

Environmental footprint

In 2009–10, Sydney Water reduced its full supply chain carbon footprint by about 21% and its ecological footprint by about 20% compared to the previous year.



2010–11
Expectations
met or
exceeded

Indicator: Ecological and carbon footprints of business activities

Sydney Water has calculated its environmental footprints for 2009–10 and has compiled data for this indicator over the past four years. We have applied an internationally recognised methodology developed at Sydney University with input from the water industry that measures our full supply chain impacts. Data for 2010–11 was not available in time for publication in this report.

Carbon footprint

Calculating our carbon footprint helps us estimate the impact of a carbon price on our operations and identify opportunities to reduce operational costs and environmental impacts.

In 2009–10, Sydney Water’s full supply chain carbon footprint for operations and capital works was 1.1 million tonnes of carbon dioxide equivalent emissions (CO₂-e), down from 1.4 million tonnes the previous year.² The footprint is reported as a gross number (that is, before the use of carbon offsets), as the gross footprint reflects carbon risk exposure. As part of our commitment to be carbon neutral for electricity and energy use by 2020, Sydney Water surrendered carbon credits to reduce our footprint by 16% in 2009–10. In 2008–09, nine per cent of our carbon footprint was offset in this way.

²Sydney Water uses the hybrid Environmentally Extended Input Output Analysis methodology developed by the Integrated Sustainability Analysis team at Sydney University. Sydney Water has expanded the footprint total this year to include expenditure on capital projects during the year as well as all operational expenses, and has recalculated the footprint total for 2008–09 using the same method. This is consistent with the recently published draft international Greenhouse Gas Protocol.

Only about five per cent of Sydney Water’s carbon footprint came from direct emissions (scope 1 emissions as per the international accounting and reporting protocol, the Greenhouse Gas Protocol). Direct emissions include methane and nitrous oxide emissions from wastewater treatment plants (WWTPs), for which we may be required to buy carbon permits, and fuel used by Sydney Water’s motor vehicles and plant and equipment.³

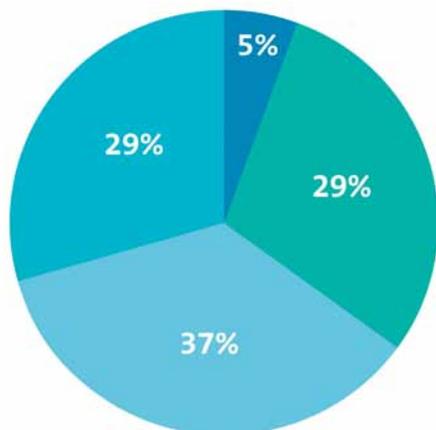
Electricity use (scope 2 emissions) made up 29% of the carbon footprint in 2009–10. Water and wastewater operations are energy intensive and Sydney Water is among the top two hundred largest users of energy in Australia.⁴ Of Sydney Water’s total electricity use, almost 50% was used for wastewater treatment, 30% was used by water pumping stations and nine per cent was used by wastewater pumping stations.

About two-thirds of Sydney Water’s carbon footprint resulted from indirect emissions produced through our supply chain (scope 3 emissions). This reflects the energy used to produce construction materials such as cement and steel and to produce treatment chemicals, and the energy intensity of bulk water supply and treatment. The operations supply chain accounted for 37% of our carbon footprint in 2009–10. Another 29% of our carbon footprint was due to emissions embedded in capital works, including construction of the desalination plant. The Sydney Desalination Plant contributes only a small amount to our footprint as it offsets 100% of its electricity use with renewable energy.

³Sydney Water uses a different method for calculating its Scope 1 nitrous oxide emissions from effluent disposal for the carbon footprint than that used for the 2009–10 National Greenhouse and Energy Report (NGER). The methodology used for the footprint has been adopted by the Federal Department of Climate Change and Energy Efficiency and will apply from the 2011–12 NGER.

