

Data provided for the
CDP Cities 2015 Report

www.cdp.net

City of Sydney



Written by



Report analysis & information
design for CDP by

AECOM

In partnership with



**Bloomberg
Philanthropies**



Sydney in Context **04**

Sydney in Focus **06**

Introduction **08**

Governance **10**

Risks & Adaptation **18**

Opportunities **33**

Emissions – Local Government **39**

Emissions – Community **48**

Strategy **53**

CDP, C40 and AECOM are proud to present results from our fourth consecutive year of climate change reporting for cities. It was an impressive year, with 207 cities reporting on their climate change data (an 88% increase from 2013), making this the largest and most comprehensive survey of cities and climate change published to date by CDP. City governments from Denver to Jakarta to Abidjan participated, including over 90% of the membership of the C40 – a group of the world's largest cities dedicated to climate change leadership.

Over half of reporting cities measure city-wide emissions. Together, these cities account for 1.2 billion tonnes CO₂e, putting them on par with Japan, the world's third largest economy and fourth largest emitter of greenhouse gas emissions. 60% of all reporting cities now have completed a climate change risk assessment. And cities reported over 2,000 individual actions designed to reduce emissions and adapt to a changing climate. CDP, C40 and AECOM salute the hard work and dedication of the world's city governments in measuring and reporting these important pieces of data. With this report, we provide city governments the information and insights that we hope will assist their work in tackling climate change.

This document contains the questionnaire data provided to CDP from the City of Sydney as part of its 2014 CDP submission.

To see all of the results for all participating cities, visit <https://www.cdp.net/cities>.

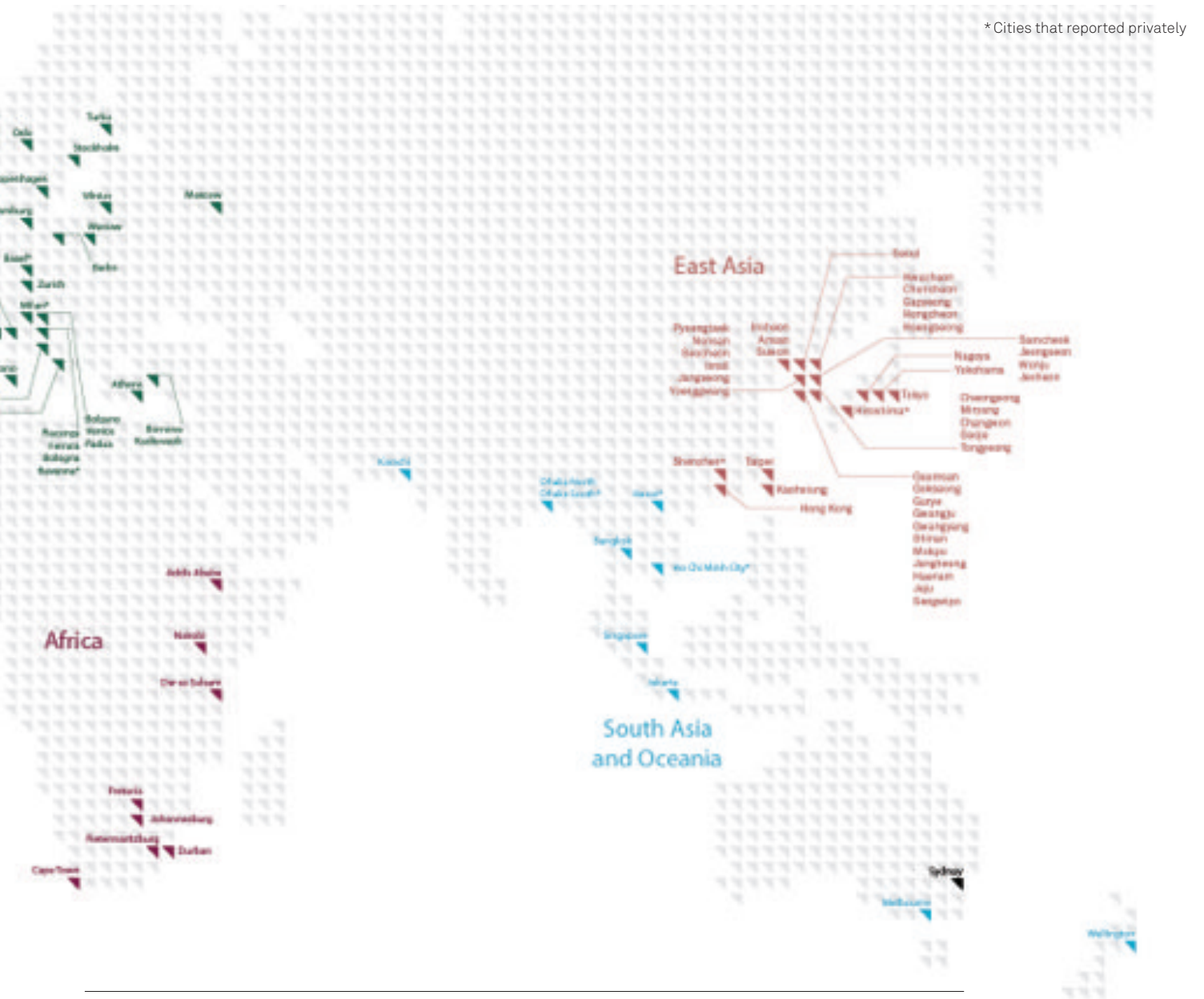
The graphics in this document are from the 2015 CDP Cities infographic and Protecting Our Capital Report



Sydney in context

Number of cities responding per year





Total population of cities responding in 2014

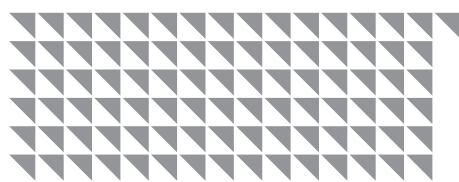
394,360,000

Sydney (city proper)

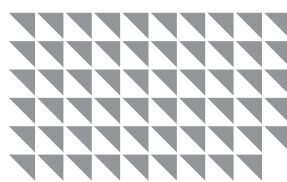
2,274,880

people

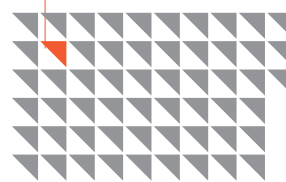
Where Sydney fits



91 small
>600k population



59 medium
600k-1.6m population



57 large
1.6m+ population

Year reported

2014

Area

26

km²

Population

2,274,880

Sydney in focus

Inventory method

CCAP City reporting tool by Kinesis

108 cities reporting emissions in 2014



0 Introduction

Sydney is a vibrant, cosmopolitan, and accessible city with a diverse population, a rich history, world famous tourist attractions and an exciting calendar of international and local events.

The City of Sydney is the local government authority responsible for the city centre and more than 30 suburbs or parts of suburbs within our boundaries.

The City's long term plans to tackle climate change started seven years ago with an unprecedented community consultation. Residents and businesses were asked what they wanted to see happen over the next 20 years and beyond. The result is a collective vision called Sustainable Sydney 2030, which will make Sydney a green, global and connected city.

Introduction

The City is fast becoming a leading environmental performer and our sustainability plan guides what we do. Sustainable development is not just about the physical environment, but about fostering Sydney's economy, society and culture as well.

We've set one of the most ambitious targets of any Australian government, to cut greenhouse gas emissions 70 per cent by 2030 (on 2006 levels), across our entire local government area, and we're already well on our way. We've reduced our own organisations emissions by 20 per cent since 2006 and projects are underway to achieve 29 per cent in coming years. Thousands of trees have been planted. It's becoming safer and easier for people to walk or ride. We're recycling waste and water. Our buildings are more energy efficient. Thousands of lights have been switched over to LED. We are in various stages of developing decentralised low and zero carbon energy and energy efficiency plans. And we're in the process of installing solar panels on a number of our buildings.

1 Governance

The Lord Mayor and Council have made a firm and unequivocal commitment to ensuring the City of Sydney is an inspiring corporate environmental world leader with impeccable environmental credentials.

These policy commitments and specific environmental targets have been articulated in Sustainable Sydney 2030 which provides a long term strategic vision of Sydney as Green, Global, Connected. Sustainable Sydney 2030 seeks to respond to the challenges of global warming and rising oil prices; suggesting five Big Moves to make Sydney more sustainable, vibrant and successful. It establishes the City's environmental vision, goals, targets and actions towards 2030 and beyond.

Governance

We've reduced our corporate emissions by 20 per cent since 2006 and projects are underway to achieve 29 per cent in coming years. Thousands of trees have been planted. It's becoming safer and easier for people to walk or ride. We're recycling waste and water. Our buildings are more energy efficient. Thousands of lights have been switched over to LED. And we've installed solar panels on our buildings - the largest rooftop solar project in Australia.

Progress against the targets of Sustainable Sydney 2030 is reported through biannual Corporate Report and "Green" environmental sustainability progress Report and through individual Unit Business Plans.

As part of the City's 2014/15 Business Planning process, Business Units are required to develop an Environmental Action Plan to note the actions they will be taking over the coming 12 month period to meet the targets of Sustainable Sydney 2030 relevant to their area of activity.

Sydney provides incentives for management of climate change issues, including the attainment of GHG reduction targets.

City of Sydney Green Champions

Recognition (non-monetary)

The City of Sydney Green Champions Program enables City of Sydney employees to make a difference to their workplace environment on a daily basis and to help make the organisation a greener, more sustainable, environmentally responsible and active place to work. Recognition is provided through the Green Champions website and newsletter and is provided in the form of Leadership Training and access to a mentoring program for top performers. In 2014, the Green Champions are focussing on 4 key projects; 1. Assisting with implementation of recommendations from a review of methods of staff transport. This project is looking to reduce emissions from transport, increase health and wellbeing and increase staff awareness of the "Transport Hierarchy" of "Active Transport, Public Transport, Drive Green, Other Vehicles" 2. Reducing paper use at Council 3. Involvement in the implementation of the City's Environmental Management System and 4. The Fluoro Green Champions. This is a sub group of the Green Champions who are reducing waste to landfill, reducing emissions and implementing water savings actions at the City's Bay Street depot, our largest depot.

City employees

Recognition (non-monetary)

All staff receive recognition for their part in reducing the organisation's energy use. This is in the form of messages of thanks from the CEO, Executive and Senior Management. Through the Environmental Management System (EMS) currently in development, staff will be recognised for their contribution to continuous improvement. In addition, the organisation is investigating the possibility for there to be opportunity for employees to be recognised for their contribution to our environmental targets through a Reward and Recognition program currently in development.

Citizens

Recognition (non-monetary)

The City's CitySwitch Green Office program Signatories are part of a vision to positively influence widespread market transformation within the tenancy sector in relation to office energy efficiency. CitySwitch is proud to recognise Signatories through its annual Awards initiative. The CitySwitch National Awards showcase Signatories that have demonstrated outstanding environmental leadership, with recognition provided to those who have improved, maintained or achieved their NABERS Energy tenancy or whole building rating and have reported significant energy savings. Signatories are judged at a state level across a number of categories, with winners from each state going into the running for National Signatory of the Year and New Signatory of the Year awards. In 2013, the inaugural Partnership of the Year Award, supported by the NSW Office of the Environment and Heritage was introduced to recognise not only projects that relate directly to energy efficiency within a tenancy, but to new collaborations that deliver over-and-above business as usual to break down market barriers and create transformation of a company, sector, target audience and/or the wider community resulting in energy efficiency becoming more widely understood and reduction activities implemented. Award events are held in each participating CitySwitch capital city, celebrating state winners and these end of year events are also an opportunity to hear about the collective program achievements, showcase those Signatories that have reached a 4 star (and above) energy rating and come together with fellow business leaders. More information is available at <http://www.cityswitch.net.au/Events/CitySwitchAwards>.

City agencies/departments

Other non-monetary reward

Our Smart Green Business program has been awarded a 2013 NSW Green Globe Award in the category of Local Government Sustainability. The awards program recognises environmental excellence, leadership and innovation in NSW and projects are chosen for their ability to demonstrate ways in which we can all live and work more sustainably. More information is available at <http://www.cityofsydney.nsw.gov.au/business/business-support/greening-your-business/smart-green-business>.

