courier hub: *The City and Transport for NSW have partnered to set up an inner-city courier hub at the Goulburn Street Car Park. The unique concept allows couriers to book exclusive courier parking spaces, lockers and storage at the carpark, meaning they will no longer have to rely on loading zones, or circle the block in traffic looking for a parking space. It is hoped the six month trial will help couriers become more efficient, while also relieving traffic congestion. If successful the concept could be rolled out to other parts of the city centre.*

[31] http://www.environment.gov.au/protection/air-quality

[32] https://www.environment.gov.au/protection/air-quality/national-clean-air-agreement/consultation

The City's fleet includes numerous hybrid vehicles

Security of fuel supply: A 2014 report by the NRMA[33] stated that Australia's reliance on imported liquid fuel, our limited local refining capacity and small stockholdings present a fuel security risk. A major supply disturbance would severely disrupt important services, such as; health, food production and distribution, business, personal and public transport and defence. Shifting to renewable energy sources, greener vehicles and non-motorised transport modes will minimise our city's reliance on imported fuel.

Improving transport corridors: In major cities, urban renewal projects are a focus. The business and residential communities that are attracted to live and work in these areas rely on public transport corridors to connect them with other parts of the city.

The NSW state government has started work on a $2.1 billion light rail project, connecting Randwick to the city centre. Investigations into light rail for the Green Square urban renewal area are underway. Green Square will be a sizable social and economic hub once completed, with 30,500 new dwellings, a population of 61,000 and the provision of around 21,000 permanent jobs. Access to other areas of the city, through public transport improvements, will be crucial to the social and economic success of this area.

Adopting new technologies: The City's fleet includes hybrid and battery electric vehicles (BEVs), powered by renewable electricity, as well as a bicycle fleet. While BEVs are good for personal transport, high productivity service fleets, such as taxis, are limited by their low range (distance driven before recharging), small power outputs and long recharge times.

Fuel Cell Electric Vehicles (FCEVs) powered by renewable hydrogen have high range and quick refuelling times. Combining the use of BEVs and FCEVs across all motorised vehicles could present an emissions-free solution at point of vehicle use. Hydrogen refuelling infrastructure, not currently available, is necessary to support commercialisation of this potential market.

Facilitating car sharing: Car sharing schemes allow people to drive when they need to, without the hassle and cost of car ownership. A single car share vehicle can take up to ten cars off the road and cater for up to twenty car share members. This takes pressure off limited city street parking and increases walking, cycling and use of public transport.

Encouraging active transport: Cycling and walking are cheap, healthy and environmentally friendly modes of transport. By 2036, it is expected that 280,000 people will live in the city and 570,000 people will work here. Population increases will place added pressure on transport infrastructure. Walking accounts for more than 90 per cent of trips in the city centre. Our city has not been designed with active transport in mind. Safer spaces and interconnected walking and cycling networks are required to encourage active transport.

[33] http://www.mynrma.com.au/media/Fuel_Security_Report.pdf

The City's Town Hall House provides end of trip facilities for employees to encourage active transport

City of Sydney operations

What we are doing

The City is committed to promoting the most sustainable methods of transport for our own operations. We have:

– Reduced our fleet emissions by 26 per cent over four years and gained recognition as finalists in the National 2015 Banksia Awards' Mindful Movement category for our sustainable fleet management program

– Expanded our onsite storage of biodiesel tanks, giving more of our vehicles access to biodiesel fuel and reducing our fleet emissions

– Encouraged our employees to choose active transport (walking and cycling) and trained them in cycling safety to use our bike fleet in preference to fleet cars and taxis

Our operational targets

Fleet emissions

– Zero increase in emissions from the City's fleet of vehicles by 2021, from 2014 levels

How we are tracking

As at mid- 2015 (latest available data), we had seen a zero increase in fleet emissions from 2014 levels.

The City has increased public access to the Glebe foreshore with new walking and cycling infrastructure

Our local government area

Progress

Within our local area, the City is:

- Establishing 12.5 km of new traffic-separated cycle-ways
- Offering training courses in safe and courteous cycling through the Share the Path program
- Creating inviting public spaces and pedestrianised areas where people want to live, shop, visit and do business in the city
- Advocating for improvements to public transport across the city as a more sustainable way to travel
- Creating a connected network of high quality walking and cycling routes through our Liveable Green Network and rolling out a wayfinding and tactile signage network
- Facilitating car sharing schemes by providing dedicated on-street parking
- Supporting research into hydrogen refuelling infrastructure to support renewable hydrogen fuel cell electric vehicle commercialisation

What others are doing

The NSW state government is responsible for planning and delivering public transport in our local area, supported by private operators. It plans and delivers metropolitan road projects that impact traffic in our area. It also has responsibility for many major roads in our local government area. Through the City's Local Pedestrian, Cycling and Traffic Calming Committee and the NSW government's Central Sydney Traffic and Transport Committee, the state government has control over most changes to signage and roads, even on local roads.

The Sydney City Centre Access Strategy is the NSW state government's plan outlining how all modes of transport will work together to support people to enter, exit and move around the city centre.

The City of Sydney is partnering with the NSW state government to transform the city centre through the CBD and South East Light Rail.

We also partner with the NSW state government to deliver cycleways. To date the City has funded all separated cycleways built in the local government area, however some future cycleways will be funded by the NSW state government.

The NSW Environmental Protection Authority is responsible for monitoring air quality.

Local government area targets

The City has many initiatives in place to influence how our residents and visitors travel, however achievement of the following targets requires significant action from the NSW state government.

Walking	– 33 per cent of trips to work during the AM peak undertaken by walking by 2030, by city residents
Cycling	– 10 per cent of total trips made in the city are undertaken by bicycle by 2030
Public transport	– 80 per cent of trips to work during the AM peak are undertaken by public transport by 2030, by city residents and those travelling to Central Sydney[34] from elsewhere
Car sharing	– 30 per cent of city residents who drive [with an unrestricted drivers licence] are members of a car sharing scheme by 2030

State targets	
NSW state government[35]	– Increase the share of commuter trips made by public transport to and from Sydney CBD during peak hours to 80 per cent by 2016 – More than double the mode share of bicycle trips made in the Greater Sydney region, at a local and district level, by 2016 – Increase the mode share of walking trips made in the Greater Sydney region, at a local and district level, to 25 per cent by 2016

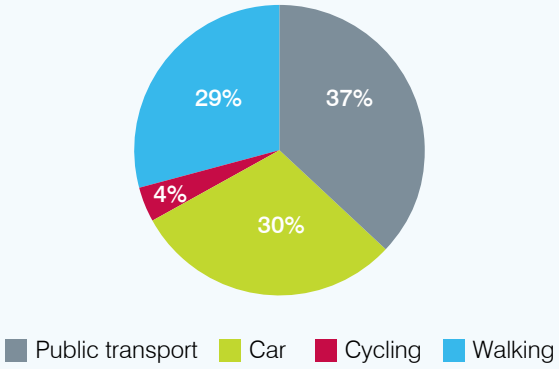
How the local government area is tracking

Transport mode: Chart 11[36] shows the transport mode split in 2011 for all trips taken by workers, visitors and residents who travel into, and within, the city.

Car sharing: As at February 2016, 30,044 residents and businesses in the city were members of a car sharing scheme.

The Liveable Green Network: *The City's Liveable Green Network is a network of high quality walking and cycling routes that connect the city. We are improving streets and public spaces to make spaces more pleasant to walk and ride in. The Liveable Green Network connects the residents to the city's villages, parks and leisure facilities. The network features include traffic calming measures, widened footpaths and more pedestrian crossings, way-finding, planting, water bubblers, seats, cycle ways, bike parking and lighting.*

Chart 11: Local government area transport mode share



[34] Central Sydney is the Census area defined by the Australian Bureau of Statistics that informs 2011 Journey to Work data
[35] http://www.2021.nsw.gov.au/sites/default/files/NSW2021_WEBVERSION.pdf
[36] Detailed assumptions for charts are in Appendix 2

The City's Liveable Green Network is connecting the City's villages with safe cycling networks

Outcomes and actions

By 2021, our city needs to be moving towards a world-class transport system with a diversity of transport modes offered to support a strong and growing economy, a connected community and improved air quality. The transport experience for residents, workers and visitors should be vastly improved.

