

State of the Environment Report

2011/12

Future focus

Across the city there are many projects underway to green our own operations, deliver ground-breaking new green infrastructure, and support residents and businesses to live and operate more sustainably.

Preliminary research shows that the City can meet its 30 per cent renewable electricity target by 2030, with about half of the target delivered from within the City of Sydney and the remainder from renewable energy sources outside the local government area (LGA). Investigations have advanced into viable renewable energy sources; we are looking at the reuse of gas produced from waste, and how this gas could run the City's trigeneration network. Renewable electricity and renewable gas could save almost 3 million tonnes of greenhouse gasses entering the atmosphere each year.

The Sydney Park water reuse project and the Green Square Town Centre development will capture more than 740ML of stormwater for reuse annually, the equivalent of 300 Olympic sized swimming pools. A new Decentralised Water Master Plan is nearing completion to plan for a recycled water network to protect Sydney's supply of drinking water.

Sustainable Sydney 2030 and the City of Sydney Environmental Management Plan establish the environmental vision, targets and actions for the City's own operations and our LGA. These targets are:

Our emissions

- Maintaining 100 per cent carbon-neutrality through carbon-reducing projects and offset of greenhouse gas emissions from City operations and services.
- Achieving a minimum 20 per cent reduction of the City's emissions by 2012 based on 2006 levels through energy-saving measures.

Emissions

- Achieving a 70 per cent reduction of greenhouse gas emissions from our LGA by 2030 based on 2006 levels.
- Ensuring 100 per cent of electricity used in our LGA comes from local energy by 2030 (70 per cent from trigeneration and 30 per cent from renewable energy).

Transport

- 10 per cent of total trips in the LGA between two and 20 kilometres to be made by bicycle in 2016.

Water

- A zero increase in mains water used by the City and our LGA by 2015 based on 2006 levels. This includes 25 per cent of water used by the City and our LGA to be recycled by 2015.
- Substituting 30 per cent of the City's water demand with recycled water.
- Replacing 10 per cent of LGA water demand with recycled water.

Waste

- Achieving 66 per cent resource recovery of residential waste from our LGA by 2014.
- Achieving 66 per cent resource recovery of waste generated by the City and its contractors by 2014.
- Achieving 76 per cent resource recovery of construction and demolition waste from our LGA and City projects by 2014.

Open space

- Having 24 square metres of public open space per resident.

Legend

\$	Cost
°C	Degrees Celsius
Ha	Hectare
Kg	Kilograms
kL	Kilolitres
kWp	Kilowatt-peak
LED	Light Emitting Diode
LGA	Local Government Area
M ³	Cubic metre
ML	Megalitres
Mm	Millimetre
MWh	Megawatt hour
MWe	Megawatt equivalent
pphm	Parts per million per hour
ppm CO ₂	Parts per million carbon dioxide
t	Tonne
tCO ₂ e	Tonnes of carbon dioxide equivalent
µg/m ³	Micrograms per cubic metre

Contents

Message from the Lord Mayor	01
Achieving Sustainable Sydney 2030	02
Energy and Climate Change	08
Transport	16
Waste and Recycling	20
Water	22
Urban Ecology	24
Land and Noise	26

Message from the Lord Mayor

You told us you
want a city that is
green, global and
connected.
We're making your
vision a reality.

Clover Moore, Lord Mayor

In 2007 the City of Sydney undertook our largest ever consultation project to develop a plan for the future - *Sustainable Sydney 2030*. Our community told us they wanted a city that was green, global and connected.

Action on climate change is the first priority. To play our part, the local government area must cut carbon pollution by 70 per cent on 2006 levels by 2030. The work we have already done means we are on track to meet that target.

Current City of Sydney projects include:

- Creating a strategic master plan to guide the efficient and cost-effective installation of new green energy, water and waste infrastructure.
- Inviting private sector partners to work with us to introduce more sustainable district energy, heating and cooling (trigeneration).
- Cutting the City's carbon pollution through improvements to buildings, installation of solar panels, more efficient fleet management and sustainable street lighting trials.
- Incorporating energy and water sustainability measures into all projects, parks and operations.
- Trialling our first electric vehicle and promoting car share through the allocation of special car share parking spaces across the LGA.
- Creating a network of safe bike paths to provide an alternative transport option and reduce congestion, obesity and carbon emissions.
- Working with residents and business, through programs such as CitySwitch to promote green technologies.

By 2030 we will provide 100 per cent of our energy needs locally. Seventy per cent will come from trigeneration, with the remainder from clean, renewable energy sources like wind and solar.

Local trigeneration systems are three times more energy-efficient than coal-fired plants because they capture the waste heat from low-carbon electricity generation and use it to heat and cool buildings.

Electricity prices in NSW are rising due to huge spending on the State aging electricity network. Local trigeneration will make much of this work unnecessary and avoid costs of \$1.5 billion for new coal-fired power stations.

Around the world, more and more people choose to live in cities - straining natural resources and altering the environment. This makes cities the best place to reduce our impact on the planet.

I am proud of the work we have done so far and am committed to delivering our ambitious projects.



Clover Moore
Lord Mayor

Achieving Sustainable Sydney 2030

Sustainable Sydney 2030 is about changing the way we live, work and play in the city; now and into the future.

The blueprint for Sustainable Sydney 2030 grew out of talking to people, asking how things could improve and what we can do to take the city forward.

Overwhelmingly, people who live and work in the city (and those who visit too), agreed Sydney in 2030 should be a place where:

- the environment matters;
- the economy thrives;
- art and culture are encouraged and supported; and
- people feel at home, connected to the local community and the wider world.

In short, you want a city that is green, global and connected.

The picture you painted in our consultations is now firmly at the heart of everything the City of Sydney does, every day.

We're making your vision a reality.

The City of Sydney has one of the most ambitious greenhouse gas reduction targets of any government in Australia. Through *Sustainable Sydney 2030*, we have implemented a range of infrastructure projects to deliver on those targets.

The City of Sydney is recognised as a leading environmental performer. We deliver a broad range of sustainability engagement programs to our residential and business communities. These programs include:

CitySwitch Green Office

CitySwitch Green Office is a national office tenant program that focuses on energy efficiency. It is run in partnership with the cities of Sydney, North Sydney, Parramatta, Willoughby, Ryde, Adelaide, Perth, Brisbane, Melbourne, Port Phillip and Yarra and with the NABERS national administrator, the Office of Environment and Heritage (NSW). The City of Sydney is the national administrator of CitySwitch Green Office.

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. Nationally, the CitySwitch Green Office aspirational targets are 20 per cent of office space in participating Council areas, more than 700 signatories and annual CO₂ reduction of 162,000 tonnes.

For more, visit cityswitch.net.au

Smart Green Business

The Smart Green Business Program, run in partnership with Sydney Water assists small to medium businesses in the local government area to improve environmental performance.

The program provides hands-on sustainability advice and support to 100 small to medium businesses in the form of water and waste audits. It also provides assistance in implementing water-efficient fixtures and fittings, waste efficiency recommendations and management, and provides referral to relevant state energy efficiency programs.

The Smart Green Business Program seeks to achieve water savings of 120 megalitres, waste reductions of 2,500 tonnes and carbon-emission reductions of 3,700 tonnes a year.

Green Villages

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 2011–12 the workshop component of the program was expanded and now provides face-to-face engagement in nine villages: Surry Hills, Alexandria, Green Square, Ultimo, Woolloomooloo, Taylor Square, Glebe, Rosebery and Waterloo.

For more visit greenvillages.com.au

Smart Green Apartments

The City'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. The program aims to minimise environmental impacts and improve liveability in strata communities.

This five-year, two-phase program aims to effect change in over 700 apartment buildings within the City local government area.

Better Buildings Partnership

The Better Buildings Partnership 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 foundation members, and will deliver solutions as defined in an annual work plan.