⁴Department of Climate Change and Energy Efficiency, 2011, National Greenhouse and Energy Reporting – Greenhouse and Energy Information 2009–10, www.climatechange.gov.au

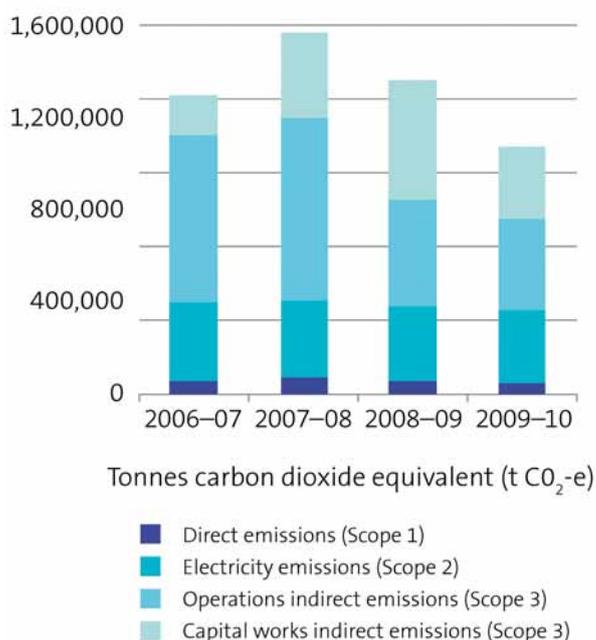
Figure 21 Sydney Water's full supply chain carbon footprint 2009–10



Total annual gross footprint
(capital and operations): 1,070,000

- Direct emissions (scope 1)
- Capital indirect supply chain emissions (scope 3)
- Operations indirect supply chain emissions (scope 3)
- Electricity emissions (scope 2)

Figure 22 Sydney Water's carbon footprint 2007 to 2010



Tonnes carbon dioxide equivalent (t CO₂-e)

- Direct emissions (Scope 1)
- Electricity emissions (Scope 2)
- Operations indirect emissions (Scope 3)
- Capital works indirect emissions (Scope 3)

Note: Emissions are defined in the Greenhouse Gas Protocol, www.ghgprotocol.org

Sydney Water is managing the cost of carbon to the business and identifying opportunities arising from Australia's move towards a low carbon future. We have introduced renewable energy projects that supplied about 10% of our energy needs in 2009–10. The completion of major capital works in 2010, including the desalination plant, also helped reduce our footprint, as did the ending of water transfers

from the Shoalhaven River by the Sydney Catchment Authority, which peaked during the drought in 2007–08. Energy efficiency improvements and renewable energy projects under the Energy Management Plan 2004–05 to 2009–10 will reduce our emissions by around 90,000 t CO₂-e a year. This represents an avoided carbon cost of more than \$2 million a year as well as significant energy cost savings.

Ecological footprint

In 2009–10, Sydney Water's ecological footprint was 130,000 hectares, about 20% smaller than the 2008–09 figure of 160,000 ha and the best result for the past four years. The reduction was largely achieved through reductions in our carbon footprint and the completion of major capital works.

Calculating our ecological footprint helps us to better understand the total environmental impact of our business activities and how we are progressing towards sustainability. Our ecological footprint represents the land area taken up by our infrastructure and by our disposed waste, land disturbed to produce the materials we use and land forecast to be disturbed as a result of greenhouse gas emissions from our carbon footprint.

Sydney Water is actively reducing its carbon and ecological footprints and the impact of volatile energy prices and potential carbon costs by:

- optimising our renewable energy plants and continuing to pursue energy efficiencies
- continuing to assess opportunities to reduce energy and greenhouse gas emissions using our in-house Cost of Carbon Abatement Tool
- moving towards sustainable procurement to reduce the carbon footprints of the products we buy and encourage our suppliers to reduce their carbon footprint
- continuing to reduce waste and reuse biosolids, rehabilitate vegetation on our sites and improve water efficiency
- reviewing investment opportunities under the Federal Government's carbon price and Clean Energy Future package.

Sydney Water's environmental footprints are likely to fluctuate each year as a result of a varied capital works program. The move to energy-intensive water recycling, tighter quality standards and the need to service a growing population will continue to place upward pressure on our footprint. However, Sydney Water aims to gradually shrink our footprint as we continue to improve the sustainability of our services.

Map 7 Sydney Water’s ecological footprint



Energy use

Achieved a 47.5% reduction in carbon emissions as at June 2011.
We are on track to meet the target of a 60% reduction by 2012.