The following are outcomes we want to see by 2021 and the types of actions the City will take to drive these outcomes directly where we have control, and through advocacy and partnership where we do not.

Outcome: Significant mode shift from cars to public transport and from public transport to active transport.

- Continue to work with Transport for NSW to improve access to the city centre, develop a freight strategy for the city centre and implement the Sydney City Centre Access Strategy
- Update the car sharing policy in consultation with the community, and investigate measures to promote car sharing in new developments
- Implement policies that address car sharing and careful management of kerbside uses

Outcome: Improved conditions to encourage greater walking and cycling in established and urban renewal areas.

To achieve this, we will:

- Encourage walking and cycling to minimise traffic congestion caused by major infrastructure projects in the city centre
- Complete the ten high-priority regional cycling routes
- Continue to advocate for federal government funding for the Inner Sydney regional bike network
- Continue to deliver cycling courses and events, such as the Sydney Rides Festival
- Investigate the feasibility of a public bike hire scheme

Artist's impression of a pedestrianised George Street with light rail

Outcome: New and improved public transport infrastructure is delivered in collaboration with other levels of government.

We will:

- Support the transformation of George Street
- Advocate for a light rail connection between the city centre and Green Square
- Continue to provide strategic transport advice and advocacy on major developments in the city
- Advocate for an improved mix of transport options across the city

Outcome: A greater proportion of fuel demand is met by zero and low carbon sources.

Initiatives will include:

- Develop policies to encourage uptake of electric vehicles in the city
- Support research into options to provide hydrogen refuelling infrastructure

Outcome: Air quality is improved across the local area.

The City will:

- Advocate for air quality monitoring to be conducted within our local area
- Encourage walking and cycling and public transport use to reduce emissions from transport

Relevant links

For a comprehensive list of actions the City will take to become more connected please see the following existing strategy documents:

- Connecting our city: 2012
- Walking Strategy and Action Plan: 2014
- Cycle Strategy and Action Plan: 2007-2017

09 Green and cool city

It is globally recognised that having more trees in big cities can help tackle climate change by reducing the urban heat island effect.

Background

In early 2016, the federal government announced plans to increase tree (canopy) cover in Australia's largest cities to keep the streets cool. Cities are often warmer because of the urban heat island effect. It is globally recognised that having more trees in big cities can help tackle climate change by reducing the urban heat island effect.

Greening our city is an important component of the *Sustainable Sydney 2030* vision to be green, global and connected. The City is increasing its canopy cover and the variety of tree and plant species in our city. We are also focussed on increasing and preserving local indigenous plant and animal populations in our city, through parks and street verges.

By doing this, we will grow and preserve native habitat linkages to support and enhance native plant and animal populations. The health and variety of plant and animal populations within our city also enhances the quality of life for our community. We will create beautiful streets and public spaces that contribute to the health and wellbeing of everyone.

A collaborative effort between the City, the community and other land managers is needed to improve our city's urban ecological value. We will continue to work with our community and others in the city to deliver this commitment.

Issues and opportunities

Deforestation: Our local area once had a variety of native trees, plants, animals and birdlife. Our forests have been replaced by hard pavements and roofs. We need trees and plants in our city because they:

- Reduce the urban heat island effect
- Filter and improve the air we breathe
- Provide our houses and streets with shade
- Reduce stormwater run-off and pollution in our waterways
- Enhance the appearance, economic value and liveability of our city
- Provide us with a connection to nature in our city
- Attract a variety of native wildlife into our city
- Mitigate carbon emissions, with trees storing emissions and preventing them from entering the atmosphere

Increasing urban canopy: It takes many years for most trees to reach their mature size, with canopies increasing as trees mature. Canopy trees need room to grow and the competition for space is high, both above and below ground. This limits the available space for planting canopy trees.

The city presents a challenging environment to grow trees and plants. The microclimatic conditions created by tall buildings and narrow streets restrict sunlight hours, which affect tree and plant growth. Trees also need sufficient soil and water. Rainfall cannot always reach the soil and water is essential for keeping our city healthy and green.

Raingardens, green roofs and walls: Raingardens retain water in the landscape, improve stormwater quality and keep our city green and cool, mitigating the impacts of the urban heat island effect. Similarly, green roofs and walls slow and clean stormwater, improve air quality, increase habitat for a variety of animal species and create additional space for urban food production and recreation.

Green walls provide amenity and beauty in the city

Green roofs and walls: *The City is encouraging building owners to include green roofs and walls in their developments. Our work on green roofs and walls, including our policy, guides and the installation of our own green roofs and walls, was highly commended at the NSW government's Green Globe Awards in October 2015. Currently, the city has at least 121,642 m² of green roofs and walls.*

One of our greatest resources for greening our city is the community.

Restoring urban ecology: Many plants found in the city today are introduced species, while the remaining native animals are species that have adapted to urbanisation. To protect our native wildlife and increase indigenous plant-life, habitat patches can be created and linked to help plant and animal species spread throughout the city. Smaller areas, such as new developments, parks, street trees, raingardens, backyards and green roofs and walls also provide links between larger habitat patches.

Improving air quality: A recent study[37] conducted by researchers from the University of Technology, Sydney found that the City's plans to increase tree canopy to 23 per cent by 2030 could have more impact on reducing air pollution than decreasing traffic. The year-long study showed that inner city areas densely populated with trees, such as Glebe, experience reduced air pollution.

Working together: Partnerships with other levels of government and agencies is important as they own and manage arterial transport and utility corridors within the city. The linear nature of these corridors makes them ideal for linking habitat areas and creating wildlife corridors.

One of our greatest resources for greening our city is the community. There is rising interest and participation in community gardens and volunteer Bushcare groups. These groups deliver great value to the city and continual engagement and education of our community is important to increase participation.

[37] http://www.sciencedirect.com/science/article/pii/S1352231015302958

Paddington Reservoir

City of Sydney operations

What we are doing

The City has programs and measures to increase canopy cover, habitat linkages and native plant and animal species in its open spaces and streetscapes. We have:

- Planted thousands of new street trees since 2005 and installed landscaping throughout the city's streets
- Provided annual floral displays and hanging baskets in areas with no landscaping or planting through the City's Living Colour program
- Planted 13,466 plants across bush restoration sites along Johnston's Creek and in Sydney Park since 2015
- Upgraded 57 small parks since 2008 and installed 154 raingardens

Our city's green spaces: *The city has more than 440 parks that cover almost 190 hectares. Our parks are immensely popular with locals and visitors and serve a wide range of needs. They include 93 playgrounds with equipment for children of all ages, sports facilities, green spaces and off-leash areas for dogs. Beautifully designed parks and green spaces are vital for people with limited, or no, backyards of their own. In 2014, the city's parks were ranked top across NSW in an independent state-wide park user survey.*

The pollinator habitat provides homes for a number of pollinator species, particularly native bees

Our operational targets

Sustainable Sydney 2030 communicated strategic directions for greening our city. The targets included in this Strategy are for enhancing the urban canopy and urban ecology in the green spaces that the City has responsibility for across our local area.

Urban canopy

- The average total canopy cover is increased by 50 per cent by 2030 (from 15 to 23 per cent of the local government area), and increased by 75 per cent by 2050 (to 27 per cent), from a 2008 baseline
- Plant 700 street trees each year until 2021
- Tree species diversity will not consist of more than 40 per cent for any particular plant family, 30 per cent for any genus or 10 per cent for any one species by 2021
- Plant 50,000 new trees and shrubs in City parks and street gardens each year until 2021

Urban ecology

- Habitat sites in the city are protected and the area of bush restoration sites is increased by 100 per cent by 2023 from a 2012 baseline of 4.2 hectares
- Indigenous fauna species diversity, abundance and distribution is maintained or increased by 2023 based on a 2012 baseline
- A progressive increase in the number of habitat features for priority fauna species is established along potential habitat linkages by 2023

How we are tracking

Measurement of canopy cover for the city is planned for 2016. When last measured in 2008, our city had 15 per cent of its area covered by urban canopy. Of this, 42 per cent of our canopy cover was from private properties, 32 per cent from street trees and 26 per cent from parks.