For more visit

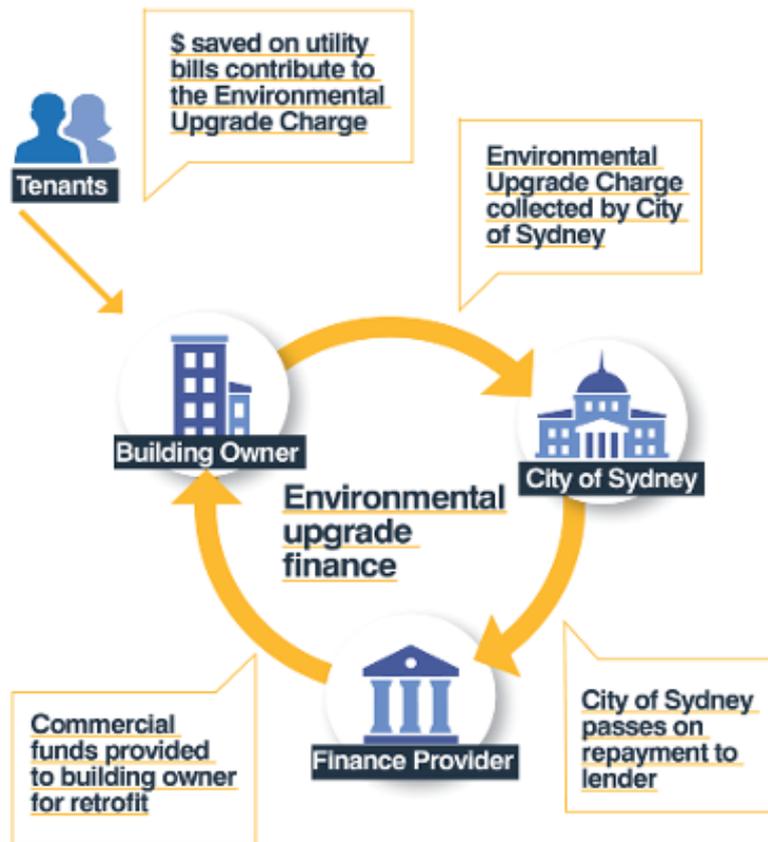
www.sydneybetterbuildings.com.au

Environmental Upgrade Finance

The City's environmental upgrade finance service is part of the NSW Government's recently introduced Environmental Upgrade Agreements (EUA). This 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 service, a finance-provider gives 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.



Achieving Sustainable Sydney 2030

Green Living Centre

The Green Living Centre is a sustainability 'drop-in' information and education hub located on King St, Newtown. The Centre is a partnership between the City of Sydney and Marrickville Councils aiming to inspire, enable and connect local communities to reduce their environmental footprint.

The Green Living Centre is open to the public Tuesdays to Saturdays. Visitors can find out about free workshops, browse the library for information and inspiration, borrow a cargo bike and take the kids for a ride, find out about local sustainable services and initiatives, buy some worms, or simply chat to staff about practical ideas for every day sustainable living.

SAVE

The SAVE Program (Sustainable Actions Value Everyone) was conducted over a three-year period to 30 June 2012.

The SAVE Program was a collaborative partnership between the City of Sydney, Marrickville Council, Randwick City Council, the City of Canterbury and Housing NSW. The aim of the program was to deliver sustainability projects to low income, Aboriginal and Torres Strait Islander and Culturally and Linguistically Diverse (CALD) communities.

SAVE developed and delivered integrated environmental projects, assessment tools and transferable resources to targeted audiences.

In addition to building capacity and knowledge around environmental and sustainability issues in the community, SAVE aimed to build the capacity of the partner organisation to work in collaboration and deliver environmental sustainability projects to these communities.

On completion of its three-year funded term, the program focused on transferring its learnings to other councils and housing providers.

During the program, there were 30 projects operating across the four local government areas. In total, 14 of these were based in the City of Sydney and six were shared across all four councils.

Green champions

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.

Green Champions represent every division of the City. They are leaders modelling the organisation values and desired behaviours to reduce energy and water-use and waste to landfill.

Champions develop and implement innovative programs ensuring environmental considerations are embedded within every level of the City's culture and decision-making.

The City of Sydney Green Champions Program has been assisted by the New South Wales Government through its Environmental Trust.

Waste avoidance programs

The City's Sustainability Programs team ensures that waste avoidance is incorporated into all programs we offer our community. This can take the form of specific Green Village workshops, waste assessments for small and medium businesses, support for City sponsored events to reduce their waste and strategies and studies.

We are currently developing a Waste Avoidance Implementation Strategy and conducting a Reuse Capacity and Capability Study that will help inform the way waste avoidance is incorporated into Sustainability Programs in 2012-13.

Environmental grants

Environmental Grants provide funding for not-for-profit groups that provide an environmental benefit to our city villages.

Grants have been awarded to start community gardens, sponsor exhibitions on sustainable living and begin urban renewal projects. Grant submissions are accepted twice a year and community information sessions are held before application closing dates.

In 2011–12 grants were provided to:

- Alternative Technology Association (Speed Date a Sustainable Designer)
- Fort Street Public School (Forever Edible Garden)
- Froebel Australia (Bilingual Learning Garden)
- Green Roofs Australasia (National Green Roofs Conference 2011)
- Green Strata Inc. (website and workshops)
- Harris Community Centre (Second-hand Saturday)
- Nature Conservation Council of NSW (Foodprint Challenge and Sustainable Renters Challenge)
- Pyrmont Ultimo LandCare Inc. (Pyrmont Wildlife Corridor Extension, Fish Markets Station)
- University of Technology Sydney (Behavioural change strategy to improve the interactions between bicycle riders and bus drivers)
- Asylum Seekers Centre (Green Skills Program)
- Australian Network for Art & Technology (seminar)
- Australian Red Cross (FOODcents)
- Garage Sale Trail (The Compost Community)
- Indonesian Welfare Association (Edible Green Garden)
- YMCA (NCIE Edible Garden)

Environmental memberships and partnerships

In 2011–12 the City maintained environmental memberships and collaborated with many environmental organisations and Government departments including:

- Australian Conservation Foundation
- Australian Electric Vehicle Network
- Australian Solar Energy Society
- Better Practice Recycling in Commercial Buildings Advisory Panel
- Birds Australia
- Community Recycling Network (CRN)
- Cooks River Foreshore Working Group
- Ecological Consultants Association NSW
- Energy Efficiency Council
- Environment Business Australia
- Green Building Council of Australia
- Green Living Centre
- Green Roofs Australia
- ICLEI – Local Governments for Sustainability
- Institute of Sustainable Futures
- Keep Australia Beautiful
- Pyrmont Ultimo LandCare
- Royal Zoological Society NSW
- Rozelle Bay Community Native Nursery
- Southern Sydney Region of Councils (SSRoC) Environmental Managers Group
- Southern Sydney Sustainability Educators Network (SSSEN)
- Stormwater Industry Association
- Sydney Metropolitan Wildlife Service
- Sydney Water Corporation
- Sydney Coastal Councils Group
- Total Environment Centre (Green Capital)
- Waste Management Association of Australia
- WWF Australia

Achieving Sustainable Sydney 2030

Awards

Projects implemented by the City of Sydney won more than 40 industry awards nationally and internationally in 2011–12.

- The upgrades to Sydney Town Hall were awarded a Heritage Award for Conservation (Energy Management) by the National Trust
- Sydney Town Hall also received the Environment and Energy Efficiency award at the National Electrical and Communications Association (NECA) Excellence Awards 2011 for the Solar Installation provided by Stowe Australia
- Paddington Reservoir Gardens received the 2011 Award for Excellence from the Urban Land Institute Asia Pacific Competition
- The Chinatown tourism kiosk (Red Lantern) was awarded the Architecture Award in the Small Project Architecture category at the 2012 NSW Architecture Awards
- Bourke Street Cycleway won the RTA Award for Excellence in Landscape Architecture on Road Transport Infrastructure Projects with Pod Landscape Architecture, GTA Consultants and Northrop Engineers at the Australian Institute of Landscape Architects (AILA) Awards 2011
- The City's Fleet Management Strategy, delivering a range of greenhouse gas emission reduction initiatives received the 2011–12 Australasian Fleet Management Association Award for 'Environment'

Lobbying

In 2011–12 the City made various submissions on environmental issues, projects, policy and programs including:

- Australian Energy Market Operator : Removal of regulatory barriers to trigeneration
- Australian Energy Market Operator: Removal of regulatory barriers to Decentralised Energy
- Australian Energy Market Commission: National Electricity Amendment Rule 2012
- Better Buildings Partnership (BBP): Sydney Metro Strategy
- Chief Executive Australian Energy Market Commission
- Clean Energy Finance Corporation Expert Review Panel
- COAG Standing Council on Environment and Water: Packaging Waste Impacts Regulation
- Energy Savings Scheme (ESS)
- Environment Protection and Heritage Committee: Computer and TV waste producer responsibility scheme
- Minister for Resources and Energy
- National Energy Savings Initiative (NESI)
- NSW Coal Seam Gas Inquiry
- NSW Special Commission of Inquiry: Electricity transactions
- Office of Environment and Heritage: NSW Waste and Environment Levy Review and NABERS ruling on co and trigeneration
- Productivity Commission: Australia's Urban Water Sector draft report
- The Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP)