Citizens

Other non-monetary reward

Through the Better Buildings Partnership (BBP), a group of Sydney's leading public, private and institutional landlords are working together to make the city's buildings more sustainable. Led by the City of Sydney, the partnership aims to address the challenges facing the commercial property sector and help Sydney become one of the world's top sustainable cities. The collaboration aims to:

- Improve the energy, water and waste efficiency of buildings within the City of Sydney;
- Help facilitate the roll-out and connection to green infrastructure, such as the proposed trigeneration and recycled-water networks;
- Engage with regulators and governments on key environmental policy and regulatory issues.

With the Better Buildings Partnership representing over half the office floor space across Sydney's city centre, these commercial landlords have an important role to play in improving the energy, water and waste efficiency of Sydney's existing buildings. BBP targets incentivise partners to implement changes. The City of Sydney showcases successes through case studies in our media and advertising to recognise partners for the work they do. In addition, the City has commissioned studies that provide assistance to partners looking to implement new programs. For example, studies are currently facilitating the uptake of solar PV through BBP participants. More information is available at <http://www.sydneybetterbuildings.com.au>

Citizens

Other non-monetary reward

The City's Green Villages program is growing a more sustainable Sydney by connecting and inspiring Sydneysiders. The Green Villages website, social media and regular e-News provides city residents with opportunities to share sustainable ideas, showcase or take part in free workshops and events, learn about sustainable products and services and be rewarded for sustainable behaviour and initiatives. Prizes are linked to City of Sydney programs and initiatives and include bicycles and tickets to events. Green Villages also celebrates all the "good" things Sydneysiders are doing to make our city a better place (like recycling, reusing, growing and living more sustainably) via our Good Hood campaign. The Good Hood encourages residents (and offers great prizes and public recognition particularly via social media as an incentive) to take a photo of their "good", upload it to the online map and share it with the hundreds of other sustainable actions happening across the villages (www.thegoodhood.com.au). Current offers include tickets to grant recipients Youth Food Movement "CropFest" event (<http://www.youthfoodmovement.org.au/>). More information is available at <http://www.greenvillages.com.au/>.

Citizens

Monetary

The City of Sydney sponsors a wide variety of projects and initiatives. Priority is given to activities that help support Sustainable Sydney 2030. The Environmental Grants Program provides funding opportunities for funding over \$5,000 to support projects that provide a clear environmental benefit to the City community by delivering services, activities or resources that result in direct environmental improvements and/or develop knowledge, skills and confidence in the community to encourage environmental improvement within the local area. The community matching grants program aims to engage the community, develop skills, build capacity and share funding arrangements to deliver local community-based projects. The program mainly works with community groups that partner with the City to support events, services and projects in their local neighbourhoods. Applicants are required to demonstrate how they will meet a specific community project, which may include: cultural projects, community building ideas, cycling related projects, tree planting and planter box proposals, community gardens, public art projects, multicultural programs, neighbourhood events and activities. The program supports projects that involve genuine community participation. By 'matching' what the community contributes the City is building a sense of community and strengthening partnerships as people work together on the project. More information is available at cityofsydney.nsw.gov.au

Citizens

Other non-monetary reward

The City of Sydney cycling team get out and about at popular cycleways to reward positive cyclist behaviour with prizes. These prizes include t-shirts featuring "Gracious Cycling" messages, bike lights, high vis strips and bike bells. The Sydney Cycleways website also provides an opportunity for cyclists to share bike routes and positive stories about riding in and around the city. Residents are rewarded through social media campaigns, including an Instagram/FaceBook campaign that photographs cyclists with a chalkboard featuring their message of support to Sydney cyclists. The City provides residents with free learn to ride, cycling proficiency and bike maintenance courses. The City sponsors events including the Sydney Rides Festival, Ride to Work Day and Ride Safely to School Day. More information is available at <http://sydneycycleways.net/>.

City employees

Other non-monetary reward

City employees can access free cycling proficiency courses during business hours as part of in-house training offered to all staff. Once proficiency has been demonstrated, staff are able to make use of the City's fleet of bikes, including electric assist and cargo bikes. Employees are also provided with helmets and other personal protective equipment. City employees make use of free entries into the Sydney Spring Cycle and other events through City sponsorship. New end of trip facilities for staff including change rooms, 15 individual shower rooms (featuring shower, toilet, hair dryer, basin and bench space), 150 lockers and 150 bicycle parking spaces, including space for the City's bicycle fleet on level 1 of Town Hall House will be provided in late 2014 for staff wanting to exercise during their lunch hour or walk, run or ride to work.

Citizens

Monetary

The City of Sydney has a scheme to help fund building upgrades that improve environmental performance. The scheme can help commercial property owners and tenants reduce the environmental impact of buildings and save on long-term operating costs. This funding scheme is part of the NSW Government's Environmental Upgrade Agreement (EUA) legislation, which helps councils enter into agreements with property owners and finance providers. Funds advanced to the property owner are repaid by councils levying a quarterly charge on their land. Once the City collects the money, it forwards that payment to the finance provider. Environmental upgrade works are works that improve the energy, water or environmental efficiency or sustainability of the building to which the EUA relates. A proposed upgrade will involve works that improve the environmental performance of the building.

Sydney anticipates that national and/or regional climate change activities will have impacts on Sydney's own climate change activities.

The City of Sydney is leading by example. Our Sustainable Sydney 2030 plan has ambitious targets for emissions reductions and we have a commitment to be a leading environmental performer. We are in various stages of developing decentralised low and zero carbon energy and energy efficiency plans.

Some parts of the local government area of the Council of the City of Sydney are controlled by State and Federal Government entities including the Darling Harbour Foreshore Authority, the Sydney Harbour Foreshore Authority, the Department of Defence, Roads and Maritime Services and others. As a result, decisions made by State and Federal Government have a significant impact on the services we deliver to our communities.

The NSW Government has developed plans for renewable energy and energy efficiency that align well with the City's plans. Energy and greenhouse gas emissions policy at the National level is less certain and the City will endeavour to work best within and beyond the national policy environment.

The City is developing a Climate Change Adaptation Plan to help us prioritise and plan actions needed to prepare the city for the environmental, social, cultural and economic impacts of climate change. This plan will include an assessment of risk, vulnerability and adaptive capacity.

2 Physical risks

Current and/or anticipated effects of climate change present significant physical risks to Sydney:

Seriousness

Less Serious !!! Serious !!! Extremely Serious !!!

Timescale

Current	┆----->
Short-term	┆----->
Medium-term	┆----->
Long-term	┆----->

Risks & Adaptation

Sea level rise

Risk:  Timescale: 

Impacts Buildings, Water, Transport, Energy, Human Health. Sea level rise on the NSW coast is expected to increase by 0.18 to 0.91m by 2100. This includes global sea level rise (0.18m to 0.59m), ice flow melt (0.2m), and effects of the East Australian Current (0.12m) (CSIRO and Bureau Meteorology 2007).

More hot days

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health. The CSIRO and Bureau of Meteorology's 2013 State of the Climate report suggests that Australian temperatures are projected to continue to increase, with more extremely hot days and fewer extremely cool days. Primary anticipated effects of climate change for the City are in increases in temperature, increased rainfall and sea level rise. Our Climate Change Adaptation Plan will provide more information on the expected effects of these changes, and anticipated timescales.

Hotter summers

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health. Through the City's Climate Change Adaptation Plan, a review of all existing climate modelling will assist in determining the exposure for the region. Key sets of data reviewed include those held by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Bureau of Meteorology, Intergovernmental Panel on Climate Change (IPCC), NSW Office of Environment and Heritage and the Australian Government Department of Environment.

More frequent heat waves

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health.

More intense heat waves

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health. The CSIRO and Bureau of Meteorology's 2013 State of the Climate report shows that air and ocean temperatures across Australia are now, on average, almost a degree Celsius warmer than they were in 1910, with most of the warming occurring since 1950. This warming has seen Australia experiencing more warm weather and extreme heat, and fewer cool extremes. There has been an increase in extreme fire weather, and a longer fire season, across large parts of Australia. Heatwaves are the natural disaster with highest number of deaths in Australia as demonstrated by the State of Australian Cities <http://www.infrastructure.gov.au/infrastructure/pab/soac/>.

Increased urban heat island effect

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health.

More intense rainfall

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health. Potential changes in frequency and distribution of large storm events is largely unknown, and it is these extreme events that cause the most damage and therefore present the greatest risks. The CSIRO and Bureau of Meteorology's 2013 State of the Climate report suggests that average rainfall in southern Australia is projected to decrease, and heavy rainfall is projected to increase over most parts of Australia.

Increased frequency of large storms

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health. Climate models for rainfall indicate the potential for both increases and decreases which provides a low level of certainty. El Nino remains the greatest uncertainty in projecting the future climate of eastern Australia.

Increased risk of storm surges

Risk:  Timescale: 

Impacts Buildings, Water, Waste, Transport, Energy, Human Health. A major impact would occur where sea level rise is exacerbated by storm surge and tidal influence. Projections for storm surge events in Sydney are largely unknown. On a regional level, there is no detailed information about the frequency and severity of storm surge, rainfall extremes, drought, hail, or links to local extremes such as air pollution and flood.

Compounding factors may worsen the physical effects of climate change in Sydney.

Some parts of the City are built in reclaimed land areas that are already subject to flooding which would be exacerbated by impacts of climate change such as sea-level rise, more frequent and intense storm events, kingtides, and storm surges.

Heat stress in the central business district causes greater peak energy demand. While this may not cause a physical impact currently, it has resulted in excessive expenditure by the Government owned electricity network to ensure security of supply during these extreme heat waves.

Sydney considers that the physical impacts of climate change could threaten the ability of businesses to operate successfully.

There are low lying areas in the south of the City that will be particularly vulnerable to flooding due to more extreme rain events in the future.

Heat stress in the central business district causes greater peak energy demand. While this may not cause a physical impact currently, it has resulted in excessive expenditure by the Government owned electricity network owner to ensure security of supply during these extreme heat waves.

Further information will be provided through the modelling carried out in the development of the City's Climate Change Adaptation Plan.

Agency specific vulnerability and risk assessment methodology

The City of Sydney is currently undertaking a Climate Change Adaptation Plan which will review the risks of climate change on our city and prepare an adaptation and mitigation plan for action. Vulnerability assessments have been undertaken to determine flooding and heat stress as the two major climate change impacts. Some of the projects undertaken by the City are outlined below:

Floodplain Management - Plans need to be put in place to safeguard flood-prone areas from extreme weather. It is also a legal requirement for councils to address flooding issues under the NSW Government's Flood Prone Land Policy. Floodplain management plans are being put together for areas most at risk of flooding, which will look at the causes and extent of possible flooding and what can be done to help affected areas. Reducing the risk of future flooding means managing flood-prone areas properly with responsible development and drainage infrastructure.

Urban Heat Island - The City of Sydney is collecting information to see how shade trees and pavement colour affect urban temperatures. Extreme and persistent high temperatures cause stress to the health of people, plants and animals. Monitoring systems have been installed in Chippendale and Redfern. The poles contain a temperature and humidity meter, and one has a pyranometer which measures the strength of the sun. Each also has a unit that sends the information to a server where it can be viewed online, and a small solar panel to power it all. The City intends to work with a university research partner to best work out costs and benefits of solutions to reduce the urban heat island effect. This could be a way to address rising temperatures resulting from climate change.

Green Roofs and Walls - The City supports green roofs and green walls being created throughout the local area. In June 2012, the City adopted a strategy to help promote green roofs and green walls in the local area and the draft Policy was released for public exhibition in November 2013. At the end of 2012 the City also finalised a research project looking at how the industry and residents see green roofs and walls benefiting the city. This study confirmed that residents understand and appreciate the many benefits green roofs and walls offer. More information at www.cityofsydney.nsw.gov.au/green-roofs-and-walls.

More information on the projects above at cityofsydney.nsw.gov.au.

3 Adaptation

Sydney does not have a city-wide plan for increasing Sydney's resilience to the expected physical effects of climate change.

The City of Sydney is continuing to develop a Climate Change Adaptation Plan which reviews the risks of climate change on our city and prepare an adaptation and mitigation plan for action.