Progress against our fauna targets will be measured formally every five years through a comprehensive survey. The next measurement is planned for 2017. Bush restoration sites in the city have increased by 43 per cent from the 2012 baseline, as at December 2015.

Median strips are another available space for plants to help green and cool the city

Our local government area

Progress to date

We are working with other levels of government and the community to:

– Develop and support 19 community gardens, five Landcare groups, three community footpath verge gardens and one community composting group
– Launch an online fauna reporting tool for our employees and the community to report uncommon animal species

Local government area targets

Our canopy cover target (see page 56) reflects canopy provided by trees in City-owned parks, street trees, and on private properties.

In addition to the actions we will take to improve greening where we have control, the City also aims to encourage other land owners to contribute to increased canopy cover and biodiversity through planning policy and community programs.

What others are doing

Australia's Biodiversity Strategy 2010 – 2030, sets out the federal government's policy to guide management and protection of Australia's biodiversity.

The NSW state government produced a Draft NSW Biodiversity Strategy 2010 – 2015[38], however this was never formally adopted.

The NSW state government's Environmental Trust is currently undertaking research to identify opportunities to embed the concept of urban ecology in urban renewal and development in NSW through the development of a practical, visionary and comprehensive plan[39].

Within our local government area there are large areas of open space that are under the control of various state government agencies, including the Royal Botanic gardens, the Domain, Barangaroo and areas of the harbour foreshore. These areas make a significant contribution to the greening of our city and to the achievement of canopy cover targets.

The NSW state government influences canopy cover and biodiversity in the local government area in its capacity as a consent authority for major development projects. Power utilities can potentially have a negative impact on canopy when pruning for powerline clearance.

[38] http://www.environment.nsw.gov.au/resources/biodiversity/strategy/10821DraftBioStrat.pdf
[39] https://tenders.nsw.gov.au/oeh/?event=public.cn.view&CNUUID=BD00BACD-F434-B81E-8310AD3A20A21D61

Every year the City and Planet Ark work with the community to plant trees on National Tree Day

Federal targets

Federal government	– Plant 20 million trees and associated understorey by 2020, to re-establish green corridors and urban forests[40] – Australia's Biodiversity Conservation Strategy[41] includes targets for biodiversity outcomes on a national scale

Engaging the community: *The City works closely with the community to encourage greening projects. National Tree Day is an annual event supported by Planet Ark and the City for 20 years. At the July 2015 event, over 600 local residents, visitors and the community attended and planted more than 6,000 native tubestock plants. The City supports other community planting events throughout the year, working with Bushcare groups, local residents and the community to plant new open spaces with native seedlings.*

[40] http://www.nrm.gov.au/national/20-million-trees

[41] https://www.environment.gov.au/biodiversity/publications/australias-biodiversity-conservation-strategy

Outcomes and actions

By 2021, the extent and quality of our city's urban canopy cover, landscaping and greening will be vastly improved. Our resilient urban ecosystems will be restored and conserved to support a diverse range of local indigenous plant and animal species.

These are the greening outcomes we would like to see by 2021 and the types of initiatives we will undertake to realise these outcomes.

Outcome: Increased canopy cover and more green spaces in our local government area.

We will:

– Obtain updated data on canopy cover and develop a strategy for the next stage of increased urban canopy towards the 2030 target

Outcome: The City is planting trees in every suitable location, and residents and developers are planting large canopy trees on private property.

Through our programs and planning, we will:

– Plant trees in unused road space, landscape median strips and replace paving with trees and landscape planting

– Establish minimum guidelines for the provision of open space, landscaping and urban canopy in new developments

Outcome: The age diversity of the City's trees is improved, and the quality of the trees is maintained.

Our team will:

– Improve tree longevity through best practice tree maintenance

– Gradually remove and replace ageing trees to ensure canopy cover is maintained

– Develop and implement special park and tree management plans for our 19th century parks with heritage trees and historic landscaping design

– Advocate for underground powerlines to avoid damage to trees from powerline clearance pruning

Outcome: Urban habitat is restored and conserved to support a diverse range of indigenous flora and fauna species.

We will seek to:

– Build habitat parks and landscape city streets to promote and support biodiversity

– Create wildlife linkages and habitat pockets through residential suburbs, backyards and public parks

– Plant trees and habitat vegetation on easements and rail corridors to create green links

Along the Glebe foreshore, seawall pots have been installed as a trial and are attracting many varieties of species

Seawall pots: *An environmental grant-funded project, led by Sydney University's School of Biological Sciences, trialled the installation of 20 concrete flowerpots to the seawall along the Glebe foreshore walk. The seawall pots created artificial rock pools that attracted 13 varieties of algae, two types of tube worm, sea snails, star fish, crabs, three sponge and other fish species to live in the pots. Following the positive early results from the trial, a further 60 pots are being installed.*

Outcome: The city has the highest quality parks and open spaces maintained to best practice standards.

To improve and maintain our public spaces, we will:

– Balance the recreational and functional requirements of parks with goals to increase canopy cover

– Look for opportunities to increase green space to meet future demand

– Use sustainable landscape management practices, such as the reuse of composted soil conditioners

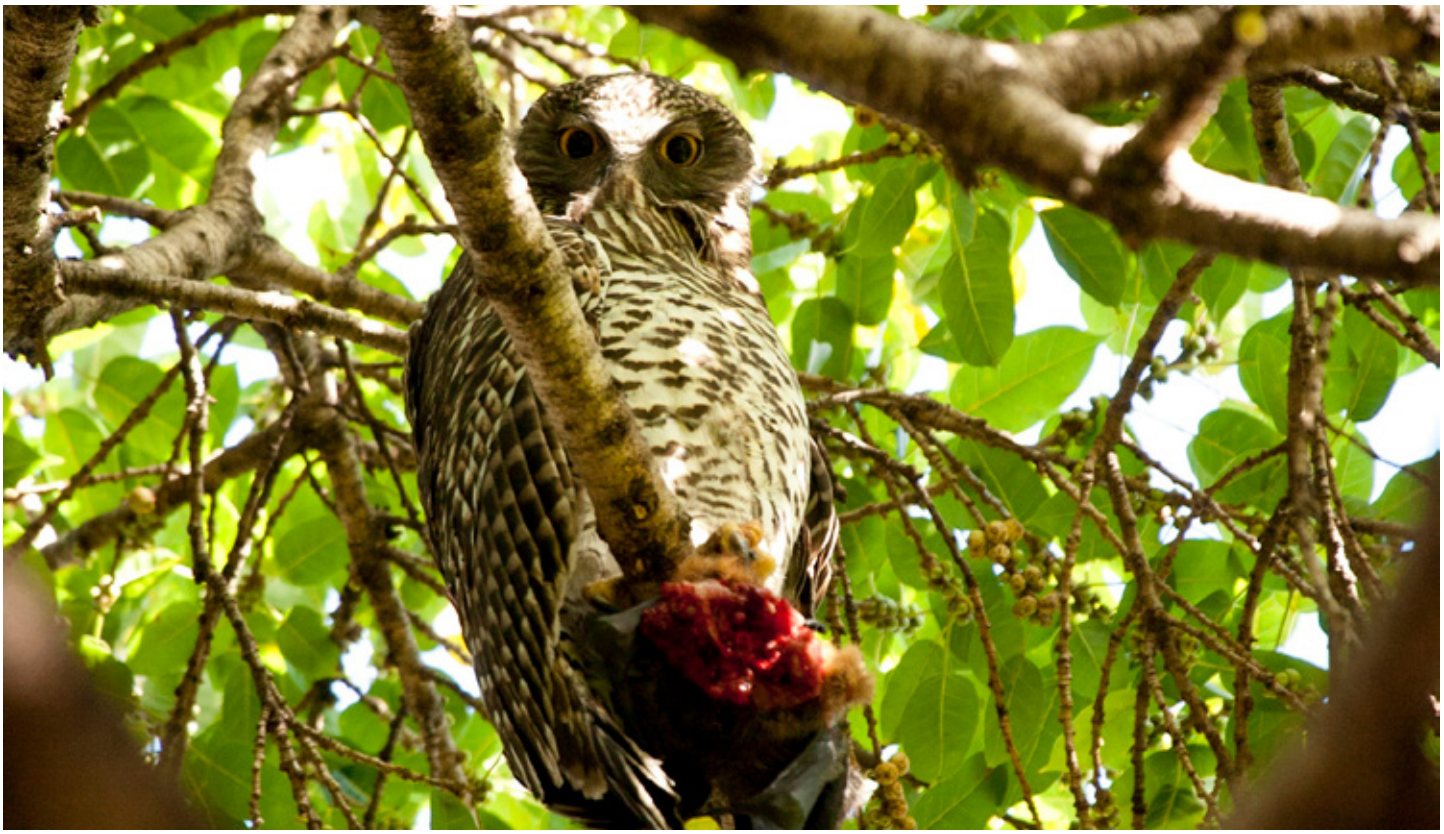
Outcome: The community are active participants in protecting and enhancing the city's trees, parks, flora and fauna.