Advocacy

The City also presented papers at key national and international conferences including:

- An international carbon conference in Kaohsiung, Taiwan
- All Energy Conference, Melbourne
- Australian Council of Recycling annual convention, Sydney
- Australian Energy Market Commission Forum, Sydney
- Australian Solar Energy Society Solar Conference 2011, Sydney
- Carbon emissions and energy efficiency targets and programs to key stakeholders
- Community Power Conference, Bendigo
- Council of Capital Cities Lord Mayors Annual General Meeting, Tasmania
- Creating Climate Wealth Australia (Richard Branson's Low Carbon War Room), Sydney
- Environmental Performance of Commercial Real Estate Conference, Sydney
- Ecogen 2011 Conference, Brisbane
- Energy Efficiency Council National Conference 2011, Melbourne
- Energy Management Association of New Zealand Conference 2012, Christchurch New Zealand
- Engineers Australia Conference, Sydney
- Green Buildings Conference (9th Annual), Sydney
- Green Jobs Conference, Wollongong
- Green-Ups and Pecha-Kucha events during the Sydney Greening Cities Conference
- Integrated Water Management Forum, Geelong
- National Electric Vehicle conference
- Parramatta City Council
- Planning Institute of Australia Annual Conference, Wollongong
- Planning Institute of Australia National Congress 2012, Adelaide
- Retrofitting for Energy Efficiency Conference, Melbourne and Sydney
- Retrofitting for Commercial and Environmental Sustainability, Sydney
- South Australia State Government Events, Adelaide
- Sustainable Councils 2011 Conference, Brisbane
- Sustainability Leadership for a New Era Conference, Cairns
- Sydney University postgraduate and PhD students in sustainable transport
- Top End Sustainability Week Government Road Table, Darwin
- Waste 2012 conference, Coffs Harbour
- Wind Farm 2011, Sydney
- Water reduction
- Young Water Professionals Workshop, Sydney

The City's Chief Development Officer Energy and Climate Change Allan Jones, MBE, was formally appointed to the Board of the National Climate Change Adaptation Research Facility by Greg Combet, Minister for Climate Change in April 2011.

Energy and climate change

The best available scientific evidence tells us that greenhouse gas emissions from human activity, particularly our use fossil fuels, are contributing to climate change. We also know that climate change is occurring faster than initially predicted.

Climate change occurs as a result of greenhouse gases building up in the atmosphere. These include carbon dioxide (CO₂), methane, nitrous oxide and CFCs. The gases trap heat radiating from Earth toward space, warming the surface of the planet.

Only stopping or dramatically reducing greenhouse gas emissions can slow the changes we are experiencing now.

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC), a group of 1,300 independent scientific experts from around the world, concluded there is a more than 90 per cent probability that human activities over the past 250 years have warmed our planet.

Cities have a critical role in reducing greenhouse gas emissions because, though they cover only 2 per cent of the Earth's land surface, they have more than 50 per cent of the population and produce 75 per cent of the world's emissions.

Centralised coal-fired power generation is responsible for 80 per cent of the city's greenhouse gas emissions and 50 per cent of Australia's emissions. Power stations lose more than two-thirds of their primary energy as waste heat rejected into the atmosphere, with further losses in the grid, and are a major user of water.

The City is working to reduce energy and water use and greenhouse gas emissions by setting ambitious targets to reduce 2006 emissions by 70 percent by 2030. These targets can only be achieved with the dedication of our organisation and support of our community, and with the provision of green infrastructure.

As part of *Sustainable Sydney 2030*, we're turning Sydney into a low-carbon city. We're creating a smarter, more sustainable Sydney through innovative plans for producing energy, and recycled water, collecting, treating and utilising waste as a resource.

We call this green infrastructure.

Green Infrastructure Plan

The City is developing a Green Infrastructure Master Plan to help decide the best way to implement green infrastructure projects in our own operations and the City of Sydney LGA. The Green Infrastructure Master Plan comprises five Master Plans:

- Decentralised Energy Master Plan – Trigeneration
- Decentralised Energy Master Plan – Renewable Energy
- Decentralised Energy Master Plan – Advanced Waste Treatment
- Decentralised Water Master Plan
- Automated Waste Collection Master Plan.

While these technologies have been successfully used around the world, Sydney will be the first city to install them to work in combination with each other.

These plans, combined with our own individual efforts to reduce our impact on the environment, will create a green, global and connected city.

For more visit greeninfrastructure.net.au

Decentralised Energy Master Plan – Trigeneration

Trigeneration is a key part of the City's goal to reduce greenhouse gas emissions by 70 per cent, and cut reliance on coal-fired electricity by 2030. It is planned that trigeneration will supply 70 per cent of Sydney's electricity needs by 2030, with the remainder provided by other renewable energy sources including solar, wind and renewable gases from waste.

In trigeneration, electricity is produced locally and the waste heat from the process is used to supply heating and hot water. Waste heat is also converted into cooling via a heat-driven chiller system. Trigeneration provides a local source of power, heating and cooling with minimal energy losses.

The final Decentralised Energy Master Plan – Trigeneration forms part of the City's Green Infrastructure Plan and completes the work of the interim Trigeneration Master Plan.

The City's Decentralised Energy Master Plan – Trigeneration updated the previous interim Master Plan to include new results for Green Square, four additional "hot spot" zones outside the CBD and Green Square low-carbon zones, and fuel cell cogeneration for the rest of the LGA, bringing the new total trigeneration and cogeneration potential capacity to 477MWe (previously 360MWe). The final report also contains updated information about the negligible air quality impacts, the availability of natural gas supplies, and case studies for buildings to connect into the thermal energy network and for domestic fuel cell cogeneration.

The Decentralised Energy Master Plan – Trigeneration shows that, if implemented, a decentralised energy network could:

- Reduce electricity consumption by 30 per cent and electricity peak demand by 60 per cent within the Low Carbon Infrastructure Zones by 2030
- Reduce greenhouse gas emissions within Low Carbon Infrastructure Zones by 39 per cent to 56 per cent below 2006 levels by 2030
- Reduce greenhouse gas emissions across the City of Sydney LGA by 24 per cent to 32 per cent below 2006 levels by 2030
- Provide lower cost of carbon abatement than solar, wind, hydro, or coal or gas-fired power station carbon capture and storage
- Provide the city with an energy solution that is transformative, future-proof and will provide an energy infrastructure that other green infrastructure can take advantage of
- Enable renewable gases from waste and other renewable energy resources such as geothermal to replace fossil fuel natural gas in the trigeneration network to provide carbon free electricity as well as carbon free heating and cooling by 2030.

The final Decentralised Energy Master Plan – Trigeneration was drawn up Kinesis, the case studies by WSP and the gas augmentation study by Jemena.

For more visit greeninfrastructure.net.au

Decentralised Energy Master Plan – Renewable Energy

The City engaged international consultancy firm Arup to determine what renewable energy resources would be needed within and near to the LGA to deliver the City's 30 per cent renewable electricity target. They looked into sources such as wind, solar and marine technologies and the amount of renewable feedstocks, primarily from waste, that could be converted into renewable gases and fuels to supply the trigeneration network.

This work has been completed, but is being supplemented by a specialist renewable gases and fuels study undertaken by Talent With Energy. Their review looks at the potential of renewable gas feedstock, including agriculture and farming waste, forestry waste, landfill and sewage as well as municipal waste, to determine the technologies required to convert renewable gases into synthetic or substitute natural gas. They are looking into how this renewable gas could be injected into the natural gas grid pipeline, replacing over time the natural gas supplying the City's trigeneration network.

The Arup and Talent With Energy work is also being supplemented by a financial and economic analysis of the renewable electricity and renewable gases resources and conversion technologies. This work is being undertaken by the Allen Consulting Group.

The combined work will form the draft Master Plan drawn up by the City which will be placed on public exhibition in Q2 2012–13.

Decentralised Energy Master Plan – Advanced Waste Treatment

The City engaged international consultancy firm Arup to undertake a business case for an advanced waste treatment plant to treat the City of Sydney's domestic waste and the LGA's commercial waste, determine what renewable energy resources would be needed within and in proximity to the LGA to deliver the City of Sydney's 30 per cent renewable energy target and the amount of renewable feedstocks (primarily from waste) that could be converted into renewable gases and fuels to displace natural gas supplying the trigeneration network by 2030.