2010–11
Expectations
met or
exceeded

Indicator: Total electricity use by Sydney Water

The total amount of electricity used by Sydney Water during the year was 400.8 million kWh. Water pumping stations and wastewater treatment plants (WWTPs) use a significant amount of electricity to treat and distribute water and to capture and treat wastewater. Water pumping stations and WWTPs accounted for 80% of Sydney Water's electricity use in 2010–11.

Sydney Water has also reported the electricity use by the Sydney Desalination Plant in this report. The plant is a wholly owned subsidiary of Sydney Water. The Sydney Desalination Plant used 257.7 million kWh last year, compared with 83.8 million kWh in 2009–10. It was the first full year of operation for the desalination plant, which began operation in January 2010. The Sydney Desalination Plant offsets 100% of its electricity use with renewable energy.

Figure 23 Total electricity used and generated



Note: The Sydney Desalination Plant offsets 100% of its electricity use with renewable energy. See the net carbon dioxide equivalent emissions indicator in this report below.

Indicator: Net carbon dioxide equivalent emissions from the use of electricity, fuel and gas

Sydney Water’s operational emissions

Sydney Water measures the net equivalent carbon dioxide (CO₂-e) emissions from its electricity, fuel and gas use, less renewable energy credits and carbon offsets surrendered.

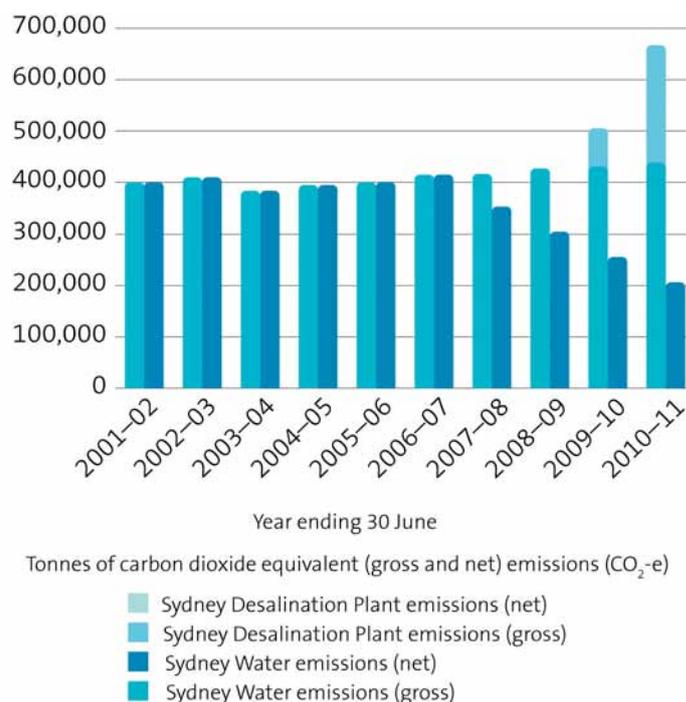
In 2010–11 Sydney Water reduced its emissions by 19.3% from 2009–10 levels to 206,437 tonnes. This reduction was due to the surrender of 231,732 NSW Greenhouse Abatement Certificates (NGACs), each representing the abatement of one tonne of CO₂-e. The certificates were created under the NSW Government’s Greenhouse Gas Abatement Scheme by reducing residential electricity use through the WaterFix Program and producing low-emission electricity at Sydney Water’s on-site generation facilities. The 2010–11 financial year is the fourth in which Sydney Water has offset a portion of its emissions by surrendering NGACs.

The year’s result represents a 47.5% reduction against the 1993–94 baseline for emissions and keeps Sydney Water on track to meet its commitment to become carbon neutral for energy and electricity use by 2020.

Sydney Water also manages its vehicle fleet to reduce emissions. In 2010–11, emissions from transport fuels were 13% lower than the previous year due to Sydney Water reducing its fleet by 24 vehicles and lower fuel use, in part because of a steady shift towards alternative fuels such as liquid petroleum gas (LPG), ethanol-blended E10 fuel and diesel.