To engage the community, we will:

– Establish a City Farm in Sydney Park for food production, farmers markets, community participation, education, innovation and collaboration

– Work with community garden managers to document management plans to share knowledge with participants and the community

– Encourage residents and developers to plant large canopy trees on private properties



The City's efforts to develop and maintain habitat links are attracting many native species back to the city, such as the Powerful Owl

Relevant links

For a comprehensive list of actions the City will take to green our city, please see the following existing strategy documents:

– Greening Sydney Plan: 2012
– Urban Forest Strategy: 2013
– Urban Ecology Strategic Action Plan: 2014

By 2021, our resilient urban ecosystems will be restored and conserved to support a diverse range of local indigenous plant and animal species.

10 Developing the strategy and action plan

The actions in this strategy will bring significant social, cultural and economic benefits to our community.

Developing the strategy and action plan

Sustainable Sydney 2030: During 2007–08, the City undertook comprehensive community consultation to ask people about their vision for the city. The result was *Sustainable Sydney 2030* – a comprehensive plan for how we will be a green, global and connected city.

Environmental master plans and strategies: To guide the implementation of *Sustainable Sydney 2030*, the City developed environmental master plans and strategies. The existing master plans and strategies are now considered as; supporting documents – containing actions consistent with this strategy; and reference documents – containing useful background information, with actions superseded by this strategy.

Supporting documents	Reference documents
Energy: – Energy Efficiency Master Plan – improving energy productivity: 2015-2030 *Climate adaptation:* – Adapting for climate change – a long term strategy for the City of Sydney: 2015-2070 *Transport:* – Cycle Strategy and Action Plan: 2007-2017 – Connecting our city: 2012 – Walking Strategy and Action Plan: 2014 *Greening:* – Greening Sydney Plan: 2012 – Urban Forest Strategy: 2013 – Urban Ecology Strategic Action Plan: 2014 *Sector sustainability plans:* – Residential Apartment Sustainability Plan: 2015	*Energy:* – Decentralised Energy Master Plan – Renewable Energy: 2012-2030 – Decentralised Energy Master Plan – Trigeneration: 2010-2030 *Water:* – Decentralised Water Master Plan: 2012-2030 *Waste:* – Advanced Waste Treatment Master Plan: 2013-2030

An integrated approach to sustainability

Informed by *Sustainable Sydney 2030* and our environmental master plans, this strategy combines insights, data and actions from these documents into one concise strategy. It communicates our overarching strategic approach to environmental sustainability over the period 2016-21. *Sustainable Sydney 2030* covers four strategic areas and the Environmental Action 2016 – 2021 addresses one of these.

These strategies reflect our integrated approach to sustainability. The actions in this strategy will bring significant social, cultural and economic benefits to the city.

Integrated Planning and Reporting Framework: The City is subject to a mandatory integrated planning and reporting framework, introduced by the state government in 2009 as a reform of the Local Government Act 1993.

This strategy aligns with the City's suite of integrated planning documents, providing an overview on how we will deliver our environmental objectives. For further information on the Integrated Planning and Reporting Framework, visit our website.

Economic benefits

- *Reducing greenhouse gas emissions and adapting to climate change will create a low carbon economy, increase job opportunities and lower utility bills. Our Energy Efficiency Master Plan identified $208 million in avoided energy costs could be achieved in our city through energy efficiency initiatives*
- *A greener, cleaner and cooler city will improve attractiveness for residents and workers to choose to live and work, and businesses to invest in Sydney*[42]
- *Environmental attractiveness will improve decisions to host international cultural and tradeshow events in Sydney, increasing tourism and spending*
- *Greater options for, and increased efficiency of, transport systems will reduce congestion and improve economic productivity*

Social benefits

- *Lower-income and more vulnerable community members will save money through lower utility bills by using less energy and water and producing less waste*
- *Green spaces in the city contribute to people's physical and mental health and wellbeing, by providing places to socialise, play, exercise and relax*
- *Improved transport options enable greater access to essential services and employment opportunities*

Cultural benefits

- *Increasing and improving green public spaces will encourage creative and cultural events to be hosted in the city's parks*
- *A connected network of high quality walking and cycling routes will enhance access to our diverse cultural, heritage and creative assets*
- *Better public transport systems will improve participation in the city's cultural and creative venues and events*

[42] Deloitte's fifth edition of *'Building the Lucky Country: The purpose of place: Reconsidered'*

Pyrmont's Pirrama Park is transformed into a forest of blue trees to raise awareness of the human impact on the environment

Implementing the strategy and action plan

This is a five-year strategy. The City will report annually against the targets and outcomes contained in this strategy, both to Council and to our community.

The Action Plan (Appendix 1) proposes timeframes for actions between FY16/17 and FY20/21. Technology, the market and the national and state policy environment are changing rapidly. The City must respond with a change of focus, where necessary. We will review the Action Plan annually and specific actions and timings may change.

Developing an effective response to the environmental challenges faced by our city requires collaboration from all parts of our community. We look forward to implementing this strategy in partnership with our residents, our business community, the NSW state government and the federal government.

11 Glossary

Active transport: Involves any physical activity that gets you from one place to another, such as walking and cycling.

Arterial transport: A high-capacity urban road or route.

BASIX or Building Sustainability Index: A NSW government index, to rate energy and water efficiency performance of residential buildings, that aims to reduce water consumption and greenhouse gas emissions by 40 per cent compared to pre-BASIX (2004) buildings.

Biodiversity: Biological diversity including species richness, ecosystem complexity and genetic variation.

Business-as-usual: A projection (e.g. greenhouse gas emission levels) based on the assumption that all existing policy measures remain in place with no new measures introduced.

Canopy cover: The proportion of land area occupied by the tree's crown or canopy, or combined canopies, when visualised from directly above. It is often expressed as a per centage or the total area covered.

Carbon intensity: Electricity that has a high emissions concentration, or energy intensity, for example coal-fired electricity has a high emissions concentration, or carbon intensity.

Carbon neutral or net zero emissions: Balancing the amount of carbon released with an equivalent amount offset by purchasing carbon credits to make up the difference. The best practice approach is to reduce or avoid carbon emissions first, then offset any unavoidable emissions.

COP21: The 2015 United Nations Climate Change Conference held in Paris, December 2015 that negotiated the Paris Agreement - a global agreement on the reduction limiting global warming to less than 2˚C compared to pre-industrial levels and to drive efforts to limit the temperature increase even further to 1.5˚C.

Dual plumbing: A plumbing system with two separate pipes supplying potable and reclaimed water to a building or precinct.

Ecosystem: Animals, plants and microorganisms that live in one place, as well as the environmental conditions that support them.

Energy efficiency: Using less energy to achieve the same output.

Energy storage: The capture of energy produced at one time for use at a later time.

Environmental Upgrade Agreements: A NSW government finance mechanism for building owners to access finance for upgrade works of existing buildings that result in energy, water and other environmental savings.

Greenhouse gas emissions: Gases that trap heat in the atmosphere. Greenhouse gases from human activities are the most significant driver of observed climate change since the mid-20th century.