This work has been completed but is being supplemented by a specialist renewable gases and fuels study undertaken by Talent With Energy to review the advanced waste treatment business case and the use of the non recyclable waste as a renewable gas feedstock and to determine the technologies required to convert renewable gases into synthetic or substitute natural gas for injection into the natural gas grid pipeline and conversion by liquefaction and transportation to replace fossil fuel natural gas supplying the City of Sydney's trigeneration network.

The combined work will form the draft Master Plan drawn up by the City which will be placed on public exhibition in 2012/13.

Energy and climate change

Decentralised Water Master Plan

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 vital the city's water supply is sustainable, drought-proofed and utilised to adapt to climate change.

The city has the oldest water supply and sewage 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. In response, the City of Sydney is working to reduce water demand, implement sustainable water supply sources and improve stormwater quality.

Currently, we only drink two per cent of the drinking-quality water which is pumped into our city.

Even taking other drinking-quality water uses into account, such as catering, showering and bathing, drinking water requirements accounts for no more than half our water consumption. The other 50 per cent is for non-drinking water uses such as toilet flushing, air-conditioning cooling towers and irrigation of our parks and gardens.

To cope with the anticipated rise in population, growth in urban development, ageing infrastructure and drought associated with climate variability, it is critical we reduce our reliance on mains water supply for non-drinking purposes. We can do this by improving water efficiency in buildings and in our parks and gardens and by having a local recycled water source independent of and complementary to the centralised mains drinking water supply.

The City engaged a consortium led by international consultancy firm GHD, assisted by the Institute for Sustainable Futures and P3iC, to develop water efficiency, recycled water and stormwater pollution reduction plan the City of Sydney.

The plan identifies actions and investments the City of Sydney could make to reduce potable (drinking) water imported from the Warragamba Dam and the Sydney electric desalination plant. The plan aims to increase the use of e use recycled water for non-potable or non-drinking use, as well as reducing stormwater pollutants discharged into Sydney Harbour and Cooks River.

There is more than enough recycled water resources in the LGA to deliver a city-wide recycled water network, which could keep the city green in times of drought, and free up drinking water supply capacity.

For more visit greeninfrastructure.net.au

The Decentralised Water Master Plan provides a blueprint for:

1. Reducing 10 per cent of mains water demand (from 2006 levels) within the LGA by 2030 through water efficiency measures
2. Reducing 25 per cent of mains water demand within the City of Sydney's own buildings and operations by 2030
3. Replacing 30 per cent of 2030 mains water demand within the LGA with recycled water by 2030. The City will implement the city-wide recycled water network and replace 10 per cent of mains water demand, with the balance of 30 per cent target being funded by NSW and federal governments. This combined effort will deliver the government's 30 per cent national waste water recycling target for metropolitan cities
4. Reducing 50 per cent of sediments and suspended solids and 15 per cent of nutrients currently discharged into the waterways from stormwater run-off generated within the LGA by 2030.

The draft Master Plan drawn up by the City will be placed on public exhibition in Q2 2012–13.

Automated Waste Collection Master Plan

An automated waste collection system evacuates recycled and non-recycled waste underground at 70km/hour via underground pipes to a receiving station. The waste is taken away by conventional trucks to the advanced waste treatment station to be recycled or converted into renewable gases for the City's trigeneration network. Advanced waste collection systems will eventually replace the conventional garbage truck collection system, just like when the underground sewage waste collection system replaced the previous sewage truck collection system in cities.

Where automated waste collection systems have been installed in other countries, they have significantly improved amenity for both residents and businesses and reduced waste collection transport emissions by 90 per cent.

The Automated Waste Collection Master Plan will set out the phased development of a city-wide automated waste collection system at strategic locations in the city and taking advantage of any common precinct-scale trigeneration network infrastructure routes and stations. As a city-wide automated waste collection system may take some time to deliver, the Master Plan will also include local advanced non-automated waste collection systems in advance of precinct-scale automated waste collection systems.

The first example of an automated waste collection system in the city will be at the new Green Square Town Centre development, where the system will be installed in conjunction with the precinct-scale trigeneration and recycled water networks.

Panel of experts for the delivery of Green Infrastructure

Following competitive tendering, the panel of experts for the delivery of green infrastructure was approved by Council in Q3 2011–12. The panel covers renewable energy, precinct scale trigeneration, recycled water and automated waste collection, advanced waste treatment – gasification/pyrolysis technologies and legal/regulatory advice projects. The panel has already been consulted on the Trigeneration Master Plan case studies and the Trigeneration contract.

Green Power

Green power is accredited renewable energy sourced from the sun, wind, water and waste. GreenPower is purchased by energy companies and fed into the grid. It does not cause greenhouse gas emissions like electricity generated by coal, gas or oil.

The City of Sydney previously purchased Green Power as an interim measure while it established its long-term carbon reduction program (trigeneration, building energy and water efficiency retrofit, LED street lighting and solar photovoltaic projects).

In 2010, Council resolved to invest the \$2 million a year previously allocated to GreenPower to invest in renewable energy installed in the City's own buildings and operations. We expect this action will also deliver a financial return on investment, reduce the City's annual electricity bills and help meet the City's target of 25 to 30 per cent renewable electricity by 2030.

The first of the renewable energy projects is the city-wide solar photovoltaic program.

Energy and climate change

Solar photovoltaics program

Tenders were accepted by Council in Q1 2012–13 to install 1.25MWp of solar photovoltaic systems across more than 30 City-owned buildings. This will supply 12.5 per cent of all the electricity needs from renewable energy and will be the largest concentration of solar photovoltaics on buildings in single ownership in Australia.

The buildings to be installed with solar power include: Town Hall House, Redfern Oval grandstand, Railway Square Bus Interchange, Sydney Park Pavilion, town halls in Paddington, Redfern and Glebe as well as libraries, community centres and depots.

The project will reduce greenhouse gas emissions by 2,100 tonnes a year and, together with the City's existing solar photovoltaic projects, will increase the City's solar electricity capacity to 1.35MWp.

The \$4.3 million contract will be let to Solgen Energy and will be completed within 2 years.

LED lighting

The City of Sydney has become the first city in Australia to roll out new energy-efficient LED street and park lights.

The City is replacing 6,450 conventional lights with the new LED lights. This will save nearly \$800,000 a year in electricity bills and maintenance costs, and reduce electricity consumption in City-owned street lights by 51 per cent and greenhouse gas emissions by 2,185 tonnes a year. Payback is estimated within 10 years.

The City has one of the largest portfolios of street lighting in NSW with 22,000 lights. Of these, 13,500 are maintained by Ausgrid and 8,500 by the City.

The rollout of LED lights follows a successful 18 month trial in Alexandria Park, Kings Cross, Martin Place and Circular Quay.

The City also participated in an international trial of LED lighting with London, New York and Hong Kong, organised by the Climate Group, an international environmental organisation.

A report on the benefits of LED lighting in cities has been produced by the Climate Group and is available on their website at theclimategroup.org

The \$7 million guaranteed energy performance contract was let to the GE and UGL consortium and will be completed within 3 years.

Carbon Disclosure Project Cities

The City joined the Carbon Disclosure Project Cities (CDP Cities) program to ensure transparency in the way that we report on greenhouse gas emissions and shares this information with other major cities around the world <https://www.cdproject.net/en-US/Programmes/Pages/CDP-cities.aspx>

A Carbon Neutral City

The City has been measuring, reducing and offsetting its operational greenhouse gas emissions since 2006–07. In 2011, the City of Sydney became the first of any level of Government in Australia to be certified as carbon neutral under the National Carbon Offset Standard. The City was recertified as carbon neutral in Q1 2012–13.

The City remains carbon neutral by continuing to implement carbon reducing projects, developing a greenhouse gas emissions inventory with independent verification and through the provision of accredited offsets equivalent to 100 per cent of the organisation's emissions.

As the City completes its carbon reducing projects, fewer and fewer carbon offsets will be required for the City to remain carbon neutral.

Building Retrofits for Energy and Water Efficiency

The City has let a contract to retrofit 45 of our major buildings with energy and water savings measures.

The retrofit will cut energy use by 6,641 MWh, reducing greenhouse gas emissions by 7,000 tonnes per year and water consumption by 53,313 kL per year.