This work expands on work done through the Environmental Management Plan, Sustainable Sydney 2030 and Decentralised Energy and Decentralised Water Master Plans and is linked to work being undertaken on the City's Advanced Waste Treatment and Energy Efficiency Master Plans currently in development.

As outlined in other parts of this report, a number of adaptive actions have been undertaken to date, including; the Greening Sydney plan, development of the Green Roofs and Walls Policy, Floodplain Management Plans (<http://www.cityofsydney.nsw.gov.au/vision/better-infrastructure/floodplain-management>), assessment of Urban Heat Island Effect (<http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/carbon-reduction/urban-heat-island>), installation of renewable PV systems (<http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/carbon-reduction/renewable-energy>), installation of LED lighting (<http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/carbon-reduction/led-lighting-project>), and more.

The Climate Change Adaptation Plan is expected to be completed by end 2013/14.

Actions Sydney is taking to reduce the risk to infrastructure, citizens, and businesses from climate changes include the following:

Sea level rise

Storm water capture systems

The City's Decentralised Water Master Plan includes strategies for stormwater capture and reuse. Decentralised water is about improving the way water is being used for buildings and operations, sourcing water locally for non-drinking purposes and the quality of our waterways. The City of Sydney has worked closely with a huge range of industry partners including Sydney Water, to come up with a solid master plan that will ensure the local area's water needs are met sustainably. We are thinking locally, rather than relying on large-scale remote solutions. Localised management of water, wastewater and stormwater is a major part of the plan. The best solution for Sydney is based on water efficiency, recycled water options, a reduction in stormwater pollution and cost. The plan, available for download below, details how we aim to bring together these solutions, where they should be located and how they will perform. More information is available at http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0005/122873/Final-Decentralised-Water-Master-Plan.pdf.

More hot days

Retrofit of existing buildings

The City has almost completed the retrofit of 45 of its major buildings with energy and water savings measures. The retrofit will cut energy use by 6,641 MWh (megawatt hours), reducing greenhouse gas emissions by 23 per cent per year and water consumption by 56,313 kL per year. The energy and water savings will be independently verified. Payback is estimated within nine years. Over the coming months energy and water saving equipment will be commissioned, fine-tuned and monitored to achieve the prescribed results. Following the commissioning period the City of Sydney's Property team will record 12 months utility usage figures to verify the savings achieved. These will be verified using industry standard measurement and verification in line with the Best Practice Guide to Measurement of Energy/Water Savings.

Projects implemented to date include:

- lighting upgrades
- voltage reduction on lighting circuits
- amenities upgrades
- building management control system (BMCS) upgrades and fine tuning
- pool circulation pump upgrades
- provision of waterless woks to food retail tenants
- voltage power optimisation
- boiler and compressor optimisation
- desktop computer power management, and more.

More information on this project is to be found in the City's Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Hotter summers

Community Solar Projects

The City of Sydney is currently investigating a number of projects to take advantage of the increase in sunny days including encouraging community solar projects, installation of PV arrays on a number of City of Sydney buildings and facilities and more through the Decentralised Energy Renewable Energy Master Plan currently in development.

More frequent heat waves

Retrofit of existing buildings

The City of Sydney's Better Buildings Partnership (BBP) is a collaborative partnership with Sydney's leading commercial building owners. Through collective targets and working collaboratively, the Partnership will help improve the environmental performance in the commercial building sector, which is responsible for approximately 50 per cent of local government area emissions. The City of Sydney's CitySwitch Green Office Program, the Smart Green Apartments Program, and the Smart Green Business Program and Environmental Upgrade Agreements service are assisting tenants, businesses, and residents and building owners to increase the environmental performance of their buildings and residences.

More intense heat waves

Retrofit of existing buildings

The City has awarded the tender to retrofit 45 of its major buildings with energy and water savings measures. The retrofit will cut energy use by 6,641 MWh (megawatt hours), reducing greenhouse gas emissions by 23 per cent per year and water consumption by 56,313 kL per year. The energy and water savings will be independently verified. Payback is estimated within nine years. Over the coming months energy and water saving equipment will be commissioned, fine-tuned and monitored to achieve the prescribed results. Following the commissioning period the City of Sydney's Property team will record 12 months utility usage figures to verify the savings achieved. These will be verified using industry standard measurement and verification in line with the Best Practice Guide to Measurement of Energy/Water Savings.

Projects implemented to date include:

- lighting upgrades
- voltage reduction on lighting circuits
- amenities upgrades
- building management control system (BMCS) upgrades and fine tuning
- pool circulation pump upgrades
- provision of waterless woks to food retail tenants
- voltage power optimisation
- boiler and compressor optimisation
- desktop computer power management, and more.

More information on this project is to be found in the City's Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Increased urban heat island effect

Green roofs/walls

The City of Sydney's "Greening Sydney" Plan includes targets to increase canopy and green space in the local government area. More information is available at <http://www.greenvillages.com.au/uncategorized/our-green-sydney-plan/> and at http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0009/135882/GreeningSydneyPlan.pdf. The City has developed a Green Roofs and Walls strategy to combat the effects of climate change, enhance amenity and increase the potential for local food production. The City actively promotes the uptake of green walls across the local government area. More information including a map of green walls to further inspire, resources and tips are available at <http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/greening-the-city/green-roofs-and-walls>. The Green Roofs and Walls Strategy and Greening Sydney Plan are opportunities to increase community education and engagement regarding Urban Heat Island Effect. In addition, the City of Sydney's website includes a page of information addressing this issue at <http://www.cityofsydney.nsw.gov.au/vision/towards-2030/sustainability/carbon-reduction/urban-heat-island>.

More intense rainfall

Maintenance/repair – leaking infrastructure

The City of Sydney's Building Energy and Water Efficiency Retrofit is retrofitting existing City of Sydney buildings and facilities to ensure they are more efficient. As noted above and elsewhere in this report, projects implemented to date include:

- lighting upgrades
- voltage reduction on lighting circuits
- amenities upgrades
- building management control system (BMCS) upgrades and fine tuning
- pool circulation pump upgrades
- provision of waterless woks to food retail tenants
- voltage power optimisation
- boiler and compressor optimisation
- desktop computer power management, and more.

More information on the City's retrofit programs is to be found in the Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Increased frequency of large storms

Flood mapping

In NSW, local councils are responsible for managing flooding. The NSW Government Flood Prone Land Policy assists in determining if development on floodplains is appropriate and sustainable. The Floodplain Development Manual, developed by the NSW Government requires preparation of a Flood Study and a Floodplain Risk Management Study and development and implementation of a Floodplain Risk Management Plan. The City of Sydney local government area comprises eight drainage catchment areas in; Alexandra Canal, Blackwattle Bay, Centennial Park, City area, Darling Harbour, Johnston's Creek, Rushcutters Bay and Woolloomooloo.

As part of our floodplain management approach, the City is undertaking the first ever city-wide look at the drainage issues and flood risks that exist in Sydney. The work being undertaken includes a series of surveys of catchment areas. These surveys will help us understand where drainage and mitigation works are required to ensure water flow and drainage is properly managed across the local government area. This will dramatically reduce flood risk and safeguard local homes and businesses. The first Management Plan to be approved by Council is the Green Square West Kensington (GSWK) Floodplain Risk Management Study and Plan. This catchment is one of the lowest lying areas of our city, and subject to water ponding and flooding. The GSWK Plan proposes the creation of a large underground drainage culvert running 2.3 kilometres through the Green Square town centre from Link Road in Zetland to the Alexandra Canal. The culvert will drain floodwaters away from homes, businesses and roads in and around Joynton Avenue, Lachlan Street, South Dowling Street and Botany Road. The proposed \$80 million drainage work will take up to three years to complete, and will be co-funded by Sydney Water. The proposed drainage works will also include stormwater quality improvement devices, such as pollutant traps and rain gardens to meet the objectives of the City's Decentralised Water Master Plan, which aims to reduce stormwater pollutants entering water ways. Progress reports are to be found in the Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Increased risk of storm surges

Storm water capture systems

The City of Sydney began building the second stage of Sydney Park's water reuse scheme in April 2013. Works will be completed in phases and are due for completion mid-2014. The project will deliver the city's largest water harvesting system, and help us achieve our 2030 target for 30 per cent of water demand to be met through local water capture and reuse. This project is the first of a suite of initiatives being formulated under the Decentralised Water Master Plan and is being partially funded through the City of Sydney and the Australian

Government's Water for the Future initiative through the National Urban Water and Desalination Plan. The Sydney Park Water Reuse Scheme Stage II follows the successful implementation of Stage I, completed in 2010. Stage I harvested and treated 50 million litres of stormwater during 2012/13 for the topping up of wetlands. The developed design for Stage II not only aims to expand stormwater treatment and reuse in Sydney Park but will include landscape improvement works to enhance the park's look and recreation and play opportunities. Stage II will expand the capacity of the wetlands to supply water for irrigation within the park, as well as offer a recycled water supply to other users, beyond the park. It will involve diverting stormwater via a new underground pipe into the Sydney Park wetlands from the stormwater channel that runs within the park near the corner of Euston Road and Sydney Park Road. Water will be treated using a gross pollutant trap which removes litter, coarse sediment and organic matter from stormwater via a physical screen, and a bio retention system which collects water in shallow depressions and filters it through plant roots and soil. As water is drawn from the system for reuse, it will receive further treatment through filtration and ultra violet (UV) cleansing processes. Progress reports are to be found in the Green Report at www.cityofsydney.nsw.gov.au/greenreport.

4 Social risks

Sydney faces social risks as a result of climate change.

Migration from rural areas to cities

Current

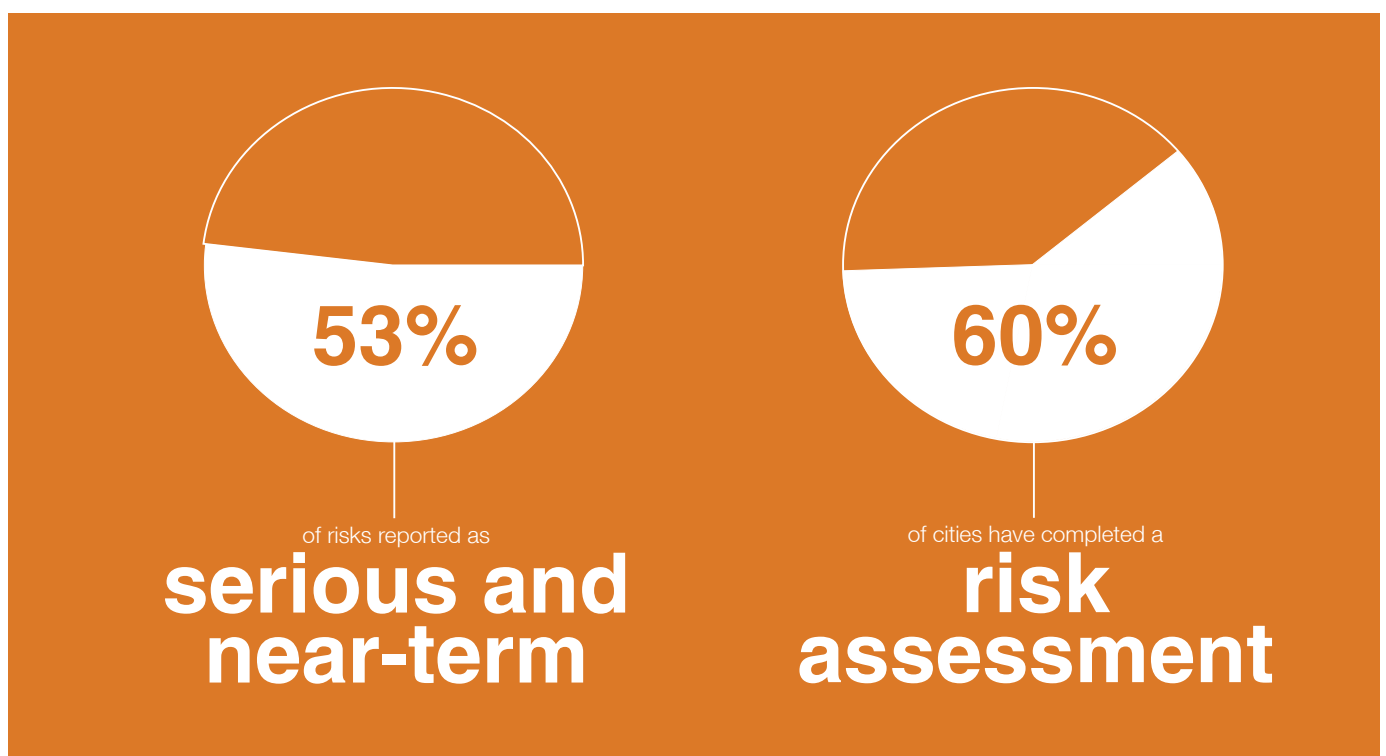
The number of residents in the City of Sydney local government area has increased from 154,073 in 2004 to 190,187 in 2013. It is anticipated that the number of residents will continue to increase with 267,264 residents estimated to be living in the local government area in 2030. Impacts will include increased resource demand, increased urban heat island effect and increased demand on services.