Locally indigenous: A native plant that is limited to a particular geographic area and often confined to a specific habitat.

Low-carbon energy: Electricity produced with lower amounts of carbon dioxide emissions than conventional fossil fuel power generation, such as wind, solar and hydro power.

Mitigate: Taking action to reduce impact on the environment, as well as contributions to climate change (in this context).

National Australian Built Environment Rating System or NABERS: An Australian government initiative that measures and rates the environmental performance of Australian buildings and tenancies.

Net zero emissions: Balancing the amount of carbon released with an equivalent amount offset. Usually offsets are through purchasing carbon credits to make up the difference. The best practice approach is to reduce, or avoid, carbon emissions first, then offset any unavoidable emissions.

Non-potable water: Water that is not of a quality for drinking and cooking purposes, used for purposes such as laundry, gardening, car washing and cooling towers.

Paris Pledge for Action: At COP21 in Paris (December 2015), a group of global cities, regions, companies and investors committed achieve climate stability, limiting global temperature rise to less than 2˚C.

Potable water: Treated water that is safe enough for consumption, use in kitchens and bathrooms.

Raingardens: Gardens that allow rainwater runoff to be absorbed, providing rainwater for plants and improving water quality in waterways by up to 30 per cent.

Recycled water: Former wastewater (sewage) is treated to remove solids and impurities and used for non-potable water needs, rather than discharged into waterways.

Renewable energy: Energy from resources which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat.

Resilience: The capacity to survive, adapt and grow no matter what kinds of chronic stresses and acute shocks are experienced.

Sea level rise: Long-term increases in the mean sea level due to global warming.

Stormwater harvesting: Water from intense rainfall events (stormwater) is captured, cleaned and typically re-used for non-potable purposes.

Swales: Low, moist or marshy land, naturally landscaped feature or a human-created one, that manages water runoff, filters pollutants and increases rainwater permeation.

Trigeneration: A system providing cooling, power and heating. Electricity is produced locally, the waste heat is used to supply heating and hot water, and converted into cooling via a heat-driven chiller system.

Urban heat island effect: Cities are often warmer than rural areas because vegetation is replaced with hard structures, such as pavements and buildings, which absorb and release more heat than the natural landscape.

Urban renewal areas: A program of land redevelopment in areas of moderate to high density urban land use.

Utility corridors: A passage built underground or aboveground to carry utility lines such as electricity, water and sewer pipes.

Water efficiency: Using less water to achieve the same output.

Water sensitive urban design: A design approach which integrates the urban water cycle into urban design to reduce environmental degradation and improve aesthetic appeal.

Wetlands: A land area saturated with water that forms a distinct ecosystem of aquatic plants that manage water runoff, filter pollutants and increase rainwater permeation.

12 Appendix 1: Action plan

Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
1. Asset management							
1.01	Develop a Sustainable Asset Policy, Guidelines, and relevant governance processes that drive best-practice during the feasibility, design, construction and operation of new City-controlled assets.	**FY16/17 - FY17/18**	•	•	•	•	•
1.02	Continue to actively engage tenants within the City's buildings to facilitate best environmental performance outcomes of whole buildings.	**FY17/18 - FY20/21**	•	•	•	•	
1.03	Define, procure and implement a new system for monitoring, management and reporting of utilities and other sustainability metrics within City-owned properties.	**FY16/17**	•	•	•		
1.04	Develop a cohesive sub-metering strategy and implementation plan for electricity, gas and water to support improved resource management and tenant billing in City-owned properties.	**FY16/17 - FY20/21**	•	•			
1.05	Develop internal capacity across the City's resources, systems and process to deliver water sensitive urban design in City assets.	**FY16/17 - FY20/21**		•		•	•
1.06	Develop procedures to ensure that climate resilience is incorporated into management of City-owned properties, including building design and operations.	**FY18/19 - FY20/21**				•	
1.07	Factor changing rainfall, flooding, storm and drought patterns into City strategies and management plans for urban greening, parks, gardens and public domain.	**FY16/17 - FY20/21**		•		•	•
1.08	Implement improved procurement templates and contract procedures to meet BBP de-fit waste resource recovery target in City assets.	**FY17/18 - FY19/20**			•		
1.09	Implement the NSW Government Resource Efficiency Policy and thereby achieve and maintain a NABERS Energy rating of at least 4.5 stars for City-owned and leased office buildings over 2,000 sqm.	**FY16/17 - FY20/21**	•				

12 Appendix 1: Action plan

Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
1.10	Improve energy and water efficiency at the City's most resource-intensive properties through installation of efficiency measures and changes in management practice, including required metering and monitoring.	**FY16/17 - FY20/21**	•	•			
1.11	Improve water efficiency at the City's parks through installation of efficiency measures and changes in management practice.	**FY16/17 - FY20/21**		•		•	
1.12	Develop and implement a new tenant "user pays" approach to utilities in City-owned properties to encourage further efficiencies.	**FY16/17 - FY18/19**	•	•			
1.13	Review, score (against the BBP Leasing Standard) and implement an improvement plan for the City's precedent lease in BBP portfolio buildings.	**FY16/17 - FY18/19**	•	•	•		
1.14	Target improved landfill diversion outcomes in new waste services contract for City properties.	**FY16/17 - FY20/21**			•		
1.15	Ensure the City's crisis and emergency management plans integrate with business continuity plan to consider the impact of extreme weather events on the delivery of essential services.	**FY16/17**				•	
2. Capital works							
2.01	Adapt infrastructure design to account for current climate change where appropriate (including water sensitive urban design, stormwater management, roads, pavement).	**FY16/17 - FY20/21**				•	•
2.02	Commence operation of trigeneration system at Town Hall House to supply electricity and thermal energy to Town Hall House and Sydney Town Hall.	**FY16/17**	•				
2.03	Complete cool pavements trial and communicate the evaluation.	**FY16/17 - FY17/18**				•	
2.04	Continue to ensure raingardens are considered in design criterion for all road and streetscape renewal projects and major precinct redevelopment projects and installed where appropriate.	**FY16/17 - FY20/21**		•		•	•
2.05	Continue to identify and implement opportunities to include water sensitive urban design infrastructure e.g. raingardens, swales and wetlands in all new City projects.	**FY16/17 - FY20/21**		•		•	•
2.06	Undertake feasibility, planning, design, installation, operation and maintenance of co/trigeneration plants at the City's aquatic facilities to achieve cost effective carbon abatement.	**FY16/17 - FY20/21**	•				

Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
2.07	Ensure that sea level rise and storm surge are factored into City infrastructure plans and design guidelines.	**FY16/17 - FY20/21**				•	
2.08	Identify opportunities to install water sensitive urban design infrastructure e.g. raingardens, swales and wetlands in public open space projects.	**FY16/17 - FY20/21**		•		•	•
2.09	Implement the new Environmental Controls for Capital Works tool.	**FY16/17**	•	•	•	•	•
2.10	Install energy storage infrastructure on City properties when it facilitates the onsite use of renewable energy.	**FY16/17 - FY20/21**	•				
2.11	Manage feasibilities and roll-out Stage 2 of Solar and storage projects in line with City renewable targets and BBP "Legacy 5" commitments.	**FY16/17 - FY20/21**	•				
2.12	Retrofit the City's drainage network with gross pollutant traps to provide a reduction of 15 per cent of the annual load of total suspended solids as estimated by the City's water quality modelling tools.	**FY17/18 - FY20/21**		•			
2.13	Revise environmental compliance process for road maintenance works, in keeping with process used on large construction works.	**FY16/17**	•	•			
3. Monitoring & reporting							
3.01	Conduct water quality testing to validate assumptions set in the City's stormwater pollution reduction modelling.	**FY17/18 - FY18/19**		•			•
3.02	Develop consistent, auditable reporting procedures for all environmental targets included in *Environmental Action 2016-2021.*	**FY16/17 - FY17/18**	•	•	•		•
3.03	Identify ways to generate data on environmental outcomes of developments during the planning assessement, construction and post-construction phases.	**FY16/17 - FY17/18**	•	•	•		
3.04	Implement processes to measure, monitor and report progress against stormwater quality targets.	**FY17/18 - FY20/21**		•			
3.05	Include relevant metering equipment to enable measuring and reporting of all non-potable water use in new and refurbished City assets.	**FY16/17 - FY20/21**		•			
3.06	Launch the City's Environmental Management System and undertake ongoing staff training, continuous improvement and reporting.	**FY16/17 - FY20/21**	•	•	•		