The energy and water savings will be independently verified. Payback is estimated within six years.

The one-year contract includes upgrades of the City of Sydney's pools, community centres, libraries and car parks. Old inefficient lights are being replaced, heating and air-conditioning systems are being upgraded and improved and collate reduction units and software to reduce energy consumption of the City's computers are being installed.

Water-saving devices include aerated taps and shower heads, cistern modifiers in toilets, waterless urinals and waterless woks.

The \$6.9 million guaranteed energy and water performance contract was let to Origin Energy and Ecosave and will be completed by Q2 2012–13.

Trigeneration

In 2011–23, Cogent Energy (owned by Origin Energy) was appointed by the City as the preferred energy services provider for the city-wide trigeneration project. Heads of agreement was exchanged with Cogent Energy in Q4 2011–12 and the development agreement executed in Q1 2012–13.

Stages 1 and 2 of the project comprise 63.5MWe of trigeneration in the first four precincts in CBD North, CDB South, Pymont/Broadway and Green Square plus Prince Alfred Park Pool. Stage 3 of the project is the remainder of trigeneration and cogeneration projects outlined in the Trigeneration Master Plan. The City will be the anchor customer for the trigeneration project and the energy sales agreements with the City will supply all 230 City owned buildings and 22,000 street lights amounting to 5.5MWe of trigeneration capacity. This will reduce the City's greenhouse gas emissions by 7,500 tonnes a year.

The City's element of the project will be completed by Q1 2014–15 at the end of the City's current energy contracts, but other precincts may be completed before this date.

Sustainable vehicle fleet

We are working on a four-year program to deliver an emissions reduction of 20 per cent across our light and heavy vehicle fleet by 2014. We are implementing a number of new and innovative emission reduction initiatives and continue to lead the fleet industry in sustainable fleet management.

Initiatives include continuously reviewing vehicle utilisation and promoting resource sharing to cut the fleet from 600 vehicles in 2006 to 440 vehicles today, without reductions in service delivery. Many of the utility vehicles used by our parks, maintenance and construction crews have now been replaced with smaller diesel vans (1.6L Volkswagen caddy), reducing emissions for these vehicles by up to 50 per cent.

The City recently completed a two-year program to retrofit 84 of our older diesel trucks with catalytic converters and particulate filters to bring them up to Euro 4 compliance standards and reduce NOx gas and particulate emissions by up to 60 per cent. All new diesel trucks bought by the City now meet the stringent Euro 5 engine standards.

The City now uses sustainable biofuels (B50 & B20) in its diesel trucks which do not contribute to land-clearing, habitat destruction and food pricing in developing countries. New biofuel sources combine diesel with recycled cooking oil and animal fat to reduce emissions by up to 18 per cent.

Twenty traditional diesel trucks used to service our parks, footpaths and roads have now been replaced with diesel-electric hybrid trucks that emit up to 30 per cent less CO₂. Over the next few years the whole mid-sized truck fleet will be replaced with diesel-electric hybrids.

Two of the first production electric vehicles (EV) in Australia were secured by the City in 2011 and we have since purchased another two. We will expand our EV fleet by a further 10 vehicles in 2012–13.

As new electric vehicle models arrive in Australia we aim to replace up to 80 vehicles, with the new vehicles powered by 100 per cent renewable energy produced by photovoltaic installations at the City's own properties. This ensures the vehicles produce zero CO₂ emissions.

To support the uptake of electric vehicles, the City has also installed zero emission electric vehicle charging facilities in our public parking stations.

A key element in emissions reduction is the improvement of driver skills and behaviours. To enable this, Eco-Driving training programs have been rolled out to all operational drivers and a professional driver educator is now working "in cabin" with our drivers to improve their low-emission driving skills.

City staff are encouraged wherever practicable to avoid using our low-emission hybrid passenger vehicles for transport to meetings and site inspections. As a zero-emission alternative, the City has now established a staff bicycle fleet and offers urban riding training programs. Around 900 kilometres of business travel was by bicycle during 2011–12.

Energy and climate change

Greenhouse gas emissions

There are many greenhouse gases, of which Carbon Dioxide (CO₂) is the most abundant. Different greenhouse gases have different global warming potentials and longevity in the atmosphere and therefore concentrations are often expressed as CO₂-equivalent (CO₂-e). There is general consensus in the scientific community that atmospheric concentrations of CO₂ need to be less than 450ppm in order to limit the probability of global average temperatures increasing by more than 2 degrees Celsius which could lead to catastrophic climate change. According to the IPCC AR4 Synthesis Report, atmospheric CO₂-e concentrations were already 455ppm in 2005, of which 379ppm is CO₂. By June 2009, long-lived greenhouse gases in the atmosphere were estimated to be 467ppm, of which CO₂ was 385ppm. Currently there is an estimated 3,706Gt (billion metric tonnes) of CO₂-e in the atmosphere and this figure continues to rise by at least 2Gt per month¹. A 2009 report by the Potsdam Institute² shows that a global emissions budget of 1,356Gt CO₂-e spread from 2000 to 2050 is required to constrain warming to below 2 degrees and even then there is a 20 per cent chance it would be exceeded. With 234Gt of CO₂ emitted between 2000 and 2006 alone, we see how urgently we must reduce emissions now.

(t CO ₂ e)	2006	2007	2008	2009	2010	2011	2012	Trend
Australia ²	527 million	542 million	547 million	548 million	545 million	542 million	547 million	~
City of Sydney LGA ³	No data	5.46 million	No data					

1 www.dbcca.com/dbcca/EN/carbon-counter.jsp

2 Malte Meinshausen et al, 'Greenhouse-gas emission targets for limiting global warming to 2 degrees C' in Nature, vol. 458 (30 April 2009). doi:10.1038/nature08017 <https://www1.ethz.ch/iac/people/knuttir/papers/meinshausen09nat.pdf>

3 Australian National Greenhouse Accounts – Quarterly Update of Australia's National Greenhouse Gas Inventory – December Quarter 2011

City of Sydney greenhouse gas emissions⁴

Greenhouse gas emissions for the City of Sydney organisation come from a range of sources – the major source being mains electricity used within our buildings and street lighting. Other emissions include fuel used by our fleet and contractors, natural gas used in buildings, work flights and taxi journeys, waste, and emissions from major events like Sydney New Years Eve. Emissions are categorised as Scope-1 (direct emissions created onsite, for example burning natural gas), Scope-2 (direct emissions created offsite for example, electricity), and Scope-3 (indirect emissions such as by contractors and travel emissions). Many carbon neutral organisations only account for Scope-1 and Scope-2 emissions. By also including Scope-3 emissions, the City is taking responsibility for more of its emissions to be more transparent and accountable.

Summary 1 tCO ₂ -e	Scope(s)	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Scope-1	1	4,053	4,338	4,465	5,022	4,744	4,449	4,273
Scope-2	2	37,760	38,709	38,439	35,506	35,073	33,821	32,463
Scope-3	3	11,159	11,429	11,490	11,208	10,213	10,066	9,515
Total		52,972	54,475	54,395	51,736	50,030	48,336	46,251
Summary 2 tCO ₂ -e								
Electricity emissions	2,3	44,973	46,020	45,700	42,213	41,698	40,281	38,664

4 2006 estimate developed by Kinesis for Sustainable Sydney 2030. There are currently no reliable emissions estimates at the local government area level.

Note: The City receives independent verification of annual emissions inventories. However 2011–12 emissions were not verified at the time of this report and may be subject to change. Verified 2011–12 emissions will be provided in the 2013 report.

Electricity usage

City of Sydney LGA (MWh) ⁵	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Households	No data	No data	432,294	440,233	433,363	431,756	408,965	✓
Small business	No data	No data	920,942	850,323	807,972	788,843	767,727	✓
Large business	No data	No data	2,877,974	2,857,349	2,852,247	2,809,656	2,717,516	✓
Council usage (MWh) ⁶								
Total	42,427	43,010	42,710	39,451	38,970	37,475	35,870	✓
Per employee	29	29	28	24	23	21	20	✓

5 Information provided by Energy Australia for suburbs in and around the City of Sydney. Data is not confined to the LGA and may be based on accruals and estimates.