Increased resource demand

Current

Increased resource demand is expected to increase in the short and long term as the number of residents living in the local government area increases. The impact of this risk will be mitigated by many of the plans the City is investigating and implementing, including the Decentralised Water, Decentralised Energy and Advanced Waste Treatment Master Plans.

Cities are at risk from climate change



Increased demand for public services (including health)

Current

Increased demand for public services including waste disposal, child care, provision of meals at community centres and through Meals on Wheels and youth and homelessness services is expected to increase in the short and long term as the number of residents living in the local government area increases. The impact of this risk will be mitigated by many of the plans the City is investigating and implementing, including the Economic Development Strategy, Retail Action Plan, Tourism Action Plan and Social Sustainability Strategy (in development). In addition, the City's Community Strategic Plan includes actions to mitigate these risks. More information is available at cityofsydney.nsw.gov.au.

Increased risk to already vulnerable populations

Short-term

Affordable housing is a basic requirement and essential component of an inclusive, dynamic and sustainable city. Affordable housing refers to 'reasonable' housing costs in relation to income. A common benchmark is that affordable housing is housing that does not absorb more than 30% of a very low, low or moderate household's income. The City of Sydney is committed to working with other governments to address the chronic shortage of affordable housing in the local area. Short and long-term homelessness, combined with affordable housing shortages, are serious issues for central Sydney and its surrounding areas. Local governments must advocate to state and federal governments to act on affordable housing shortages and help facilitate planning permissions to make way for different types of housing. Sustainable Sydney 2030 establishes an ambitious target that by 2030, 7.5% of all housing in the local area will be social housing provided by government and community providers and 7.5% will be affordable housing delivered by not-for-profit or other providers. More information at <http://www.cityofsydney.nsw.gov.au/vision/towards-2030/affordable-housing>.

5 **Opportunities**

Climate change action presents economic opportunities for Sydney.

Opportunities

Sydney is positioning itself to take advantage of opportunities from taking climate change action.

Improved efficiency of operations

The City has almost completed the retrofit of 45 of its major buildings with energy and water savings measures. The retrofit will cut energy use by 6,641 MWh (megawatt hours), reducing greenhouse gas emissions by 23 per cent per year and water consumption by 56,313 kL per year. The energy and water savings will be independently verified. Payback is estimated within nine years. These retrofits are increasing efficiency of our buildings but also reducing maintenance costs and utility charges. More information on this project is to be found in the City's Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Development of new business industries (e.g. clean tech)

Sydney has become the first city in Australia to roll-out new energy-efficient light emitting diode (LED) street and park lights. The City of Sydney will replace 6,448 conventional lights; saving nearly \$800,000 a year in electricity bills and maintenance costs and reducing greenhouse gas emissions in City owned street lights by 51 per cent. More information on this project is to be found in the City's Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Development of new business industries (e.g. clean tech)

The City has awarded the tender to install solar photovoltaic panels on around 30 of its major buildings. The installation of the panels is estimated to deliver a 4.0 per cent reduction in the City's overall greenhouse gas emissions and produce clean renewable energy equivalent to 12.0 per cent of the City's own energy requirements following the completion of the Building Energy Retrofit and LED Street lighting projects. The \$6 million system is expected to produce up to two MWh (megawatt hours) annually saving up to 2,074 tonnes of CO₂-e per annum. The output of the panels will be reviewed regularly. Indicative figures based on current analysis suggest that the cost per tonne of carbon abatement for sites where panels are already installed is approximately \$10 per tonne with a payback period of approximately 13 years. Currently, electronic displays are being created to communicate this project, its benefits and performance to the local community at each location. For now, this is set to be the largest solar rooftop project in Australia. More information on this project is to be found in the City's Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Development of new business industries (e.g. clean tech)

The City now uses sustainable biofuels in many of our diesel trucks. These combine mineral diesel fuel with recycled cooking oil and waste animal fats. A total of 216,800 litres of B20 and B50 sustainable bio-diesel was used during Q2 enabling emission savings of 18 per cent per vehicle. The City was a foundation partner with Mitsubishi and first introduced the fully electric iMiEV to Australia 3 years ago. Initially leased, these first two vehicles have now been returned to Mitsubishi. The City has now expanded its electric vehicle fleet through the purchase of 18 zero emission electric vehicles charged with 100% renewable energy. The vehicles are used by Council staff for daily inspections and meeting attendance.

Increased energy security

Trigeneration is a key part of the City's goal to reduce greenhouse gas emissions by 70 per cent below 2006 levels by 2030. The Decentralised Energy Master Plan - Trigeneration shows that, if implemented, a decentralised energy network could provide lower cost of carbon abatement than solar, wind, hydro or coal or gas-fired power station carbon capture and storage. We are investigating the installation of a low carbon trigeneration plant that would produce clean local power, heating and cooling for Sydney Town Hall and the neighbouring Town Hall House where over 1,500 City employees work. Hundreds of lights, printers, computers, air conditioners and the City's electric vehicle fleet would be powered by the plant. Trigeneration is more than twice as efficient as coal-fired power stations that produce around 80% of Sydney's electricity – heat by-products created at coal-fired power stations are wasted but trigeneration captures and uses them for air-conditioning, heating and hot water services. Installing trigeneration at Town Hall House would allow for future expansion to the nearby Queen Victoria Building, and potentially other buildings in the area. Trigeneration is an extremely efficient decentralised energy technology where electricity is made near where it is used, avoiding the need to bring electricity over long distances. It replaces coal-fired electricity and reduces emissions from connected buildings. Producing energy locally helps avoid expensive upgrades to the NSW electricity grid of poles and wires which have pushed up power prices. Currently, consumers are forced to pay for upgrades to an aging and inefficient network that moves coal-fired electricity from the Hunter Valley to Sydney. More information is available at <http://www.cityofsydney.nsw.gov.au/vision/sustainable-sydney-2030/sustainability/carbon-reduction/trigeneration>.

Increased infrastructure investment

The City of Sydney and Transport for NSW have signed a development agreement that sets out the standards for the construction of light rail through the local area, which the City is contributing \$220 million towards. The light rail service will run from Circular Quay along George Street via Central railway station, along Devonshire Street in Surry Hills, through Moore Park to the University of NSW and to the Prince of Wales Hospital in Randwick.

Increased infrastructure investment

The \$8 billion Green Square project is transforming the southern precinct of our local area into a vibrant and sustainable urban environment. From its industrial past, Green Square is emerging as a place of innovative housing design, bespoke business and retail, and creative and engaged communities proud of their area's past and future. Green Square is set to become a true exemplar of green living with developments linked to recycled water, people linked to shops, parks, gardens and entertainment with bike and walking routes, and public transport. At the heart of the Green Square development is the new town centre, a major new residential, retail and cultural hub. The City has committed \$440 million over the next 10 years to deliver quality infrastructure and community facilities such as the new library, plaza, and aquatic centre as well as parks, public art and community creative hub. The City's role in Green Square is to ensure planning controls for the new town centre and nearby precincts allow for growth and development that is sustainable, innovative and respects the character of existing neighbourhoods. Green Square is the fastest growing area in the City's local area – new families are moving in every day, while residents in long-established suburbs like Rosebery have lived there for many generations. This diverse community needs opportunities to create and build connections while exploring their interests.

CDP cities represent a growing slice of the world's economy.



That's
28%
of world GDP...



...an incredible
\$21 trillion
in total annual output.



Cities reporting to CDP
have a combined annual budget of
\$954 billion
roughly the annual budget of the UK.

Increased infrastructure investment

In addition to the projects noted above, the City of Sydney is working to improve the local area and its facilities. A number of landmark buildings and facilities in the local area are getting a facelift, including Glebe Town Hall, libraries and community centres. The City wants to be better prepared for heavy rains and flooding. In response, floodplain management plans are being put together for areas most at risk of flooding, which will look at the causes and extent of possible flooding and what can be done to help affected areas. Reducing the risk of future flooding means managing flood-prone areas properly with responsible development and drainage infrastructure. New parks, pools and open spaces are being created with clean technologies built in, including stormwater capture, LED lighting, solar panels and more. The new Prince Alfred Park Pool complex utilises the latest filtration systems, and incorporates the best in sustainable practices, including water-saving fixtures, stormwater harvesting and a green roof of native grasses to regulate temperature.



LGO Date and boundary

Sydney is reporting a GHG measurement inventory for a period of one year.

Fri 01 July 2011 – Sat 30 June 2012

Boundary typology used for Sydney's GHG emissions inventory:

Departments, entities or companies over which financial control is exercised.

LGO GHG emissions data

Major sources of emissions included in Sydney's GHG emissions inventory:

Buildings

Electricity generation

Electricity transmission and distribution

Municipal vehicle fleet

Street lighting and traffic signals

Waste collection

Emissions – Local Government

Primary protocol, standard or methodology used to calculate GHG emissions.

Greenhouse Gas Protocol: Public Sector Standard

- Internal utility monitoring system for electricity and gas
- Waste audit figures
- Fleet and major contractors fuel usage
- Flight distance information from travel provider
- Taxi journeys from cabcharge

All energy sources are converted into emissions using factors listed in the National Greenhouse Factors workbook

Further Information

Carbon neutral documentation all available online at <http://www.cityofsydney.nsw.gov.au/carbon>.

Total (Scope 1 + 2) emissions for Sydney:

36,484
metric tonnes CO₂e

Total amount of fuel (direct/Scope 1 emissions) consumed in Sydney during the reporting year:

Natural Gas

29,360,267 MJ

Diesel/Gas oil

1,186,172 L

Motor Gasoline (Petrol)

187,621 L

Motor Gasoline (Ethanol)

12,964 L

Liquefied Petroleum Gas (LPG)

19,621 L

Biodiesels

131,386 L

Electricity, heat, steam, and cooling (indirect/ Scope 2 emissions) that has been consumed by Sydney during the reporting year:

Electricity

36,175,696

kWh

Total (Scope 1 + 2) emissions for Sydney:

36,484

metric tonnes CO₂e

Breakdown of Sydney's
GHG emissions by scope:

Scopes are a common categorisation method. Scope 1: All direct GHG emissions (with the exception of direct CO₂ emissions from biogenic sources). Scope 2: Indirect GHG emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling.

Total Scope 1 activity

4,649

metric tonnes CO₂e

Total Scope 2 activity

31,835

metric tonnes CO₂e

Sydney does measure Scope 3 emissions.

Total Scope 3 activity

Business travel, buildings, waste, paper, contractor fuel, and emissions from events

10,217

metric tonnes CO₂e

Breakdown of emissions by department, facility, greenhouse gas (CO₂, CH₄, N₂O etc) used in Sydney.