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Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
3.07	Provide the City and its stakeholders with easy access to data on the environmental performance of the local government area.	**FY16/17 - FY17/18**	•	•	•		
3.08	Revise the City's environmental reporting with consideration of national and international environmental reporting standards.	**FY16/17**	•	•	•	•	•
4. Procurement							
4.01	Develop procedures to ensure that climate resilience is incorporated into procurement processes.	**FY17/18 - FY20/21**				•	
4.02	Pilot draft Sustainable Procurement Guidelines on selected procurement activities.	**FY16/17 - FY17/18**	•	•	•	•	•
5. Strategic projects							
5.01	Develop heat wave response plan aligned with the NSW State Heatwave Sub Plan.	**FY16/17**				•	
5.02	Continue research and trials in reducing the urban heat island effect.	**FY16/17 - FY20/21**		•		•	•
5.03	Create a net zero building challenge, where the City facilitates the design and construction of Sydney's first net zero buildings, both new and/or retrofits.	**FY16/17 - FY17/18**	•				
5.04	Deliver large-scale recycled water projects where there is no market mechanism or incentive for private sector delivery (e.g. Green Square Town Centre and Sydney Park offsite reuse).	**FY16/17 - FY20/21**		•			
5.05	Develop procedures to ensure that climate resilience is incorporated into all future key Council decision-making.	**FY16/17 - FY20/21**				•	
5.06	Facilitate the delivery of recycled water in established areas during major infrastructure projects such as the CBD and South East Light Rail Project.	**FY16/17 - FY20/21**		•			
5.07	Facilitate the delivery of recycled water precincts by the private sector in urban renewal areas (e.g. Greater Green Square and Southern Employment Lands).	**FY16/17 - FY20/21**		•			
5.08	Invest up to $10M to accelerate the uptake of renewable energy, additional to the grid, by our local businesses and residents through mechanisms such as aggregated purchases, direct investments, GreenPower and community projects.	**FY16/17 - FY20/21**	•				
5.09	Identity opportunities to help reduce local air pollution.	**FY17/18 - FY20/21**				•	

Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
5.10	Investigate the feasibility of using aquifer storage and recovery for recycled water (including stormwater).	**FY18/19**		•			
5.11	Encourage and support building owners within the accommodation and entertainment sector to improve their environmental performance through the Smart Green Business program and/or other actions as outlined in the forthcoming sector sustainability plan.	**FY16/17 - FY20/21**	•	•	•		
5.12	Encourage and support building owners and tenants within the institutionally owned commercial office sector to improve their environmental performance through the BBP and CitySwitch Green Office programs and/or other actions as outlined in the forthcoming sector sustainability plan.	**FY16/17 - FY20/21**	•	•	•		
5.13	Encourage and support building owners and tenants within the privately owned commercial office sector to improve their environmental performance through actions as outlined in the forthcoming sector sustainability plan.	**FY16/17 - FY20/21**	•	•	•		
5.14	Encourage and support building owners and tenants within the residential apartment sector to improve their environmental performance through the Smart Green Apartments program, Green Villages program and other actions as defined within the Residential Apartment Sustainability Plan.	**FY16/17 - FY20/21**	•	•	•		
6. Planning policy							
6.01	As recycled water schemes are developed review planning controls to identify opportunities to facilitate connection of maximum number of buildings to the scheme.	**FY16/17 - FY20/21**		•		•	
6.02	Develop a pathway for the City's current planning controls to be strengthened over time to deliver net zero building standards.	**FY17/18 - FY20/21**	•				
6.03	Investigate incorporating climate resilience measures into Local Environment Plan (LEP) and Development Control Plan (DCP) revisions.	**FY17/18 - FY20/21**				•	
6.04	Continue to implement the City's Interim Floodplain Management Policy, and work collaboratively with asset owners and developers to fund and implement flood risk management plans, incorporating climate change scenarios.	**FY16/17 - FY20/21**		•		•	

12 Appendix 1: Action plan

Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
6.05	Encourage energy and water efficiency, renewable energy, increased stormwater quality outcomes, onsite water recycling and connection to precinct scale water recycling schemes within planning proposals.	**FY16/17 - FY20/21**	•	•		•	
6.06	Develop a standard advice document to be used by City planning staff leading voluntary planning agreement discussions to facilitate stronger environmental outcomes.	**FY16/17 - FY17/18**	•	•	•		
6.07	Develop standard environmental criteria for design excellence strategies and competitions for new development and a process that tracks these commitments through to construction.	**FY16/17 - FY17/18**	•	•			
6.08	Encourage land owners to contribute to the greening of the city and increased canopy cover through the implementation of the City of Sydney Landscape Code.	**FY16/17 - FY20/21**		•		•	•
6.09	Explore ways within the current planning system to require energy and water sub-metering in new and refurbished commercial developments, to improve building management and monitoring.	**FY16/17 - FY18/19**	•	•			
6.10	Investigate the inclusion of DCP provisions that introduce NABERS Energy Commitment Agreements for new commercial office buildings and major commercial office refurbishments over 500 sqm or 1000 sqm; with other sectors added as fit-for-purpose rating tools become available.	**FY16/17 - FY17/18**	•				
6.11	Progressively introduce the stormwater quality clause recommended by the Sydney Metropolitan Catchment Management Authority into the Sydney Local Environment Plan (LEP).	**FY17/18 - FY20/21**		•		•	•
6.12	Respond to updated canopy cover data by reviewing implementation of the Urban Forest Strategy.	**FY16/17 - FY17/18**		•		•	•

Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
7. Development assessment & compliance							
7.01	Develop a process to ensure that water sensitive urban design in all developments is assessed against technical guidelines or by a suitably qualified specialist, to meet or exceed DCP stormwater quality requirements.	**FY16/17 - FY17/18**		•			
7.02	Develop stormwater management "Deemed to comply" tool to simplify DA process.	**FY16/17 - FY17/18**		•			
7.03	In conjunction with commercial service providers, develop package of technical information for developments able to connect to recycled water schemes, for reference during planning approvals process.	**FY16/17 - FY20/21**		•			
7.04	Investigate the 'as built' compliance of recently certified completed commercial office and apartment buildings in the City against the environmental commitments specified in their development application documentation.	**FY16/17 - FY17/18**	•	•	•		
7.05	Regularly review Development Application Standard Conditions to improve environmental outcomes.	**FY16/17 - FY20/21**	•	•	•		
7.06	Review ways to strengthen governance of environmental compliance within the City's development application assessment function.	**FY16/17 - FY18/19**	•	•	•		
8. Programs & services							
8.01	Communicate with City staff, relevant agencies, and the community about what to do in heatwaves, poor air quality and other climate events.	**FY16/17 - FY20/21**				•	
8.02	Develop a building tune-up and retrofit program for non-residential buildings in priority sectors as defined in the Sector Sustainability Plans.	**FY17/18 - FY20/21**	•	•	•		
8.03	Develop and deliver a High Rise Leaders Retrofit Program for apartment buildings.	**FY16/17 - FY20/21**	•	•			
8.04	Encourage Community Garden management committees to develop a documented management plan to guide their operations and to share knowledge with participants and the community.	**FY16/17 - FY17/18**					•
8.05	Promote Environmental Upgrade Agreements or other appropriate funding mechanisms for environmental improvements.	**FY16/17 - FY17/18**	•	•	•		
8.06	Work with small business stakeholders to inform the local business community about the likely business impacts of climate change and how they can adapt.	**FY18/19 - FY20/21**				•	