6 Information provided by billing data.

GreenPower usage

	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Australia (MWh) ⁷	495,250	688,754	1,013,707	1,455,887	2,144,726	2,275,234	2,110,628	1,945,548	✗
Households	150,374	281,701	565,977	748,377	940,560	838,492	712,932	737,078	✓
Businesses	7,229	14,676	24,313	30,313	32,276	38,688	47,082	47,821	✓

7 National GreenPower quarterly reports www.greenpower.com.au

City of Sydney GreenPower⁸

From 2009–10 the City will remain carbon neutral through the purchase of offsets but will no longer purchase GreenPower. Instead, these funds will be invested in local renewables projects.

	2009–10	2010–11	2011–12	Trend
City installed renewables (kWp)	73.5	93	0	✗

8 From 2009/10 the City of Sydney remains carbon neutral through the purchase of offsets but no longer purchases Green Power. Instead, these funds are invested in local renewables projects.

Air pollution

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Regional air quality (days stds exceeded) ⁹										
Visibility – NEPH	3	0	1	3	0	2	5	0	0	✓
Ozone – 1hr	1	1	0	0	0	0	0	0	0	✓
Ozone – 4hr	0	1	0	0	1	0	0	0	0	✓
Particulates (PM10)	0	0	0	2	0	4	5	0	0	✓
Customer requests – Air pollution/odour ¹⁰										
	No data	17	228	200	283	262	321	270	–	

9 Data from Air Quality Index (Randwick) www.environment.nsw.gov.au as at 5 September 2012. Note, the higher days exceeded for visibility in 2009–10 was the result of the dust storm affecting Sydney in September 2009.

10 Requests to City of Sydney Customer Service centre.

Transport

Within the City of Sydney car ownership has grown more slowly than the rest of Sydney. The City is reinforcing and supporting the choice by more residents to shift from car to sustainable transport through a number of initiatives – the provision of a 200 km network of bike routes, adopting the Liveable Green Network which links cycle connectivity and walking connectivity into a capital works delivery program, the encouragement of car sharing, investment in potential light rail services and sustainable parking policies.

Connecting Our City, a 25 year transport strategy for the local government area, recognises that in providing non-car alternatives wherever feasible there will be a beneficial local environmental impact on top of the social and economic benefits.

Connecting our City

A sustainable transport network will deliver more choices for people to make a trip, including walking, cycling, buses, light rail, train, ferries, taxi and car share.

We recognise that using a car is sometimes the only feasible option for people, particularly given that public transport reliability and frequency outside of peaks has some way to go. To support sustainable transport choices, the City is investigating how we can best support the transition to hybrid and electric motor vehicles.

The City continues to work closely with the NSW Government to improve public transport reliability, services and networks. We aim to reduce peak congestion, reduce cost to city users and deliver a better local environment where people live, work and visit.

Cycling

Cycling is steadily growing as a popular way to get around Sydney.

In the two years to March 2012, at 100 intersections across the local government area we counted an increase of 82 per cent in bike usage across a 6 hour count period.

Where separated bike paths were provided, the localised increase in the number of bike riders was between double and triple previous counts.

More than 1,000 people attended the City's free cycling confidence or bike maintenance courses and the City distributed more than 70,000 cycling maps.

The City has started delivering three of the StreetShare projects to increase bicycle use and encourage better behaviour:

- The Workplace Cycling Challenge
- Community Leadership (matching grants)
- Share-the-path project.

More information on these projects can be found at http://www.cityofsydney.nsw.gov.au/AboutSydney/documents/ParkingAndTransport/Cycling/FinalStrategyReport_23112010.pdf

Congestion

Congestion is costing Sydney \$3.5 billion per year, and this is projected to rise to \$7.8 billion by 2020. The cost includes travel time, loss in productivity, unreliability, higher fuel costs and air pollution.

In Sydney's CBD, there are nearly 100,000 car trips and 6,000 bus movements to Central Sydney each weekday.

The City of Sydney has been working closely with the NSW Government to improve bus reliability, light rail, heavy rail, cycling and walking.

The NSW Government's commitment to light rail is progressing, with recent announcements regarding the commencement of feasibility studies for further routes through the inner east and west to create an effective network.

The City of Sydney is contributing through planning and financial support and essential public domain works including plans to support the state's light rail with the transformation of the public domain of George Street.

The City is also on Transport NSW's Congestion Management Taskforce, which is implementing changes to parking and traffic operations in the city centre to ensure that both buses and cars can travel more freely in peak hour to reduce travel time and localised pollution.

Improving bus reliability has a twofold effect: it reduces the number of buses required to carry the same number of people by turning them around more quickly, and it also becomes a more attractive service and a realistic alternative for car users.

The introduction of bus clearways in the past year has improved bus reliability, but both the state and the City realise that there needs to be a rerouting of bus services to take route clashes out of the system to be truly effective.

Transport

The City has developed a comprehensive pedestrian master plan that complements the bike network called the Liveable Green Network.

This Liveable Green Network will connect people to destinations through a network of attractive and easy access walking routes and cycling routes.

Walking

Within the city centre nearly 93 per cent of all trips are by foot.

The City recognises the popularity of walking and is working closely with Transport for NSW to investigate, design and implement infrastructure to encourage and support walking as a priority mode of transport in the local government area.

We recognise that Sydney has some of the longest waiting times at signals for pedestrians of any global city and that there are many opportunities to both reduce frustration and increase safety by managing signals differently.

Car share

Since 2007, the City has installed more than 400 dedicated on-street car share spaces, catering for approximately 7,000 City residents and 3,000 City-based businesses.

Membership is growing by over 200 new members a month. At the end of 2012, it is estimated there will be 6,200 cars taken off the road as a result of car share since the beginning of 2009.

This year, SGS Economics and Planning undertook an economic analysis that determined for every public dollar invested in car share, there is a local benefit equating to \$19. This derived from there being less cars competing to park and drive locally, with each car share vehicle estimated to replace 12 local cars as local people become members.

Fleet

Council fleet emissions prior to 2009–10 only reflected Scope 1 – ‘tailpipe’ (for example emissions directly from the vehicle) only and did not include Scope 3 – ‘well to wheel’ (for example emissions resulting from fuel and gas extraction, production and transport). By also including Scope-3 fleet emissions from 2009–10, the City is taking responsibility for more of its emissions to be more transparent and accountable.

Council Fleet emission data is directly proportional to the increasing distances travelled each year in delivering City services.

Total tCO ₂ -e	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Contractor vehicle emissions	1,150	1,315	1,407	1,548	1,378	1,262	1,251	✓

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Council fleet emissions (tCO ₂ e) by Scope										
Scope-1	2,795	2,981	2,692	2,980	3,001	3,208	2,993	2,931	2,494	✓
Scope-3							227	224	189	✓
Total	2,795	2,981	2,692	2,980	3,001	3,208	3,220	3,155	2,683	✓

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Vehicles per day in LGA ¹¹	No data	No data	701,476	689,581	697,788	689,391	689,458	679,233	644,190	✓
Staff with travel passes	194	266	321	338	363	408	362	425	512	✓
Percentage of staff with travel passes	13%	18%	21%	21%	23%	24%	20%	23%	27%	✓

11 Information provided by the NSW Roads and Traffic Authority (does not include Cross City Tunnel). Based on combined direction vehicle numbers for Sydney Harbour Bridge, Sydney Harbour Tunnel, Anzac Bridge, Oxford Street, Parramatta Road, King Street, Regent Street, O’Riordan Street, Cleveland Street, and City West Link Road.

Cycleways

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Cycleways installed (m) ¹²	Nil	Nil	Nil	Nil	Nil	204	4,324	8,909	2,965	✗

12 Includes College Street, Kent Street, Gardiners Road, Bourke Street, Prince Alfred Park and Glebe Point Road and Sydney Park to Centennial Park. Includes Separated, Shared Path and Shared Park Path and Mixed Traffic facilities.

Waste and recycling

Waste and recycling processes can have a significant impact on the environment. These impacts are largely a result of methane release at landfill and energy and water use in processing and recycling materials.

The City of Sydney has reached its landfill diversion target of 66 per cent by 2014, two years ahead of schedule.

In 2011–12, for the first time, the City sent all its domestic garbage to an advanced waste treatment facility for processing.

The City's Interim Waste Strategy was adopted by Council to investigate new waste management technologies including treatment technologies to replace landfill.

One possibility is converting waste materials to a synthesis gas which could be adapted for use in the City's trigeneration network or converted to a transport fuel.

Advanced Waste Treatment

Advanced Waste Treatment (AWT) is part of an integrated suite of works being planned by the City to achieve the vision and objectives of Sustainable Sydney 2030. Other key elements include two decentralised energy master plans – Trigeneration and Renewable Energy.