Electricity – Buildings (Scope 2)

17,622

metric tonnes CO₂e

Electricity – Buildings (Scope 3)

3,604

metric tonnes CO₂e

Electricity – Parks (Scope 3)

419

metric tonnes CO₂e

Electricity – Streetlighting (Scope 2)

12,164

metric tonnes CO₂e

Electricity – Streetlighting (Scope 3)

2,488

metric tonnes CO₂e

Natural Gas – Buildings (Scope 1)

1,507

metric tonnes CO₂e

Natural Gas – Buildings (Scope 3)

417

metric tonnes CO₂e

Diesel – Fleet (Scope 1)

2,258

metric tonnes CO₂e

Diesel – Fleet (biodiesel) (Scope 1)

15

metric tonnes CO₂e

Diesel – Fleet (Scope 3)

171

metric tonnes CO₂e

ULP – Fleet (Scope 1)

237

metric tonnes CO₂e

ULP – Fleet (Scope 3)

19

metric tonnes CO₂e

LPG – Fleet (Scope 1)

8

metric tonnes CO₂e

LPG Fleet (Scope 3)

1

metric tonnes CO₂e

Diesel – Contractors (Scope 3)

1,009

metric tonnes CO₂e

ULP – Contractors (Scope 3)

207

metric tonnes CO₂e

LPG – Contractors (Scope 3)

25

metric tonnes CO₂e

Flights (Scope 3)

21

metric tonnes CO₂e

Taxis (Scope 3)

37

metric tonnes CO₂e

Refrigerants (Scope 1)

618

metric tonnes CO₂e

Diesel – On Site Fuel (Scope 1)

5

metric tonnes CO₂e

Council Waste (Scope 3)

1,489

metric tonnes CO₂e

New Year's Eve Event (Scope 3)

255

metric tonnes CO₂e

Paper – A4 (Scope 3)

51

metric tonnes CO₂e

Paper – A3 (Scope 3)

4

metric tonnes CO₂e

Paper – Plotter (Scope 3)

1

metric tonnes CO₂e

Electricity – Parks (Scope 2)

2,048

metric tonnes CO₂e

LGO External verification**Sydney's emissions decreased.**

As referenced elsewhere in this submission, numerous emission reduction projects have been implemented across City operations including; fleet emission reduction programs, building energy retrofits, installation of LED streetlighting, installation of solar PV and staff education and engagement programs.

Sydney's emissions have been externally verified.

Verification was conducted to a "reasonable" level to comply with the National Carbon Offset Standard by independent auditors, Banarra.

Further Information

All carbon related documentation is available on the City of Sydney website at:
<http://www.cityofsydney.nsw.gov.au/vision/carbon>

C Date and boundary

Sydney is reporting a GHG measurement inventory for a period of one year.

Fri 01 Jul 2005 - Fri 30 Jun 2006

Boundary typology used for Sydney's GHG emissions inventory:

Geopolitical Boundary – physical areas over which local government has jurisdictional control

C GHG emissions data

Primary protocol, standard or methodology used to calculate GHG emissions.

Other: CCAP City reporting tool by Kinesis. All energy sources are converted into emissions using factors listed in the National Greenhouse Factors workbook.

Methodology methods used for calculation, and processes for data collection.

Consultancy commissioned to prepare emissions inventory based on utility network data, transport and waste analysis.

Emissions – Community

Total (Scope 1 + 2) emissions for Sydney:

5,458,899

metric tonnes CO₂e

Scopes are a common categorisation method. Scope 1: All direct GHG emissions (with the exception of direct CO₂ emissions from biogenic sources). Scope 2: Indirect GHG emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling.

Total Scope 1 activity

895,105

metric tonnes CO₂e

Total Scope 2 activity

4,563,794

metric tonnes CO₂e

Breakdown of these emissions by end user, economic sector, IPCC sector, GHG or any other classification system used:

Non-residential – Buildings

4,039,490

metric tonnes CO₂e

Non-residential – Transport

738,704

metric tonnes CO₂e

Non-residential – Waste

250,552

metric tonnes CO₂e

Residential – Buildings

524,304

metric tonnes CO₂e

Residential – Transport

156,401

metric tonnes CO₂e

Residential – Waste

57,485

metric tonnes CO₂e

Electricity, heat, steam, and cooling (indirect/Scope 2 emissions) that has been consumed by Sydney during the reporting year:

Electricity

3,958,863

kWh

Gas

3,258,584

GJ

Scope 3 emissions for Sydney have been measured.

Waste

308,037
metric tonnes CO₂e

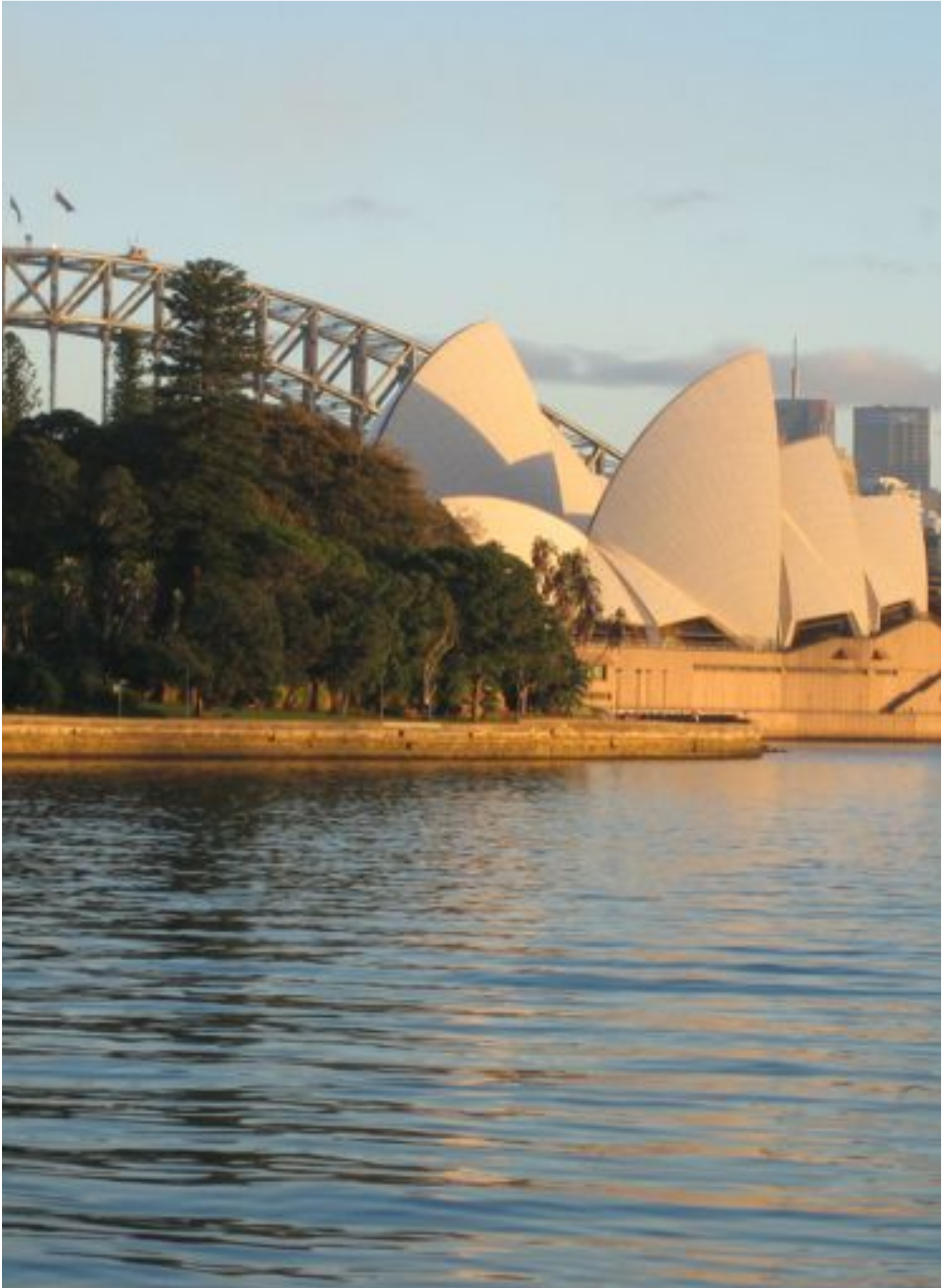
Some scope 3 emissions are included in scope 2 amounts listed above for emissions resulting from the extraction, processing, transport and transmission losses of electricity and fuels.

Sydney's emissions decreased.

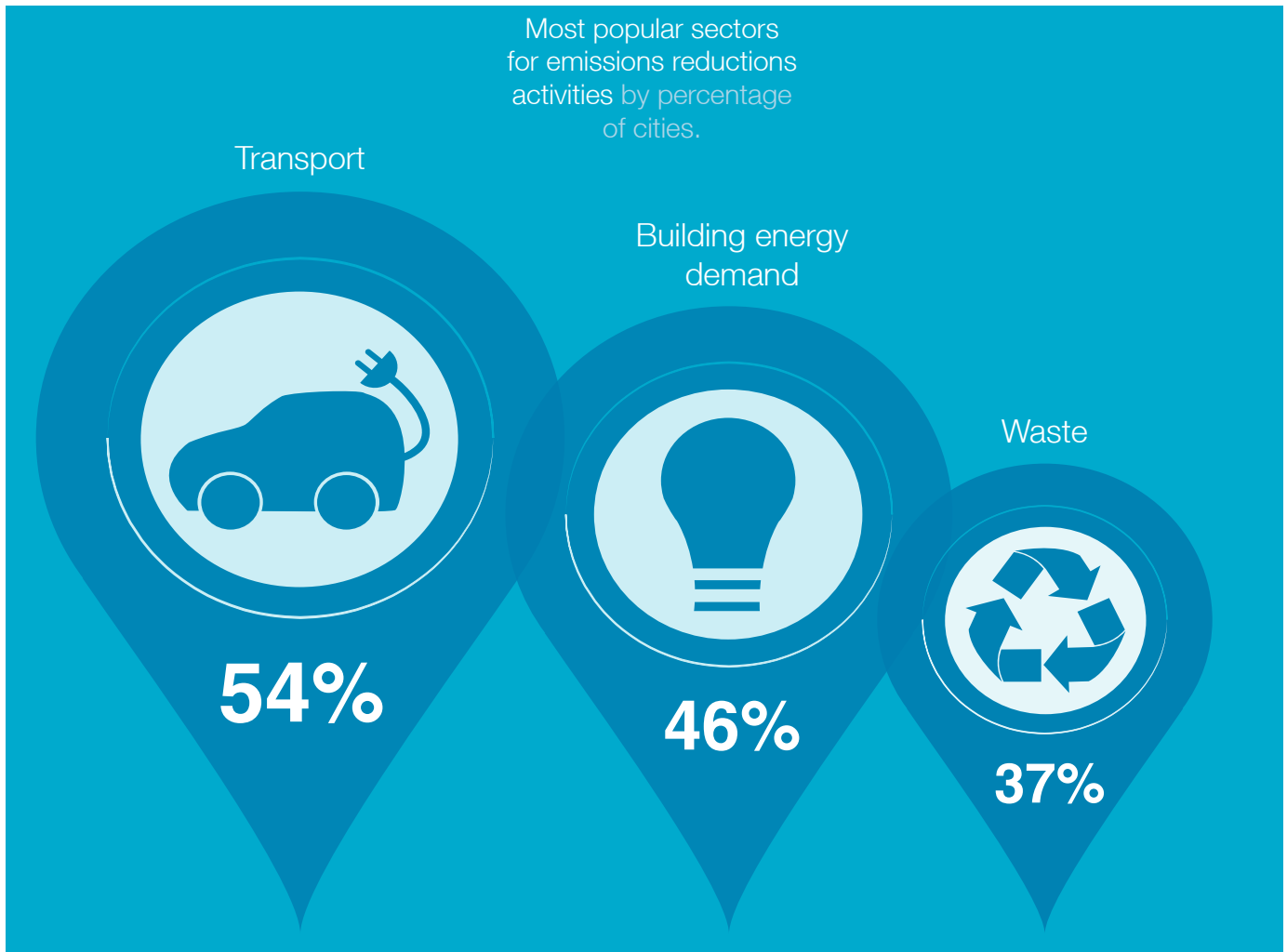
Emissions have decreased due to cleaning of the grid, increased network costs leading to greater awareness and behaviour change (indicating there is some price elasticity in electricity consumption), improved energy efficiency, uptake of solar PV and weather influences.

Sydney's emissions have not been externally verified.

An internal audit of the Implementation Plan for the City of Sydney's Environmental Management System (EMS) included an audit of a random sample of GHG emissions data reported in our Green Report. This audit did not issue any corrective actions in relation to the processes followed. Our carbon inventory is audited externally on an annual basis as part of our certification under the National Carbon Offset Standard (NCOS).