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Actions FY16/17 - FY20/21	Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
9. Advocacy						
9.01 Advocate for a credible independent performance benchmark, such as a NABERS rating tool, to inform the market and drive upgrades for residential apartment buildings.	**FY16/17 - FY20/21**	•	•	•		
9.02 Advocate for mandatory disclosure of performance requirements for non-commercial building types, including residential apartment buildings.	**FY16/17 - FY20/21**	•	•	•		
9.03 Advocate for the continuation of the Commercial Building Disclosure program with a reduced building and tenancy threshold and with greater provision of information to tenants.	**FY16/17 - FY20/21**	•	•	•		
9.04 Advocate for the federal government to establish a price on carbon to drive the shift to a low carbon economy.	**FY16/17 - FY20/21**	•				
9.05 Advocate for a higher national renewable energy target.	**FY17/18 - FY20/21**	•				
9.06 Advocate for accelerated closure of carbon-intensive electricity generation.	**FY16/17 - FY20/21**	•				
9.07 Advocate for Ausgrid to adopt LED lights for all light types in the LGA.	**FY16/17 - FY18/19**	•				
9.08 Advocate for the federal government to expand national product stewardship schemes.	**FY17/18 - FY20/21**			•		
9.09 Advocate for higher BASIX targets for residential buildings.	**FY16/17 - FY20/21**	•	•			
9.10 Advocate for higher minimum environmental standards and increased compliance in the National Construction Code.	**FY16/17 - FY20/21**	•	•	•		
9.11 Advocate for IPART and the NSW Government to implement progressive pricing structures for Sydney Water that reflect resource value and enable water sensitive solutions in the City of Sydney local government area.	**FY16/17 - FY20/21**		•			
9.12 Advocate for major urban renewal precincts to be world's best practice environmental standards e.g. water sensitive, net zero or carbon positive.	**FY16/17 - FY20/21**	•	•	•	•	•
9.13 Advocate for the NSW EPA to continue with waste levy as a financial incentive to waste operators to develop waste recycling and treatment facilities.	**FY16/17 - FY20/21**			•		
9.14 Advocate for the NSW EPA to improve transparency and integrity of waste data from both residential and commercial producers and waste operators.	**FY16/17 - FY20/21**			•		

Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
9.15	Advocate for the NSW EPA to provide an independent reference point for general public wishing to understand more about the environmental impacts of energy from waste.	**FY16/17 - FY20/21**			•		
9.16	Advocate for the NSW Planning Department to allocate appropriate land resources to waste treatment and transfer within the Sydney Metro Region.	**FY16/17 - FY20/21**			•		
9.17	Advocate for Sydney Water to work with the City to identify and manage stormwater and sewer overflow impacts on waterway health and amenity.	**FY16/17 - FY20/21**		•			
9.18	Advocate for revision of engineering and building standards and codes to take account of the projected impacts of climate change on buildings and infrastructure.	**FY16/17 - FY20/21**				•	
9.19	Continue to advocate to the NSW Minister for Planning and the Building Professionals Board for improved governance of environmental compliance during construction, including for establishment of a more effective state-wide auditing program and reporting regime.	**FY16/17 - FY20/21**	•	•	•		
9.20	Initiate and advocate for change to the National Electricity Rules to permit local electricity customers to purchase electricity direct from local generators (instead of the national market).	**FY16/17 - FY18/19**	•				
9.21	Initiate and advocate for change to the National Electricity Rules to reward local generators for the reduced load that they impose on electricity supply networks compared to large-scale remote power station.	**FY16/17 - FY18/19**	•				
9.22	Work with like-minded organisations to seek change to the National Electricity Objective so that it includes climate change (not just security and cost of supply).	**FY16/17 - FY20/21**	•				
10. Grants & funding							
10.1	Provide grants to support environmental innovation, efficiency measures and ratings and assessments in the community through the Environmental Performance Grants program.	**FY16/17 - FY20/21**	•	•	•	•	•

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Actions FY16/17 - FY20/21		Timeframe	Low-carbon city	Water sensitive city	Zero waste city	Climate resilient city	Green and cool city
10.2	Support academic and non-profit initiatives that promote energy and water efficiency, improved stormwater quality, water recycling and renewable and low-carbon energy.	**FY16/17 - FY20/21**	•	•			
11. Partnership							
11.1	Identify and communicate economic development opportunities and co-benefits that result from energy efficiency, renewable and low-carbon energy in partnership with the C40.	**FY17/18**	•				
11.2	Investigate collaborating with Sydney Water and the Office of Environment and Heritage to trial the Adapt Infrastructure tool to coordinate inter-agency responses and quantitative analysis, measurement and manage of risks and adaptation actions.	**FY17/18 - FY18/19**				•	
11.3	Work with emergency services and supporting agencies to prepare, respond and recover from extreme weather events.	**FY16/17 - FY20/21**				•	
12. Education							
12.1	Develop and implement a community education program focussed on our water sensitive city.	**FY17/18 -FY20/21**		•			

13 Appendix 2: Assumptions

Chart 1 – City of Sydney operations greenhouse gas emissions

– Buildings, parks and street lighting data source: City system STEvE (the System for Tracking Everything Environmental) based on utility billing data.

– Fleet data source: Based on fleet fuel consumption data.

– Other: Includes emissions from activities such as onsite fuel use, refrigerants, waste and work transport sourced from most recent City carbon inventory using verified methods.

– All data is independently verified.

Chart 2 – City of Sydney operations greenhouse gas emissions target

– All percentages are in relation to the 2006 baseline figure.

Complete

– 2006 emissions: Independently verified greenhouse gas emissions inventory including emissions from energy, waste and transport.

– Portfolio change includes removal of some assets e.g Lawson Square and Domain Parking Station; and addition of others: Ian Thorpe Aquatic Centre, 343 George Street, Mountain Street, Surry Hills Community Centre.

– Management improvements shows emissions reductions achieved outside of the major efficiency initiatives. This includes improved energy measurement and monitoring, behaviour changes, small works, and the influence of annual weather changes.

– Energy retrofit Stage 1: Energy and Water retrofit completed by Origin/Ecosave.

– City-owned LED lighting: Contract with GE/UGL to replace 6,448 lights owned by the City.

– Solar PV: Based on installed PV as at November 2016.

– Fleet: Target achieved to reduce 2009 fleet emissions by 20 per cent by 2014.

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By 2021

– Future portfolio: Includes estimated increases due to new child-care centres, Green Square sites, pedestrian lighting and other projects; and accounts for planned property divestment.

– Trigeneration: City estimate for Town Hall precinct project, Cook & Philip Park Aquatic Centre and Ian Thorpe Aquatic Centre.

– Building upgrades: City estimate based on previous efficiency delivered costs.

– Ausgrid LED lighting: The City pays for electricity from all street lights, even though a large proportion are owned and managed by Ausgrid. This reduction reflects what could be achieved if Ausgrid upgraded all its streetlights in the LGA to LED bulbs. City estimate based on savings achieved from the upgrade of City-owned lights.

– Grid renewables (12 per cent of electricity demand): Marginal contribution of grid toward lower greenhouse emissions based on 12 per cent of 2021 electricity demand and the difference in grid coefficient between 2006 and 2021. Despite more renewables in the grid between 2006 (~7 per cent) to 2021 (~23 per cent) emissions savings are not forecast to be significant due to substitution of gas and black coal generation with brown coal. Source data from ACIL RET Review modelling undertaken for the federal government in 2014.

– Solar PV (15 per cent of electricity demand): Based on 15 per cent of 2021 electricity demand. PV already installed amount has not been counted.

– Offsite renewables (23 per cent of electricity demand): Based on 23 per cent of 2021 electricity demand – the amount required to meet the City's target of 50 per cent renewable electricity by 2021.

Chart 3 – Local government area greenhouse gas emissions

– Local government area greenhouse gas emissions data supplied by external environmental data service provider (Kinesis) using electricity and gas network utility consumption data waste tonnages, transport data and national greenhouse gas emission coefficients.

– In 2017 we updated the way we report on local area emissions, in order to become compliant with the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC) – the new international benchmark for reporting city emissions. Differences between the methodology previously used by the City and the GPC mean that there has been an adjustment to the data reported in previous years including the baseline.

Chart 4 – Local government area greenhouse gas emissions target

– All per centages are in relation to the 2006 baseline figure. Please note adjusted baseline as noted above for Chart 5.