Overall, the City achieved a resource recovery level of 66 per cent, up from 49 per cent the previous year.

In 2011–12, the City sent all 40,000 tonnes of domestic garbage for processing at the Waste Treatment facilities at Kemps Creek and Eastern Creek. At these facilities, garbage is processed, and recycling and compost suitable for use in mine-site rehabilitation and other approved uses is extracted.

Electronic waste

The City runs free quarterly E-waste drop-off events for residents to recycle broken or obsolete electronic equipment.

In 2011–12, four drop-off events were held. A total of 78.75 tonnes of E-waste was collected from 2,149 households.

Since the first collection day in 2008, the City has received more than 5,600 electronic waste drop-offs, equating to 196 tonnes, 95 per cent of which have been recycled.

Chemical waste

In July 2011 the City hosted an annual Household Chemical Cleanout collection with the Office of Environment and Heritage.

A total of 458 households dropped off 15.06 tonnes of hazardous household waste which were recycled or safely disposed of.

Hazardous chemicals included:

- oil based paint (39 per cent),
- water based paint (38 per cent),
- oils and fuels (7 per cent),
- batteries (5 per cent),
- gas bottles (4 per cent) and
- other materials (8 per cent).

For 71 per cent of residents, this was the first cleanout collection they had attended.

Waste and Recycling Improvement Program

The City continued its Waste and Recycling Improvement Program for apartment buildings in 2011–12.

Through the program, City representatives visited 502 apartment buildings to provide advice and resources to building managers, cleaners and residents on effective management of waste and recycling for their building.

Bins and lids are modified to reflect the City's comingled (mixed) recycling service, whereby all recyclables are collected in one truck, making recycling easier for residents.

This project is funded through the NSW Government Waste and Sustainability Improvement Payments.

Waste and recycling

Indicator	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	Trend
Household waste¹³										
Total (t)	26,020	36,553	39,999	38,752	40,230	41,890	37,180	30,358	20,759	✓
Per person (kg)	230	238	257	234	238	237	215	168	112	✓
Household recycling¹⁴										
Total (t)	9,169	12,186	13,227	16,122	16,654	19,556	21,031	29,231	39,664	✓
Per person (kg)	84	79	85	97	99	110	116	161	214	✓
Landfill diversion (per cent)	26%	25%	25%	29%	29.3%	32%	36%	49%	66%	✓
Public place waste collection ¹⁵	7,565	6,901	7,410	7,750	7,205 ¹⁶	7,451	8,044	9,560	9,752	✓
Clean-up notices ¹⁷	15	67	54	15	3	0	4	0	0	–
Litter infringements	80	122	671	1,412	1,340	1,406	531	1,176	1,672	–
Council A4 paper use (sheets/employee)	6,370	8,597	8,595	7,908	6,059	5,152	5,662	5,424	5,446	–
Building materials recycled at Council facility (t) ¹⁸	21,417	18,950	26,727	19,894	19,349	25,725	19,803	18,041	15,832	–

13 Waste includes garbage sent to landfill as residual from waste processing and clean-up material disposed to landfill.

14 Recycling includes containers, paper, green waste and white goods collection and recovery at AWT facilities.

15 Includes street cleansing waste, public bins, events and waste dumps.

16 10% of public waste in 2007–08 was recycled through the UR3R resource recovery facility.

17 Clean-Up Notices were first issued by the City in Q4 of 2003–04.

18 Burrows Road Materials Recycling Facility, St Peters.

Water

Water is one of the most valuable resources underpinning the healthy functioning of society. As water storage levels decrease and the population increases, the conservation of water and water pollution are key environmental issues for the City of Sydney. Water pollution is also a major environmental issue. While the water quality of Sydney Harbour has improved in recent times, this natural asset continues to be degraded by pollution from stormwater, sewer overflows, land contamination and vessels.

The inner-city currently imports 32 gigalitres of drinking-standard water from Warragamba Dam, but only 20 per cent is used for cooking, drinking and washing. The other 80 per cent could be supplemented by recycled water for toilet flushing (19 per cent), air-conditioning cooling towers (15 per cent) and irrigation (3 per cent).

In response to these challenges, the City of Sydney is working to reduce water demand, implement sustainable water supply sources and improve stormwater quality.

Decentralised Water Master Plan

For details of the City's Decentralised Water Master Plan see page 10 of this report.

Property upgrades for water efficiency and recycling

City of Sydney Council buildings and operations account for 1.5 per cent of water use in the LGA with about 80 per cent used by apartments, commercial and institutional buildings. Retrofitting City buildings will improve water efficiency of major high water using properties with water saving devices such as aerated taps and shower heads, cistern modifiers in toilets and waterless urinals to be installed. The City has installed rainwater tanks at nearly 20 childcare centres, kindergartens and community centres. There are also 20 stormwater harvesting and reuse projects completed or under construction to irrigate the City's park and sporting fields.

Raingardens

There are now more than 20 rain gardens in local streets, traffic islands, footpaths, parks and open spaces collecting and filtering stormwater. The City aims to achieve its target of 50 per cent reduction in pollutants entering waterways through stormwater harvesting and integrating natural treatment devices such as raingardens into the City's roads and footpaths.

Sydney Park water reuse

The City began working May 2010 on an \$18 million project, jointly funded by the Australian Government, which will harvest and cleanse 800 million litres of stormwater draining to a channel near Sydney Park and make the recycled water available to nearby industries and new developments. The project will prevent nearly 500,000 kg of pollutants from being discharged to the Cooks River each year.

Green Square town centre

The City is investigating a stormwater recycling scheme as part of the infrastructure being planned to service the energy, water and waste management demands at the Green Square Town Centre. The recycled water will be used for irrigation of gardens, parks and for toilet flushing and laundries in the residential development and for cooling towers in the commercial development. The project is expected to prevent nearly 33,000 kg of pollutants from entering the Cooks River each year.

Details of some of the water initiatives listed in this section are available at cityofsydney.nsw.gov.au

Water supply

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Trend
Potable water cost (\$/kL) ¹⁹	\$1.013	\$1.013	\$1.264	\$1.48	\$1.83	\$1.87	\$1.87	\$2.103	\$2.13	-
Water storage level (per cent) ²⁰	42.6%	38.3%	41.8%	50.5%	66.7%	61.4%	57.6%	76.4%	95.9%	✓
Average City of Sydney rainfall (mm) ²¹	705	1,041	792	1,403	1,197	1,156	1,045	1,172	1,661	-

19 Sydney Water pricing for consumption more than 100 kilolitres per quarter. Source <http://sydneywater.com.au/YourAccount/PricingInformation/>.

20 Sydney Catchment Authority June figures. Source <http://www.sca.nsw.gov.au/dams-and-water-weekly-storage-and-supply-reports>.

21 Average rainfall for 5 monitoring stations around the City of Sydney provided by Sydney Water

Water usage

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Trend
City of Sydney LGA water usage										
Total (ML)	32,891	34,508	33,712	34,419	32,471	32,602	31,032	33,833	33,710	✓
Commercial average (kL)	2,825	2,504	2,417	2,451	2,292	2,194	2,049	3,154	1,213	✓
Units average (kL)	176	171	172	170	161	160	159	203	166	✓
Houses average (kL)	200	191	190	183	173	175	180	147	143	✓
Council water usage ²²										
Total (ML)	534	484	483	497	500	432	415	395	325	✓
Per employee (kL)	361	326	268	240	251	214	217	212	183	✓
Fountains (total kL)	No data	No data	43,094	21,839	15,176	13,224	11,665	10,720	7,665	✓

22 Information provided from the City of Sydney's utility management system using data from Sydney Water. Figures vary from previous reports as properties that the City of Sydney do not have operational control over have been removed, consistent with reporting guidelines.

Water pollution

Indicator	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Trend
NSW Maritime rubbish collection (m ³)										
Blackwattle Bay	96	99	116	126	93	95	80	92	94	-
Rozelle Bay	214	298	263	204	157	87	45	46	41	✓
Rubbish from Council stormwater pollution traps (t)	1,104	1,372	1,102	1,290	1,334	1,263	1,205	1,272	1,284	-
Water pollution infringements	52	94	76	44	84	81	54	42	52	-
Customer requests – sewer overflows/water leaks ²³	No data		25	170	144	191	194	187	195	-
Customer requests – stormwater pollution ²³	No data		5	85	68	93	88	107	121	-

23 Requests to City of Sydney Customer Service Centre

Greening Sydney

The City of Sydney recognises the importance of trees and other plants in providing significant environmental, social and economic benefits for the community. There is growing recognition internationally of the role of cities and local governments in supporting and promoting biodiversity.