Since 2008–09, Sydney Water has been required to report its greenhouse gas emissions and energy use under the *National Greenhouse and Energy Reporting Act 2007*. The National Greenhouse and Energy Reporting (NGER) scheme requires reporting of fugitive emissions and uses a different emission factor from those used to report under Sydney Water’s *Operating Licence* requirements. To know more about NGER, please see the Commonwealth Department of Climate Change website at www.climatechange.gov.au/reporting.

Figure 24 Operations emissions



Notes: 1. Results use emission factors prepared by the Commonwealth Department of Climate Change and Energy Efficiency in the National Greenhouse Accounts (NGA) Factors. Sydney Water uses the full fuel cycle emissions factor and its subsidiary company, the Sydney Desalination Plant uses the Scope 2 factor, as per the reporting requirements of the two organisations.
 2. Under the *National Greenhouse and Energy Reporting Act 2007*, Sydney Desalination Plant is currently required to report ‘gross’ emissions, which excludes reductions due to the surrender of renewable energy certificates. The net emissions for the desalination plant reflect the offset of electricity use with 100% renewable energy.
 3. Gross emissions are total emissions from electricity, fuel and gas use. Net emissions are the total gross emissions less renewable energy certificates and/or carbon offsets surrendered.

Table 24 Sydney Water’s greenhouse gas contribution by fuel type 2010–11*

Source	Tonnes CO ₂ equivalent	% of total
Electricity	428,855	97.87
Natural gas	238	0.05
Stationary fuel	157	0.04
Transport fuel	8,918	2.04
Sub-total tonnes CO ₂ -e	438,169	100.00
Surrender of carbon credits	-231,732	
Total tonnes CO ₂ -e	206,437	

*excludes the Sydney Desalination Plant, which is reported separately below.

Sydney Desalination Plant's emissions

The Sydney Desalination Plant is a wholly owned subsidiary of Sydney Water and is operated and maintained by Veolia Water. The desalination plant began operating in January 2010 and progressively increased to full operating capacity over the financial year. Electricity supplied to the plant was 100% offset by accredited renewable energy through the surrender of 257,671 certificates (equivalent to 231,904 tonnes CO₂-e).

Veolia Water is responsible for reporting the Sydney Desalination Plant's emissions under the *National Greenhouse and Energy Reporting Act 2007* in 2010–11. To know more about NGER, please see the Commonwealth Department of Climate Change website at www.climatechange.gov.au/reporting.

Table 25 Sydney Desalination Plant's greenhouse gas contribution from electricity 2010–11

Source	Tonnes CO ₂ equivalent
Electricity	231,904
Renewable Energy Certificates (RECs) surrendered by electricity retailer	-11,029
NSW Greenhouse Abatement Certificates (NGACs) surrendered by electricity retailer*	-43,867
RECs surrendered by the Sydney Desalination Plant	-177,008
Total surrender of environmental certificates (carbon credits)	-231,904
Total tonnes CO ₂ -e	0

*The NGACs transferred to the electricity retailer in 2010–11 originated from various sources. Each NGAC surrendered offsets one megawatt hour (MWh). This meets the requirements of the Sydney Desalination Plant *Greenhouse Gas Reduction Plan 2009*.

Table 26 Sydney Desalination Plant's greenhouse gas contribution from other fuel sources 2010–11

Source	Tonnes CO ₂ equivalent
Natural gas	0
Stationary fuel	0
Transport fuel	59
Total tonnes CO ₂ -e	59

By-products

Continued to meet our target of 100% beneficial use of biosolids.



2010–11
Expectations met or exceeded

Indicator: Percentage of biosolids beneficially reused

Biosolids are the nutrient-rich organic material produced during the treatment of wastewater at Sydney Water's wastewater treatment plants (WWTPs). The total mass of biosolids produced in 2010–11 was 38,074 dry tonnes. Yearly totals are affected by variations in wastewater treatment processes, population and flows to WWTPs. They can also be affected by when in a reporting period biosolids are removed from storage facilities.

In 2010–11, Sydney Water again met its target of beneficially using 100% of biosolids produced at WWTPs. This material is beneficially used in agriculture and horticulture. To know more about biosolids use, please visit Sydney Water's website: sydneywater.com.au/Sustainability/Biosolids.

Table 27 Percentage of biosolids beneficially reused

2006–07	2007–08	2008–09	2009–10	2010–11
100%	100%	100%	100%	100%

Waste minimisation

Maintained a recycling rate of 72% in 2010–11 compared to 74% the previous year.