– 2006 baseline: Local government area greenhouse gas emissions data supplied by external environmental data service provider (Kinesis) using electricity and gas network utility consumption data waste tonnages, transport data and national greenhouse gas emission coefficients.

– In 2017 we updated the way we report on local area emissions, in order to become compliant with the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC) – the new international benchmark for reporting city emissions. Differences between the methodology previously used by the City and the GPC mean that there has been an adjustment to the data reported in previous years including the baseline.

– Estimated 2030 BAU Increase: Source - External environmental data service provider (Kinesis) reconciliation of Master Plans 2015 based on frozen efficiency growth estimate and emission factors from the Energy Efficiency Master Plan 2015 (foundation report developed by pitt&sherry).

– Energy Efficiency: Existing & new energy efficiency programs and policies scenarios from the Energy Efficiency Master Plan 2015 (foundation report developed by pitt&sherry).

– Renewable Energy: Calculated as 50 per cent of expected 2030 electricity consumption (1.35GWh) after taking account of energy efficiency. Previous versions of this chart showed 30 per cent renewable energy target (1.17GWh) which came from the Renewable Energy Master Plan 2013 (foundation report developed by Arup). Since the Renewable Energy Master Plan was developed, the Energy Efficiency Master Plan and the observed fall in energy consumed across the LGA in recent years has led to a revised lower forecast for 2030 energy demand.

- Trigeneration: City estimate based on 50MW capacity operating at a 7am-10pm scenario. This estimate is based on the emissions savings identified in the Trigeneration Master Plan 2013 (developed by external environmental data service provider (Kinesis)) downscaled to an amount of installation that reflects historic averages. It is estimated there is currently around 15MW of cogeneration or trigeneration installed in the local government area with more building scale projects underway and potential precinct opportunities for new urban renewal areas.
- Waste Diversion / AWT: Advanced Waste Treatment Master Plan March 2014 includes 0.135MtC02e from recycling and 0.196MtC02e through avoided landfill gas. In addition, internal source and Kinesis estimate 0.058MtC02e saving by producing electricity onsite (replacing the higher 0.106 figure for producing gas contained within AWT Master Plan). These figures are consistent with landfill and stationary energy methods used by the GPC.
- Transport: Source - Original Sustainable Sydney 2030 estimate (developed by Kinesis 2008) Emissions reductions would be realised by use of vehicles with lower emissions intensity, and by changing the mode split to move away from car travel and towards public transport and walking and cycling.
- Offsets and future opportunities: Residual required to achieve 2030 target (City estimate 2016). Future savings may include transport, waste, renewable energy, energy efficiency, regulatory and/or technological improvements, or other opportunities. Offsets could be purchased by those entities generating emissions.

Chart 5 – City of Sydney operations potable water use

- This chart has been updated to reflect recent improvements in our data management processes. These improvements identified a small number of additional water meters that were not included in data in previous public reporting. The inclusion of these additional meters has resulted in an increase in all years consumption figures including the baseline. The FY05/06 baseline has increased from 413 to 431 mega litres per annum.
- All data sourced directly from Sydney Water and contained within and reported from the STEvE system.
- Parks and Public Domain - Includes parks, reserves, playgrounds, street closures, garden beds and nature strips. Also included are water features that are in the public domain.
- Commercial buildings- Includes income producing buildings, such as Customs House, parking stations and retail shops. It also includes properties acquired for strategic purposes that do not fall into the above categories.
- Operations (depots, etc) - Includes depots and workshops.
- Community buildings- Includes childcare centres, libraries, community centres and town halls.
- Aquatic Facilities – Includes Victoria Park Pool, Andrew (Boy) Charlton Pool, Cook and Phillip Park Aquatic Centre, Ian Thorpe Aquatic Centre and Prince Alfred Park Pool.
- Exceptions - Only sites where the City has 'operational control' are included. Properties where a whole building is leased and the tenant has full building operations and maintenance obligations, such as the Queen Victoria Building and the Capitol Theatre, are excluded.
- Note - A number of City buildings are used for multiple purposes – for example Customs House is used for office and retail, along with library and exhibition uses. In allocating each property to one of the above categories, the dominant water user was the determining factor. Over time the categorisation of a property may change depending on the use.

13 Appendix 2: Assumptions

Chart 6 – City of Sydney operations potable water use target

– All percentages are in relation to the 2006 baseline figure.

Complete

– 2006 baseline: actual 2005/06 water consumption sourced from Sydney Water.

– Portfolio change, weather: Indicative of increased demand due to increased City assets such as parks, buildings and aquatic centres and net change in demand due to climate conditions between baseline and 2015/16. Calculated by adding savings of completed projects as well as predicted 2015/16 savings to actual 2013/14 water savings.

– Building retrofits: Energy and Water retrofit completed by Origin (Ecosave).

– Efficiency in parks: Estimate based on industry standards or advice obtained from certified irrigation designers and industry experts.

– Recycled water in parks: Includes estimated reuse volume of 11 stormwater harvesting schemes in parks and estimated wetland top up via harvested stormwater at Sydney Park.

By 2021

– Portfolio buildings: Estimated increase in water demand by new buildings planned by 2021. Includes the Green Square Aquatic Centre, child care centres and community and recreational centres.

– Portfolio parks: Estimated increase in water demand by new parks and open spaces planned by 2021 in the Greater Green Square, Ashmore Estate, Harold park, Federal & Jubilee park and other small parks & open spaces. Also includes existing parks that will be irrigated by 2021.

– Building retrofits: Estimated water savings associated with planned retrofit project for the City's highest water using buildings.

– Recycled water in parks and buildings: Estimated water savings from identified future City stormwater harvesting schemes in Harold Park, Jubilee Oval, Federal Park North, Sydney Park Stage 2 and Green Square Town Centre.

– Recycled water – George Street and Greater Green Square: Estimated water savings from supplying City assets including Hyde Park, Land and Wynyard Parks, Town Hall House and 343 George St cooling towers with recycled water from future George St precinct water reuse project; and supplying city parks in the Greater Green Square area with recycled water from future Green Square Stage 2 Water Reuse project.

Chart 7 – Local government area potable water use

– All data sourced directly from Sydney Water.

Chart 8 – Local government area potable water use target

– All per centages are in relation to the 2006 baseline figure.

– 2006 potable water demand: Actual 2005/06 water consumption sourced from Sydney Water.

– Predicted 2030 potable water demand: Growth in water demand across the City was forecast in GHD's 2012 Recycled Water Plan, prepared for the City of Sydney. Growth in potable water demand was based on projected urban development to accommodate the forecasted growth in population to 2030 in the City's Capacity Study (2010).

– City of Sydney efficiency programs: Estimated measurable results from City-run efficiency programs with residents and business.

– Existing & approved recycled water schemes: Existing and approved City-run stormwater harvesting schemes, and private utility schemes (assumed to be operating at maximum capacity).

– Potential recycled water schemes: Estimated contribution of potential recycled water schemes using recycled water within buildings and open space. Potential schemes include Sydney Park off site reuse, George St precinct, Greater Green Square, Central to Eveleigh precinct.

– Future opportunities: Residual required to achieve 2030 target (City estimate 2016). Further efficiency programs or additional recycled water schemes.

Chart 9 – City of Sydney operations resource recovery targets

– City construction and demolition waste data includes City of Sydney managed maintenance projects and excludes waste generated by third party contractors and major projects, this data will be recorded and reported in future waste data reporting.

– City managed properties waste includes City of Sydney owned and managed buildings where the City has responsibility for the collection and management of the waste generated (approximately 65 buildings).

– City managed properties waste is based on three months of data extrapolated to reflect one full year. The City has recently changed waste contractor for managed properties and the data reporting is only available for the previous three month period however this data is considered to be a more accurate representation of the actual tonnages managed by the City.

Chart 10 – Local government area resource recovery targets

– Residential waste data provided by City of Sydney waste collection and treatment contractors for 2014/15.

– Commercial and industrial waste generation based on estimates provided by Talent with Energy (2013).

Chart 11 – Local government area transport mode

– Source - 2011 Journey to Work data from the five yearly Census conducted by the Australian Bureau of Statistics.

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