The City is committed to increasing tree coverage, improving urban ecology and biodiversity and supporting community greening to make Sydney one of the world's leading green cities.

To achieve this, the City has developed the Greening Sydney Plan. The Plan acknowledges the importance of ecology and biodiversity to city living and supports the development of the Urban Ecology Strategy.

Under the Greening Sydney Plan, the City will deliver some 42 programs and projects in partnership with residents, local business, developers and volunteer groups.

Urban Ecology Strategy

The ecological health of urban areas influences the diversity and abundance of plant and animal species and the quality of life of urban residents. Improved urban ecosystems can have environmental and social benefits.

The City of Sydney is developing an Urban Ecology Strategy. Focus areas of the draft strategy include;

- Increasing the area and diversity of locally indigenous vegetation
- Increasing availability of fauna habitat features
- Improving habitat connectivity
- Increasing staff and contractor engagement
- Increasing community engagement
- Establishing partnerships

Urban Forest Strategy

Trees and the urban forest play a vital role in the health and social framework and economic sustainability of a city. Research shows that trees improve our air, soil and water; they improve mental health and well being, reduce anger and aggression, provide a sense of place, enhance property values and provide other economic savings.

These environmental, social and economic benefits underpin the City's development of an Urban Forest Strategy. The key initiatives of the draft Strategy are to;

- Prioritise the maintenance and protection of existing trees
- Increase total canopy cover
- Improve forest diversity (age spread and species)
- Increase community knowledge and engagement

Green space

The City of Sydney recognises that green spaces are one of a city's most important natural assets. They are crucial to maintaining the high quality of our public realm and achieving the Sustainable Sydney 2030 strategy, by assisting the creation of green corridors and increased canopy cover.

The City is also delivering a number of small parks upgrades within the LGA. Since 2008, 20 small parks have been completed with another 12 currently being planned.

We have contributed to the MyParx free Smartphone app providing users with up-to-date information, interactive maps, and personal guided tours of local parks. City of Sydney major parks, playgrounds and sports fields are featured.

The City's Street Tree Master Plan 2011 is a blueprint for street trees across the City of Sydney. The objectives of this Master Plan are to improve and develop the number, health, longevity and form of street tree species; and to enhance the distinct character of the various City precincts. With this Master Plan, we will continue to provide healthy street trees which will beautify our urban environment today and will become a legacy for future generations.

Our Community Gardens program has continued to support the implementation of community gardens across the LGA with 16 community gardens currently in place.

Rain gardens were incorporated into 10 of the 23 Traffic Safety Improvements installed in 2011-12. Rain Gardens are one of the simplest forms of Water Sensitive Urban Design (WSUD) used for treating stormwater prior to discharge to the main stormwater system and ultimately our waterways and bays.

Street trees

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Raingardens

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Green roofs and walls

In cities around the world and in Australia, green roofs and walls make a positive contribution to urban environments.

These include retention and detention of stormwater, mitigation of the urban heat island effect, insulation of buildings and increases in habitat and biodiversity.

Increasing the number of green roofs and walls will help the City to meet its Greening Sydney target to increase tree canopy by 50 per cent by 2030. Green roofs have the capacity to reduce the energy required for air-conditioning of buildings and will help the City to meet its target of a 70 per cent reduction of green house gas emissions by 2030.

Urban Ecology

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Area of parks and open space (Ha)	377	377	377	377	377	377	377	377	377
Area managed by the City of Sydney (Ha)	188	188	188	188	188	188	188	188.5	188.5
New and replacement street trees	850	1,127	1,150	2,030	1,301	777	759	462	753
Native plantings for National Tree Day ²⁴	11,660	6,547	8,000	4,665	5,400	4,500	5,600	4,900	3,000
Native Plantings with Blue Wren Group	–	–	–	–	–	–	–	–	1,500
Native plantings by Rozelle Bay Community Native Nursery	2,365	1,441	2,806	2,812	2,757	No data	2,112	3,800	2,500
Native plantings by Pyrmont Ultimo Landcare	No data		~1,500 per year			2,000	3,000	2,000	
Free native plants distributed	90	1,500	2,250	1,198	772	No data	2,500	2,700	1,500
Customer requests – Weeds ²⁵	No data	No data	1	24	19	32	31	22	45
Customer requests – Vermin/pests/insects ²⁵	No data	No data	18	270	177	328	282	310	308
New aerial bundle cabling on electricity cables (spans)	100	95	45	15	9	0	147	77	0

²⁴ Includes World Environment Day, National Tree Day and other environmental events.

²⁵ Requests to City of Sydney Customer Service Centre.

Land and noise

Since European settlement, the City of Sydney area has experienced a substantial degree of urbanisation. There is very little remaining of the original landscape, natural creeks and vegetation.

Today, the City of Sydney serves as a commercial, financial and cultural centre also supporting a sizeable residential population. While urbanisation brings with it many economic and social benefits, it also places considerable pressure on the land. Human activities and buildings have altered the natural form and in some areas resulted in land degradation and contamination.

As the local government authority for the area, the City seeks to manage the land in an environmentally and socially responsible manner. This is a balancing act between the needs of work and social interactions, as well as ecological processes.

Noise

The City of Sydney regulates unwanted neighbourhood noise from a variety of sources such as loud music, mechanical plant and machinery, licensed venues, household burglar alarms, barking dogs and construction related activities.

City officers receive and investigate complaints concerning “offensive noise” and activities being conducted in an environmentally unsatisfactory manner which includes the emission of noise as defined under the Protection of the Environment Operations Act 1997.

In determining whether a noise is offensive, officers must give consideration to many factors including the frequency and duration of the noise, the time of the day it occurs, its volume and any tonal characteristics and how it is affecting the complainant. Once a complaint has been substantiated, the City has a variety of enforcement options available to ensure the noise in question is reduced to an acceptable level. City Officers will always try to resolve complaints where possible informally and refer to the City’s Enforcement Policy when considering what course of action to take.

Under existing noise regulations there are certain time restrictions within which noise from residential premises, such as noise from air conditioners, musical instruments and power tools should not be heard inside any neighbouring residence.

The City also controls noise through the ongoing development and enforcement of noise-related development consent conditions and associated policies and works with other Regulators in order to provide a coordinated approach in regulating noise impacts.

The City is currently updating and revising its Construction Hours/Noise Code of Practice published in 1992, which gives guidance for developers in minimising excessive noise from construction activities and in liaising with the local community prior to any noise intrusive development works taking place.

Demographics

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residents ²⁶	154,073	159,854	165,596	170,173	173,444	177,920	180,679	183,616	185,590
Workers (per day) ²⁷	350,000	365,000	377,000	385,413	375,000	370,000	372,000	376,000	390,000
Visitors (per day) ²⁸	450,000	475,000	475,000	480,000	475,000	475,000	480,000	483,000	500,000
Visitors (total nights) ²⁹	8,732,065	9,000,032	9,039,918	9,462,835	9,519,826	9,358,668	9,804,849	10,096,232	10,004,209
City of Sydney employees	1,479	1,485	1,509	1,601	1,602	1,686	1,781	1,863	1,891

26 The data has been recast from the 2006 Census. Up to 2008–09 is ABS ERP data, 2009–10 and 2010–11 are CoS projections as ERP unavailable.

27 2006–07 FES Census – Count of workers, estimates for other years.

28 CoS estimate – tourist visitors, students, business visitors, shoppers.

29 Tourism NSW data.

Built Form³⁰

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Households (dwellings)	154,073	159,854	165,596	170,173	173,444	177,920	180,679	183,616	185,590
Completed commercial development (sqm)	350,000	365,000	377,000	385,413	375,000	370,000	372,000	376,000	390,000
Completed residential development (no of units)	450,000	475,000	475,000	480,000	475,000	475,000	480,000	483,000	500,000

30 06–07 FES Census – (Private Dwellings); other years – development statistics – residential completions. Includes non-private dwellings.

Noise³¹

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Customer requests – Construction noise	No data	No data	15	274	183	348	354	374	293
Customer requests – other noise	No data	No data	124	852	625	899	893	900	896

31 Requests to City of Sydney Customer Service Centre.

For more information about the City of Sydney's progress against environmental targets, please visit

cityofsydney.nsw.gov.au