Cities are undertaking 2110 activities to mitigate and adapt to climate change



Strategy

6 Local government operations – GHG emissions reduction

Sydney has a GHG emissions reduction target in place for local government operations.

Sydney's local government operations
GHG emissions reduction target in detail:

Baseline year

2006

Baseline emissions

52,972

metric tonnes CO₂e

Percentage reduction target

70%

GHG sources to which the target applies

Scope 1 + 2 + 3

Target date

2030

Baseline emissions, shown for scope 1 & 2. The City is investing in energy efficiency upgrades, solar photovoltaics, trigeneration and LED street lighting to achieve the 70% reduction target by 2030.

Activities undertaken to reduce Sydney's emissions in its government operations:

Energy Demand in Buildings

Energy efficiency/ retrofit measures

17 metric tonnes CO₂e

The City has awarded the tender to retrofit 45 of its major buildings with energy and water savings measures. The retrofit will cut energy use by 6,641 MWh (megawatt hours), reducing greenhouse gas emissions by 23 per cent a year and water consumption by 53,313 kL per year. The energy and water savings will be independently verified. Payback is estimated within nine years. The two-year, \$6.9 million project will include an upgrade of the City of Sydney's pools, community centres, libraries and car parks. Old inefficient lights are being replaced and heating and air-conditioning systems are being upgraded and improved. Water-saving devices will include aerated taps and shower heads, cistern modifiers in toilets and waterless urinals. Over the coming month's energy & water saving equipment will be commissioned. Following the commissioning period the City Property team will record 12 months utility usage figures to verify the savings achieved. More information is available in the City's Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Energy Supply

Clean energy procurement strategies

1 metric tonne CO₂e

A major part of helping the City meet its renewable energy targets is the installation of solar photovoltaic panels on around 30 of its major buildings. The installation of the panels is estimated to deliver a 4.0 per cent reduction in the City's overall greenhouse gas emissions and produce clean renewable energy equivalent to 12.0 per cent of the City's own energy requirements following the completion of the Building Energy Retrofit and LED Street lighting projects. The \$6 million system is expected to produce up to two MWh (megawatt hours) annually saving up to 2,074 tonnes of CO₂-e per annum. The output of the panels will be reviewed regularly. Indicative figures based on current analysis suggest that the cost per tonne of carbon abatement for sites where panels are already installed is approximately \$10 per tonne with a payback period of approximately 13 years. Approximately 50 per cent of the installation is now complete. Installation of the systems will take place over the next two years. The systems will be spread across multiple properties in the City of Sydney, such as Glebe, Redfern and Paddington town halls, the Redfern Oval grandstand, plus a number of libraries, council depots, and community centers. It is estimated

the panels will supply the equivalent of up to 12.5 per cent of the electrical power needs of City council properties. The installation of the panels is funded using budget previously allocated to purchasing Green Power. The City of Sydney remains carbon neutral through the purchase of carbon offsets. The installation of solar PV panels will complement the installations already in place on rooftops of 18 other City properties including Sydney Town Hall, Alexandria Child Care Centre and Redfern Community Centre and Oval. More information is available in the City's Green Report at www.cityofsydney.nsw.gov.au/greenreport.

Energy Supply

Combined heat and power 20 metric tonnes CO₂e

The City's goal is to produce 70 per cent of its electricity needs from trigeneration and 30 per cent from renewable energy. Trigeneration is more than twice as energy efficient as coal-fired power stations because they use the waste heat from local electricity production to both heat and cool buildings. The rest of the City's reductions in greenhouse gas emissions will come from energy efficiency and other carbon reducing measures such as advanced waste treatment and sustainable transport.

Outdoor Lighting

LED / CFL / other luminaire technologies

50 metric tonnes CO₂e

Sydney has become the first city in Australia to roll-out new energy-efficient light emitting diode (LED) street and park lights. The City of Sydney will replace 6,448 conventional lights; saving nearly \$800,000 a year in electricity bills and maintenance costs and reducing greenhouse gas emissions in City owned street lights by 51 per cent. A joint venture of GE and UGL Limited, selected by tender, is installing LED street lights in the City of Sydney LGA, as part of a \$7 million three year project. The project was approved with a carbon abatement cost of \$17 per tonne. Simple payback is estimated within ten years. A joint venture of GE and UGL Limited, selected by tender, has begun installing LED street lights in the City of Sydney LGA, as part of a \$7 million three year project. The project was approved with a carbon abatement cost of \$17 per tonne. Simple payback is estimated within ten years. Sydney is one of the largest users of street lighting in NSW with 22,000 lights. Of these, 13,500 are maintained by Ausgrid and 8,500 by the City. This quarter, 869 luminaries (lights) were changed. The City is also using LED technology for lighting displays, such as the catenary lighting system in Pitt Street Mall.

Public procurement

Encourage low carbon products

Green concrete has the potential for a 44 per cent reduction in the use of Portland cement through the use of fly ash and blast furnace slag, up to 20 per cent replacement of aggregates and sand with recycled material and up to 72 per cent reduction of potable water usage.

Transport

Improve fuel economy and reduce CO₂ from motorized vehicles

All new diesel trucks bought by the City now meet the stringent Euro 5 engine standards which aim to reduce fuel consumption and emissions. The City now uses sustainable biofuels in many of our diesel trucks. These combine mineral diesel fuel with recycled cooking oil and waste animal fats. A total of 216,800 litres of B20 and B50 sustainable bio-diesel was used during Q2 enabling emission savings of 18% per vehicle. The City was a foundation partner with Mitsubishi and first introduced the fully electric iMiEV to Australia 3 years ago. Initially leased, these first two vehicles have now been returned to Mitsubishi. The City has now expanded its electric vehicle fleet through the purchase of 18 zero emission electric vehicles charged with 100% renewable energy. The vehicles are used by Council staff for daily inspections and meeting attendance. Behaviour change initiatives across the organisation to support these changes to our fleet include the professional driver educators working “in cabin” with our operational drivers to improve their low emission driving skills and behaviours.

7 Community – GHG emissions reduction

Sydney has a GHG emissions reduction target in place for its community.

Sydney's community GHG emissions reduction target in detail:

Baseline year

2006

Baseline emissions

52,972

metric tonnes CO₂e

Percentage reduction target

70%

GHG sources to which the target applies

Scope 1 + 2

Target date

2030

Activities currently being undertaken to reduce emissions city-wide:

Energy Demand in Buildings

Energy efficiency/ retrofit measures

The Smart Green Business Program, run in partnership with Sydney Water assists non-office based businesses in the local government area to improve environmental performance. During the first four years (to June 2013) the program assisted 366 small to medium sized businesses. Phase III of this program commenced in July 2013 to support medium to large non-office based businesses with an initial focus on the accommodation sector. The program provides hands on sustainability advice and implementation support for water and waste reduction and provides referral to State energy efficiency programs. CitySwitch Green Office is a national office tenant energy efficiency program run in partnership with the cities of Sydney, North Sydney, Parramatta, Willoughby, Ryde, Adelaide, Perth, Melbourne and the national partner, Net Balance Foundation. The program is also supported by the NABERS national administrator: the Office of Environment and Heritage (NSW). The City of Sydney is the national administrator. The program provides advice, resources and recognition to participants who commit to achieving highly energy efficient offices as measured by the NABERS Energy rating system. CitySwitch Green Office aspirational targets are that by June 2015 the program will have engaged with more than 20 per cent of commercial office space in participating Council areas, being 3.27 million square meters, more than 650 tenancies and annual CO₂ reduction of 163,000 tonnes.

Financing mechanisms for retrofit

The City's environmental upgrade finance is part of the NSW Government's recently introduced Environmental Upgrade Agreements (EUA), which allows councils to enter into agreements with property owners and finance providers in order to fund works aimed at improving the energy, water or environmental efficiency of their building. Under this scheme, a finance provider provides funds to a building owner for an environmental improvement project, with the funding repaid over time via Council charges on the land. Environmental upgrade finance also allows the cost of an upgrade to be shared with the tenant. Under the agreement, a building owner may pass on part of the cost of the upgrade to the tenant providing the amount does not exceed the financial saving that the tenant will benefit from as a result of the upgrade. This means that tenants can enjoy the benefits of an environmental upgrade in the short-term and operating cost savings in the long-term.

Renewable on-site energy generation

The Better Buildings Partnership (BBP) is a collaborative partnership with Sydney's leading commercial building owners. The Partnership will support the implementation of the City's green infrastructure plan, play an important role in developing and advocating for solutions to key issues and barriers facing building owners and help improve the environmental performance in the commercial building sector, which is responsible for approximately 50 per cent of local government area emissions. The Partnership is directed by a Leadership Panel, consisting of the Sustainability Managers of the founding members, and will deliver solutions as defined in an annual work plan.

Energy efficiency/retrofit measures

The City of Sydney's Smart Green Apartments program aims to create a more sustainable apartment building sector by inspiring, driving and supporting greener, more cost effective and efficient buildings, minimising environmental impacts and improving liveability in strata communities. The current focus of the program is on supporting the implementation of the recommendations made to the 30 participating apartment buildings. A participant network trial was completed to support SGA buildings to implement recommendations from their Sustainability Action Plans. Fifteen of the thirty Smart Green Apartments buildings actively participated in 6 monthly forums in which building representatives, (a mixture of owners and strata and building managers) shared case studies and experiences gained through undertaking building and equipment efficiency upgrades. The Clean Energy Finance Corporation (Low Carbon Australia) strata finance working group is working with six SGA buildings to progress the development of new financial products and services for the strata apartment sector. Five buildings have been selected to participate in a decentralised e-waste and household problem waste collection trial. Due to significant interest in the trial a further five buildings are being offered a one-off e-waste muster. A trial of a large scale worm farm to reuse food waste and develop a best practice model has commenced in a SGA apartment building located in Erskineville. This trial will be managed by the Green Living Centre, a partnership between the City of Sydney and Marrickville Councils. The City of Sydney's Better Buildings Partnership (BBP) is a collaborative partnership with Sydney's leading commercial building owners. The Better Buildings Partnership is supportive of the City's investigations into green infrastructure. They play an important

role in developing and advocating for solutions to key issues and barriers facing building owners and help improve the environmental performance in the commercial building sector, which is responsible for approximately 50 per cent of local government area emissions.

Energy Supply

Combined heat and power

The City of Sydney's Better Buildings Partnership (BBP) is a collaborative partnership with Sydney's leading commercial building owners. The Better Buildings Partnership is supportive of the City's investigations into green infrastructure. They play an important role in developing and advocating for solutions to key issues and barriers facing building owners and help improve the environmental performance in the commercial building sector, which is responsible for approximately 50 per cent of local government area emissions.

Low or zero carbon energy supply generation

Trigeneration is a key part of the City's goal to reduce greenhouse gas emissions across the entire local government area by 70 per cent below 2006 levels by 2030. This includes a target of 70 per cent of electricity from trigeneration by 2030. The City is investigating plans to initially fuel trigeneration by low carbon natural gas to enable the construction of the first precincts. We are aiming to replace this low carbon natural gas by renewable gases by 2030. The final Decentralised Energy - Trigeneration Master Plan was adopted by Council in June 2013. It forms part of the City's Green Infrastructure Plan and completes the interim Trigeneration Master Plan, published in 2010/11. The Master Plan includes new results for four "hot spot" zones, bringing the new total trigeneration and cogeneration potential capacity to 477MWe (previously 360MWe). The adopted Master Plan also contains updated information about the negligible air quality impacts, availability of natural gas supplies, case studies for buildings to connect to the thermal energy network and for domestic fuel cell cogeneration.

Optimize traditional power/energy production

The City is looking at technologies and actions we can use to reduce energy consumption and greenhouse gas emissions across the local government area through an Energy Efficiency Master Plan as part of our suite of energy related Master Plans.