2010–11
Expectations met or exceeded

Indicator: Percentage of solid waste recycled or reused

Sydney Water’s recycling and reuse rate slightly decreased from 74% in 2009–10 to 72% in 2010–11. Recycling or reuse increased for internal construction and demolition and office waste. However this was offset mainly by a large decrease in recycling or reuse of process waste.

Construction and demolition waste

Sydney Water is on track to meet the Office of Environment and Heritage construction and demolition recycling and reuse target of 76% by 2014⁵. In 2010–11, Sydney Water recycled or reused 86% of generated construction and demolition waste, while contractors recycled or reused 71%.

Two projects in particular demonstrated impressive recycling and reuse rates. The Priority Sewage Program achieved 92% diversion from landfill and the North West Growth Centre projects achieved 96% diversion. Together these projects diverted more than 70,000 tonnes of material from landfill. Contractor construction and demolition waste recycling and reuse rates have remained steady over the past two years. A low rate of 49% in 2008–09 was mainly because of contaminated soils from the Replacement Flows Project and the desalination plant, and an increase in mixed waste from renewals works that could not be recycled or reused.

Office waste

There was a large increase in the amount of office waste we recycled or reused in 2010–11, as expected. In 2008–09 and 2009–10, Sydney Water consolidated its office space, moving staff to the new head office in Parramatta and new Potts Hill facilities. A large amount of non-recyclable office waste was generated during the moves, which reduced the overall recycling and reuse rate.

We continue to recycle paper and cardboard at all Sydney Water offices. Toner cartridges and batteries are recycled at Head Office and Potts Hill.

Process waste

Recycling and reuse of process waste decreased from 81% in 2009–10 to 48% in 2010–11 as a result of an increase in litter captured from stormwater devices. Continued difficulties in recycling litter, due to the costs involved in separating contaminants and sorting the recyclable material, reduced the overall diversion of stormwater waste to 18%.

A new contract for grit and screenings waste was introduced in 2010, which aims to increase grit and screenings recycling over three years. Recycling of water treatment residuals and wastewater treatment plant grit and screenings increased in 2010–11 to 90% from 80% in 2009–10.

To know more about Sydney Water’s process waste reuse, see the By-products and chapter in this report.

Table 28 Percentage of solid waste recycled or reused

	2006–07	2007–08	2008–09	2009–10	2010–11
Construction and demolition waste – Sydney Water (%)	87	76	78	73	86
Construction and demolition waste – contractors (%)	99	88	49	73	71
Office waste (%)	54	66	38	19	47
Water, wastewater and stormwater process wastes (%)	91	81	67	81	48
Total (%)	97	86	53	74	72

⁵2007, NSW Waste Avoidance and Resource Recovery Strategy 2007, Department of Environment and Climate Change NSW, Sydney.

Flora, fauna and heritage

Restoration and rehabilitation works achieved a net gain of native vegetation. Heritage management targets were met.



2010–11
Expectations met or exceeded

Indicator: Total area of clearing of native vegetation, and total area of native vegetation gain due to rehabilitation, replanting and protection

Sydney Water carries out capital works to renew and upgrade its assets, deliver government programs and support urban growth. We aim to minimise the impact of works on native vegetation and to conserve biodiversity and essential fauna habitat.

The minimum area of native vegetation reported for each project is 0.01 hectares (ha), or 100 square metres. There are no set targets for these native vegetation indicators. The scale and scope of capital works, the natural and built characteristics of a site and the timing of reporting influence Sydney Water's performance. As major capital works projects often take longer than 12 months, there is a lag between reporting data on upfront clearing and reporting the completion of rehabilitation, restoration or replanting works.

Since 2006–07, Sydney Water cleared a total of 15.1 ha of native vegetation and revegetated 40.3 ha. In 2010–11, there was a net gain of native vegetation, with 1.8 ha cleared and 2.2 ha revegetated. Much of the clearing was temporary, with the disturbed land revegetated through bush regeneration.

We cleared less native vegetation in 2010–11 than in recent years. Several major capital works projects in remnant bushland areas are now complete and have significantly reduced Sydney Water's capital works expenditure. Projects that involved native vegetation clearing are listed in the table above. Over the next five years, Sydney Water will continue to deliver a large capital works program to the value of about \$3.8 billion.