Low or zero carbon energy supply generation

Renewable energy is a key part of the City's goal to reduce greenhouse gas emissions across the entire local government area by 70 per cent below 2006 levels by 2030. This includes targets to replace 100 per cent of the natural gas supplying the trigeneration network with renewable gas and 30 per cent renewable electricity generation by 2030. Together, trigeneration fuelled by renewable gas and electricity generated from renewable sources within 250km of the City's LGA could meet 100 per cent of the City's LGA electricity, heating and cooling requirements by 2030. The Decentralised Energy Master Plan – Renewable Energy has been developed to focus on renewable resources and technologies that could deliver a 100 per cent non-intermittent renewable energy system for the City of Sydney LGA by 2030. The Master Plan is based on the most detailed technical, financial and economic assessment of renewable energy opportunities for the Sydney region. Based on worldwide renewable energy best practice, the Master Plan identifies the mix of renewable electricity and renewable gas resources to overcome the irregularity of supply of renewable energy and to supply the City's LGA with 100 per cent non-intermittent, secure and reliable renewable energy. The plan can be downloaded at <http://www.cityofsydney.nsw.gov.au/vision/sustainable-sydney-2030/sustainability/carbon-reduction/renewable-energy>.

Food

Promotion of climate smart eating habits

The Green Villages Program works to drive, build and celebrate sustainable villages through the development of local sustainability programs, events and resources. Participants are encouraged to develop and drive their own local community projects supported through the Environment Grants Program. In 2012/13 the program expanded to provide face to face engagement through workshops in ten villages: Surry Hills, Alexandria, Green Square, Ultimo, Kings Cross, Woolloomooloo, Taylor Square, Glebe, Rosebery and Waterloo. The Green Village Program aims to directly engage with 27,000 residents (a third of all households) through a combination of face-to-face learning, online engagement and capacity building. This level of engagement should ensure most residential households in the city will become aware of the benefits and resources provided by the program through word of mouth and other channels.

Outdoor Lighting

LED / CFL / other luminaire technologies

Sydney has become the first city in Australia to roll-out new energy-efficient light emitting diode (LED) street and park lights. The City of Sydney will replace 6,448 conventional lights; saving nearly \$800,000 a year in electricity bills and maintenance costs and reducing greenhouse gas emissions in City owned street lights by 51 per cent. A joint venture of GE and UGL Limited, selected by tender, is installing LED street lights in the City of Sydney LGA, as part of a \$7 million three year project. The project was approved with a carbon abatement cost of \$17 per tonne. Simple payback is estimated within ten years. Sydney is one of the largest users of street lighting in NSW with 22,000 lights. Of these, 13,500 are maintained by Ausgrid and 8,500 by the City.

Education

Climate change-focused curriculum

The Green Villages Program works to drive, build and celebrate sustainable villages through the development of local sustainability programs, events and resources. Participants are encouraged to develop and drive their own local community projects supported through the Environment Grants Program. In 2012/13 the program expanded to provide face to face engagement through workshops in ten villages: Surry Hills, Alexandria, Green Square, Ultimo, Kings Cross, Woolloomooloo, Taylor Square, Glebe, Rosebery and Waterloo. The Green Village Program aims to directly engage with 27,000 residents (a third of all households) through a combination of face-to-face learning, online engagement and capacity building. This level of engagement should ensure most residential households in the city will become aware of the benefits and resources provided by the program through word of mouth and other channels.

Transport

Infrastructure for non-motorized transport

The City of Sydney is building a 200km network – of which about 55km will be separated cycleways – and is now concentrating on building or upgrading 10 priority regional routes. We have created 10km of separated cycleways, 60km of shared paths and 40km of other infrastructure – that's 110km of the 200km City network already complete. Where separated paths have been introduced the number of bike trips have doubled and trebled in some places. Overall the number of bike trips has doubled in the past 3 years. Commuter periods are peak cycling times, proving that it is being used as a viable get-to-work transport option. The City is also behind a series of bike-riding and bike-maintenance courses to ensure locals are armed with everything they need to be self-sufficient cyclists. Major cycling festivals and events are also supported, including National Ride2Work Day, Bicycle NSW's Spring Cycle and the Sydney Bike Film Festival.

Improve rail, metro, and tram infrastructure, services and operations

The City of Sydney and Transport for NSW have signed a development agreement that sets out the standards for the construction of light rail through the local area, which the City is contributing \$220 million towards. The light rail service will run from Circular Quay along George Street via Central railway station, along Devonshire Street in Surry Hills, through Moore Park to the University of NSW and to the Prince of Wales Hospital in Randwick. More information on these projects can be found at <http://www.cityofsydney.nsw.gov.au/vision/city-transformation>.

Transportation demand managements

The City of Sydney is currently undertaking a review of transportation in our local government area through the EcoMobility SHIFT framework in conjunction with ICLEI. The City is the first city in the Southern Hemisphere to undertake the review. EcoMobility SHIFT is a project to develop a total quality management scheme - the SHIFT scheme - to be launched in April 2013. The scheme allows cities to assess their current EcoMobility performance and evaluate the effectiveness of their policies and actions to achieve a more sustainable transport system in terms of environment, accessibility, safety, and equity. More information is available at <http://www.ecomobility.org/>.

Urban Land Use

Greenspace and/or bio-diversity preservation and expansion

With this in mind, the City of Sydney commissioned the Urban Ecology Strategic Action Plan as one of many initiatives aimed at achieving the Sustainable Sydney 2030 vision of a green, global and connected city. The focus of the plan is the biodiversity of the local area. Although biodiversity has been greatly reduced from its original state within the local area, some significant vegetation and many fauna species remain. There is a huge opportunity to conserve and enhance these existing biodiversity values in the city. The Urban Ecology Strategic Action Plan is available at http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0011/198821/2014-109885-Plan-Urban-Ecology-Strategic-Action-Plan_FINAL-_adopted.pdf

Eco-district development strategy

The \$8 billion Green Square project is transforming the southern precinct of our local area into a vibrant and sustainable urban environment. Green Square is set to become a true exemplar of green living with developments linked to recycled water, people linked to shops, parks, gardens and entertainment with bike and walking routes, and public transport. At the heart of the Green Square development is the new town centre, a major new residential, retail and cultural hub. The City has committed \$440 million over the next 10 years to deliver quality infrastructure and community facilities such as the new library, plaza, and aquatic centre as well as parks, public art and community creative hub. The City's role in Green Square is to ensure planning controls for the new town centre and nearby precincts allow for growth and development that is sustainable, innovative and respects the character of existing neighbourhoods.

Urban agriculture

Growing in significance throughout Australia and the rest of the world, city farms are part of the shift towards locally sourced foods and increased education on the connection between the paddock and the plate. City farmers reap the physical and social benefits of these communal spaces. The City is investigating the possibility of a city farm within the local government area. A business plan is now being prepared to support the future implementation and operation of the city farm. The city farm advisory group meet regularly and provide guidance to the City on the city farm's business plan, design and ongoing community consultation.

Waste

Integrated waste management

To cut down on the noise, odour and traffic congestion associated with the current process, the City of Sydney is working on new waste systems for new buildings and high traffic areas. The City already relies on advanced treatment of household garbage to extract every bit of recycling it can, recovering two thirds of waste generated. The City is now reviewing new technologies that can do even better. Converting non-recyclable waste to energy to help power the local area is a major goal. Over 90% of the local area's household garbage could be diverted from waste using treatment and turned into gas to help provide renewable energy. This renewable energy could be used to power the City's trigeneration network.

Recycling or composting collections and/or facilities

The City is developing an Advanced Waste Treatment Master Plan. Advanced waste treatment is a key part of the City's goal to reduce greenhouse gas emissions across the entire local government area by 70 per cent below 2006 levels by 2030. This includes a target of converting the 34 per cent of the city's waste that would otherwise go to landfill as non-recyclable waste, into a renewable gas for the City's trigeneration network.

Other

Decentralised Water Master Plan

The City of Sydney has worked closely with a huge range of industry partners including Sydney Water, to come up with a solid master plan that will ensure the local area's water needs are met sustainably. We are thinking locally, rather than relying on large-scale remote solutions. Localised management of water, wastewater and stormwater is a major part of the plan. The best solution for Sydney is based on water efficiency, recycled water options, a reduction in stormwater pollution and cost. The plan, available for download below, details how we aim to bring together these solutions, where they should be located and how they will perform.

8 Planning

Sydney has renewable energy targets.

Sydney's renewable energy targets in detail:

Scale: Citywide

Proportion of total energy from renewable energy sources

30%

Target date

2030

A renewable energy master plan has been developed to focus on technologies that deliver the greatest outcome for the City for the lowest cost. The plan can be downloaded at <http://www.cityofsydney.nsw.gov.au/vision/sustainable-sydney-2030/sustainability/carbon-reduction/renewable-energy>. The renewable energy master plan outlines how 100% of the City's electricity, heating and cooling can come from renewable energy sources, such as solar, wind and energy from waste, by 2030. Based on worldwide renewable energy best practice, the master plan focuses on the mix of renewable energy resources and most effective technologies. The most exciting part of the City using renewable energy is that as the cost of coal-fired electricity rises, the cost of renewable energy is falling as new technology becomes available and countries around the world embrace decentralised energy networks.

Scale: Municipal

Proportion of total energy from renewable energy sources

30%

Target date

2030

The City has awarded the tender to install solar photovoltaic panels on around 30 of its major buildings. The installation of the panels is estimated to deliver a 4.5 per cent reduction in the City's overall greenhouse gas emissions and produce clean renewable energy equivalent to 12.5 per cent of the City's own energy requirements following the completion of the Building Energy Retrofit and LED Street lighting projects. The \$6 million system is expected to produce up to two MWh (megawatt hours) annually saving up to 1,571 tonnes of CO₂-e per annum. The output of the panels will be reviewed regularly. Indicative figures based on current analysis suggest that the cost per tonne of carbon abatement for sites where panels are already installed is approximately \$10 per tonne with a payback period of approximately 13 years. Approximately 50 per cent of the installation is now complete. Installation of the systems will take place over the next two years. The systems will be spread across multiple properties in the City of Sydney, such as Glebe, Redfern and Paddington town halls, the Redfern Oval grandstand, plus a number of libraries, council depots, and community centres.

Sydney has climate-change related projects which are targeted to attract private sector involvement:

The City is implementing a range of projects to 2030 in line with our suite of Decentralised Energy, Decentralised Water and Advanced Waste Treatment Master Plans. Opportunities for involvement in the private sector will be advertised through our consultation processes and via our website at www.cityofsydney.nsw.gov.au.

Through the Better Buildings Partnership, the City is working with the private sector to implement a range of energy efficiency and renewable energy projects, as outlined in other areas of this report.

In addition, the City is working with a range of Government agencies to implement projects including; stormwater and floodplain management and mitigation strategies with Sydney Water, installation of LED lights with Ausgrid (formerly Energy Australia), infrastructure projects including Green Square Town Centre and George Street Light Rail. Information on all of these projects can be found in other areas in this report and at cityofsydney.nsw.gov.au or within the City's Green Report, also available on the City's website.

Sydney incorporates desired GHG reductions into the masterplanning of the city.

Sustainable Sydney 2030 is the City of Sydney strategic plan which includes targets for greenhouse gas emissions reduction. Master plans have been or are being developed for Trigeneration, Renewable Energy, and Advanced Waste Treatment which will inform the City's planning controls.

9 Water

Sydney foresees substantive risks to its water supply in the short or long term.

Risks to Sydney's water supply as well as timescale:

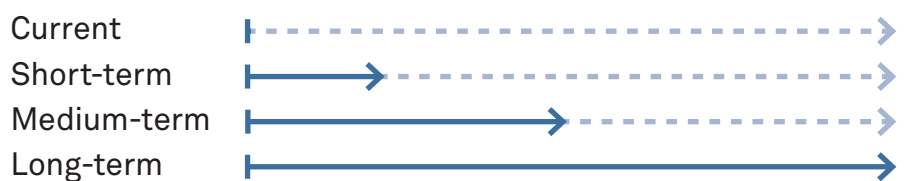
Seriousness

Less Serious ! ! !

Serious ! ! !

Extremely Serious ! ! !

Timescale



Increased water stress or scarcity

Risk: !!! **Timescale:** 

The 2003–2010 droughts brought home the impacts of taking water for granted. The recent floods have also reminded us that Australia's historic drought and flood cycles are predicted to become more intense with climate change. The drought led to water restrictions and a growth in individual recycled water systems as Sydney tried to adapt to unpredictable and dramatic weather cycles. However, there was no integrated city wide strategy to mitigate or adapt to these events. It is imperative the city's water supply is sustainable, drought-proofed and utilised to adapt to climate change.

Inadequate or aging infrastructure

Risk: !! **Timescale:** 

The city has the oldest water supply and sewerage infrastructure in Australia, and now is the time to rethink how we deliver the city's drinking and non-drinking water supplies for the 21st century. Current infrastructure can be insufficient to prevent flooding and issues from stormwater runoff.

Flooding

Risk: !!! **Timescale:** 

Australia is experiencing more severe weather events, including severe rain events. Flooding is a current issue in large parts of the local government area. Wet weather in early 2012 hit Sydney hard. The resulting floods caused considerable damage to public and private property and some people had to be rescued from their cars. Plans need to be put in place to safeguard flood-prone areas from this kind of weather. It is also a legal requirement for councils to address flooding issues under the NSW Government's Flood Prone Land Policy, which specifies a staged process.

10 Water Supply Adaptation

Increased water stress or scarcity

Diversifying water supply (including new sources)

The City's Decentralised Water Master Plan provides a blueprint to:

1. Reduce mains water consumption across the local government area and in our own operations by 10 per cent of 2006 levels by 2030. With the growth in Council buildings and operations portfolio, in particular irrigating all City parks and gardens to adapt to climate change and reduce the urban heat island effect, the City anticipates that its water consumption will increase by 30 per cent on a 'business as usual' basis. Reducing 2006 mains water use will provide an effective target of a 40 per cent reduction in mains water consumption by 2030 in practical terms.
2. Replace 30 per cent of the mains water demand across the local government area with recycled or alternative water generated from local resources by 2030. The 30 per cent target can only be delivered in partnership with NSW and Federal governments to help deliver the City's LGA contribution towards the national target of 30 per cent of Australia's wastewater being recycled, with 10 per cent by the City of Sydney implementing measures and 20 per cent by NSW and Federal government funding and/or implementing measures.
3. Reduce sediments and suspended solids discharged into the waterways by 50 per cent and nutrients by 15 per cent from stormwater runoff generated across the local government area by 2030. The Master Plan was produced by the City and is based on three technical appendices – a Water Efficiency Plan, a Recycled Water Plan and a Water Sensitive Urban Design and Stormwater Infrastructure Improvement Plan. The Master Plan is available at <http://www.cityofsydney.nsw.gov.au/vision/sustainable-sydney-2030/sustainability/water-management>. In addition, the Smart Green Business Program, run in partnership with Sydney Water assists non-office based businesses in the local government area to improve environmental performance. During the first four years (to June 2013) the program assisted 366 small to medium sized businesses. Phase III of this program commenced in July 2013 to support medium to large non-office based businesses with an initial focus on the accommodation sector. The program provides hands on sustainability advice and implementation support for water and waste reduction and provides referral to State energy efficiency programs. More information at <http://www.cityofsydney.nsw.gov.au/business/business-support/greening-your-business/smart-green-business>.

Inadequate or aging infrastructure

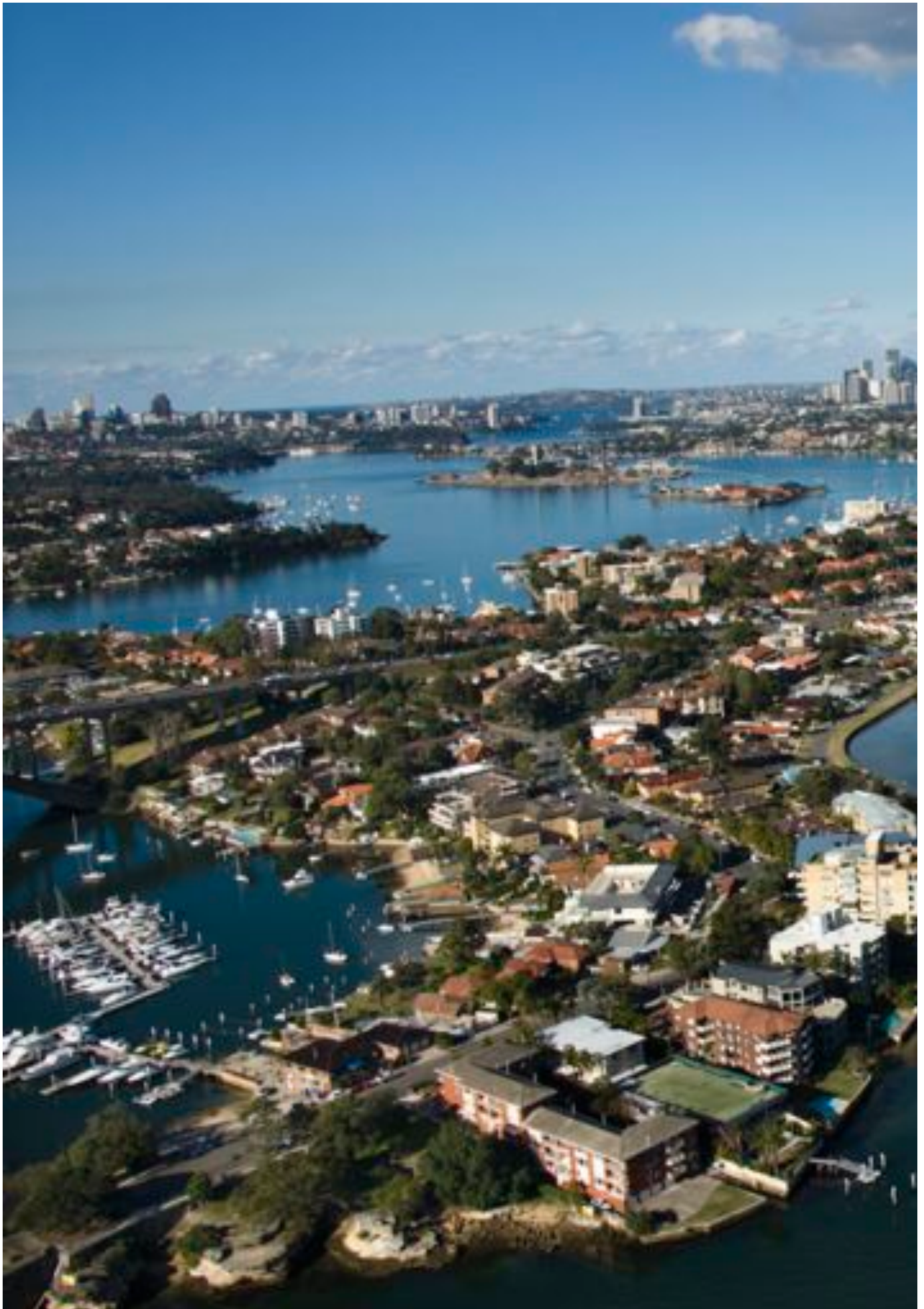
Diversifying water supply (including new sources)

The City of Sydney began building the second stage of Sydney Park's water reuse scheme in April 2013. Works will be completed in phases and are due for completion mid-2014. The project will deliver the city's largest water harvesting system, and help us achieve our 2030 target for 30 per cent of water demand to be met through local water capture and reuse. This project is the first of a suite of initiatives being formulated under the Decentralised Water Master Plan and is being partially funded through the City of Sydney and the Australian Government's Water for the Future initiative through the National Urban Water and Desalination Plan. Water harvesting will deliver a new sustainable water supply to the wetlands, to Sydney Park and potentially beyond to other water users in the local government area. Sydney Park has four wetland areas which are an important part of the park's eco-systems as well as playing a role in flood mitigation. Prior to the completion of Stage I, these wetlands did not have a sustainable water supply. Stage II will expand the capacity of the wetlands to supply water for irrigation within the park, as well as offer a recycled water supply to other users, beyond the park. It will involve diverting stormwater via a new underground pipe into the Sydney Park wetlands from the stormwater channel that runs within the park near the corner of Euston Road and Sydney Park Road. Water will be treated using a gross pollutant trap which removes litter, coarse sediment and organic matter from stormwater via a physical screen, and a bio retention system which collects water in shallow depressions and filters it through plant roots and soil. As water is drawn from the system for reuse, it will receive further treatment through filtration and ultra violet (UV) cleansing processes. A sustainable water supply protects the wetlands from problems such as poor plant establishment, blue green algae blooms and rapid growth of unwanted, submerged aquatic plants such as azolla, which blocks sunlight. More information in the Green Report at www.cityofsydney.nsw.gov.au/greenreport and <http://www.cityofsydney.nsw.gov.au/vision/better-infrastructure/parks-and-playgrounds/sydney-park>.

Flooding

Stormwater management (natural or man made infrastructure)

In NSW, local councils are responsible for managing flooding. The NSW Government Flood Prone Land Policy assists in determining if development on floodplains is appropriate and sustainable. The Floodplain Development Manual, developed by the NSW Government requires preparation of a Flood Study and a Floodplain Risk Management Study and development and implementation of a Floodplain Risk Management Plan. The City has committed \$1.8 million to city-wide Floodplain Risk Management Studies, which includes \$600,000 in NSW and Federal Government grants. We have allocated \$57 million for Green Square essential infrastructure drainage improvements, and \$59 million over the next 10 years for drainage capacity works across Sydney. As part of our floodplain management approach, the City is undertaking the first ever city-wide look at the drainage issues and flood risks that exist in Sydney. The work being undertaken includes a series of surveys of catchment areas. These surveys will help us understand where drainage and mitigation works are required to ensure water flow and drainage is properly managed across the local government area. This will dramatically reduce flood risk and safeguard local homes and businesses. The first Management Plan to be approved by Council is the Green Square West Kensington (GSWK) Floodplain Risk Management Study and Plan. This catchment is one of the lowest lying areas of our city, and subject to water ponding and flooding. The GSWK Plan proposes the creation of a large underground drainage culvert running 2.3 kilometres through the Green Square town centre from Link Road in Zetland to the Alexandra Canal. The culvert will drain floodwaters away from homes, businesses and roads in and around Joynton Avenue, Lachlan Street, South Dowling Street and Botany Road. The proposed \$80 million drainage work will take up to three years to complete, and will be co-funded by Sydney Water. The proposed drainage works will also include stormwater quality improvement devices, such as pollutant traps and rain gardens to meet the objectives of the City's Decentralised Water Master Plan, which aims to reduce stormwater pollutants entering water ways. More information at <http://www.cityofsydney.nsw.gov.au/vision/better-infrastructure/floodplain-management>.





CDP team

Conor Riffle
Director, Cities and Data
Product Innovation

Kyra Appleby
Head of Cities

Andreia Banhe
Account Manager,
Latin America

Hanah Paik
Account Manager, Asia
Pacific

Katie Walsh
Account Manager,
North America

Pauline Martin
Account Manager, Europe
and Africa

Sara Telahoun
Project Officer

Tino Kretschmer
Project Officer

CDP Board of Trustees

Chair: Alan Brown
Schroders

Ben Goldsmith
WHEB Group

Chris Page
Rockefeller Philanthropy
Advisors

James Cameron
Climate Change Capital

Jeremy Smith
Berkeley Energy

Takejiro Sueyoshi

Tessa Tennant
The Ice Organisation

Martin Wise
Relationship Capital Partners

AECOM team

Gary Lawrence
Chief Sustainability Officer

Claire Bonham-Carter
Principal, Director of Sustainable
Development

Alexander Quinn
Director of Sustainable Economics

Vanessa Lauf
Economist

Daniel Elsea
Creative Director

Sarah Nadin
Graphic Designer

Contact
Claire Bonham-Carter
AECOM
+1 415 955 2800
claire.bonham-carter@aecom.com
www.aecom.com/News/Sustainability

C40 team

Seth Schultz
Head of Research,
Measurement and Planning

Michael Doust
Head of Measurement and
Planning

Michael Marinello
Director of Communications

Brooke Russell
Head of Editorial and Content

Kathryn Vines
Network Manager, Climate
Change Risk Assessment

Ava Zekri
Manager, City Reporting

CDP
3rd Floor, Quadrant House,
4 Thomas More Square,
Thomas More Street,
London,

E1W 1YW
Tel: +44 (0) 20 3818 3900

www.cdp.net
cities@cdp.net
@CDP

Lead sponsors

AECOM