A large area of drainage land was rehabilitated and revegetated in 2009–10 for the Rouse Hill Development Area. Sydney Water is the trunk drainage authority for the Rouse Hill Development Area and manages the land with the aim of protecting and reinstating its natural vegetation where feasible.

About 15 ha of Sydney's desalination plant site, acquired in November 2005, remains as a protected conservation area. This bushland contains four endangered ecological communities of plants and habitat for a number of threatened animal species. Ongoing vegetation management includes weed control and native planting.

Sydney Water's fire management plan for the North Head wastewater treatment plant encourages regeneration of mature and ageing vegetation and protects flora and fauna from unplanned fires.

Table 29 Total area of native vegetation cleared

	2006–07	2007–08	2008–09	2009–10	2010–11	Cumulative total (2006–07 to 2010–11)
Total area (hectares)	0.9	3.9	3.1	5.4	1.8	15.1

Table 30 Total area of native vegetation gain due to rehabilitation, replanting and protection

	2006–07	2007–08	2008–09	2009–10	2010–11	Cumulative total (2006–07 to 2010–11)
Total area (hectares)	1.3	2.1	4.6	30.1	2.2	40.3

Indicator: Area of riparian land managed by Sydney Water in accordance with a Plan of Management

Sydney Water has plans of management for the natural wetlands and naturalised stormwater assets that it owns and manages. These plans guide how we maintain these assets, and define strategic and operational goals and actions.

Sydney Water’s *Operating Licence* requires a Plan of Management for Botany Wetlands. We also have plans for Freshwater Creek Wetlands at Chullora, Eve Street Wetland at Arncliffe and trunk drainage land at Rouse Hill Development Area.

Riparian land is land that is next to or surrounds a body of water. Sydney Water manages 415.8 hectares (ha) of riparian land under plans of management, including about 254.7 ha at Rouse Hill, 151.9⁶ ha at Botany, 3.4 ha at Arncliffe and 5.8 ha at Chullora.

The total area of riparian land managed has increased by 25.69 ha since 2004–05 because Sydney Water is the trunk drainage authority for the Rouse Hill Development Area and has acquired trunk drainage land in Stages 1, 2 and 3 of the development. Sydney Water has been acquiring trunk drainage land in the area since the early 1990s. Although some of it was significantly degraded and infested with weeds, other parts contain significant stands of remnant vegetation, some of which are recognised as endangered ecological communities. Sydney Water manages the land with the aim of protecting and reinstating its natural vegetation where feasible.

The plans of management have a particular focus on vegetation management, including the protection and enhancement of native bushland and endangered ecological communities. They also address control of noxious weeds and guide work carried out by weed management and bush regeneration contractors.

Sydney Water is reviewing its Plan of Management for Rouse Hill. Please see sydneywater.com.au/MajorProjects/Stormwater for more information.

Table 31 Area of riparian land managed (ha) at 30 June

2006 –07	2007 –08	2008 –09	2009 –10	2010 –11
399.9	404.2	406.3	413.1	415.8

Note: Total hectares have been amended to reflect the correct area for Botany Wetlands.

Indicator: Percentage of State heritage-listed sites with conservation management plans prepared

Sydney Water has conservation management plans (CMPs) or conservation management strategies for 54 of its 58 State heritage-listed sites. This is 93% of the total number of sites (a two percentage point increase on 2009–10), and above the 90% target set for 2009–10 in Sydney Water’s *Environment Plan 2009–2014*.

The number of sites with CMPs has risen steadily. CMPs enable heritage sites to be maintained while being used as an asset. Sydney Water is required to prepare CMPs for all sites listed on the State Heritage Register (SHR). Work is underway to prepare CMPs for the remaining assets.

Table 32 Percentage of State heritage-listed sites with conservation management plans prepared

	2006 –07	2007 –08	2008 –09	2009 –10	2010 –11
Number of SHR sites with CMPs	38	46	49	53	54
Total number of SHR sites	59	59	58	58	58
Percentage of SHR sites with CMPs	64%	78%	84%	91%	93%

⁶This area was previously under-reported as 151.1 ha.