$257 million funding for projects and programs
813,000 MWh annual electricity savings
$140 million annual power bill savings
1.8 years average payback

Power savings

With $257.3 million support from the NSW Climate Change Fund, households, businesses, community groups and government save an estimated 813,223 megawatt hours of electricity, 853,072 tonnes of greenhouse gas emissions and $139.9 million off their power bills a year, as well as 48,355 kilowatts of peak demand.

These savings are being delivered through 464 grant funded projects, 215,015 residential rebates and fridge removals, 13,182 public housing retrofits, 115,508 lower income household assessments and retrofits, 154 government building retrofits, and more than 17,000 business and government sites receiving energy saving advice and implementation support.

Power savings for households

533,000 MWh annual electricity savings
$87 million annual power bill savings
1.9 years average payback

To date, $166 million from the NSW Climate Change Fund has helped NSW households save an estimated 532,807 megawatt hours of electricity, 566,645 tonnes of greenhouse gas emissions and $86.8 million off their power bills a year, as well as 10,708 kilowatts of peak demand.

NSW households have embraced a range of initiatives to reduce their power bills and make their homes more energy efficient.

The Home Power Savings Program is targeted at lower income households. Eligible households receive a free in-home energy assessment by an energy expert, a free Power Savings Kit valued at around $200 and installed by the energy assessor, plus a free Power Savings Action Plan advising how much power each area of their home is using, and tailored tips to reduce their energy use.

The Power Savings Kit includes a stand-by power board, water efficient showerhead, shower timer, tap aerator, energy efficient light bulbs, door snakes, a set of draught-proofing strips for doors and windows and a thermometer.

As at 30 June 2012, 115,508 lower income households across NSW have participated in the Home Power Savings Program and are saving an estimated 59,600 megawatt hours of electricity, 63,200 tonnes of greenhouse gas emissions and $18.7 million off power bills each year. By June 2014, the $63 million Home Power Savings Program will target 220,000 lower income households across New South Wales to reduce their energy usage.

Under the Home Saver Rebates Program, 181,305 energy-related rebates were provided to NSW households. The program finished on 30 June 2011 as scheduled. It provided rebates for more efficient hot water systems to help save an estimated 378,372 megawatt hours of electricity, 401,075 tonnes of greenhouse gas emissions and $41.2 million off power bills each year. Uptake of rebates in regional NSW was very high, with regional areas driving strong demand for hot water system upgrades.

Under the Fridge Buyback Program, 33,710 households recycled their inefficient second fridge to save an estimated 26,631 megawatt hours of electricity, 28,229 tonnes of greenhouse gas emissions and $8.3 million off power bills each year. The Fridge Buyback Program provides regular collection runs to selected areas of the Blue Mountains, the Central Coast, Cessnock, the Illawarra, Lake Macquarie, Maitland, metropolitan Sydney, Newcastle, Port Stephens, Shoalhaven and Singleton. Visit www.fridgebuyback.com.au for more details.

More than 13,000 public housing properties have been fitted with more efficient hot water systems or insulation to save an estimated 18,126 megawatt hours of electricity, 19,214 tonnes of greenhouse gas emissions and $2.4 million off power bills a year.

NSW households have also benefited from 11 grant funded projects, including residential audits, energy efficient appliance refits, and education and awareness campaigns. These projects will help save an estimated 50,069 megawatt hours of electricity, 54,942 tonnes of greenhouse gas emissions and $16.3 million off power bills a year. Ten of these projects were completed by 30 June 2012.

The Save Power Program helps teach people how to save power at home and work and includes information available in 19 languages. During 2011–12, more than 110,000 people visited the Save Power website to learn more about what they can do to save power at home and work, and a radio and online advertising campaign highlighted energy efficiency tips over summer. Residents also had access to a Save Power kit in 263 local libraries throughout NSW. The kit provides households with tools and information to help them reduce power and save money on bills. Ninety-six per cent of surveyed participants reported that borrowing the kit was a worthwhile experience and helped them understand how to reduce their energy use.

Households have also benefited from 142 retail stores participating in a unique program to train sales staff to help consumers choose energy efficient appliances. Ninety-two per cent of the participating stores were extremely satisfied with the program.

Households participating in the NSW Energymark Program, a partnership with CSIRO, achieved an average 12.5 per cent reduction in their energy use and each household saved around $250 off annual power bills.

Regional focus

Figure 1 Household power savings

Households in regional NSW have embraced ways to become more energy efficient and are strongly represented in some of the Office of Environment and Heritage's biggest statewide programs.

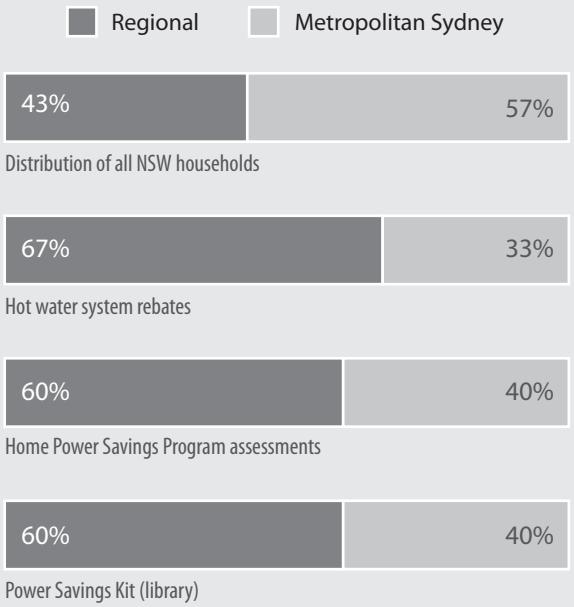


Table 2 Household power saving projects and programs

Estimated savings as at 30 June 2012

Program	No. of projects or participants	Funding allocated	Estimated electricity savings	Estimated greenhouse gas savings	Estimated utility bill savings	Cost effectiveness
		$	MWh/year	tCO_2-e/year	$/year	$ per MWh
Home Saver Rebates Program	181,305	105,609,471	378,372	401,075	41,157,975	27.91
Home Power Savings Program	115,508	29,436,133	59,609	63,186	18,657,678	98.76
Public housing retrofits	13,182	19,202,407	18,126	19,214	2,432,370	105.94
CCF grant projects	11	6,693,030	50,069	54,942	16,256,828	13.37
Fridge Buyback Program	33,710	5,045,815	26,631	28,229	8,335,472	18.95
Total		**$165,986,855**	**532,807**	**566,645**	**$86,840,323**	**$33.00**

For reference, the cost of new electricity infrastructure is $114 per MWh.

Case study

Working with communities

The Home Power Savings Program is helping lower income households manage the cost of living as well as providing more sustainable living environments. The program is helping community members by giving them information on their specific energy usage, providing energy efficient products and offering education on ways to change the way they use energy.

Twenty-two pre-determined geographical delivery areas ensure that the program is provided equitably across metropolitan Sydney and regional NSW.

The program is delivered in-field by a third party, which employs over 100 energy experts across the state. Energy experts work in their local community to raise awareness of the program, deliver the in-home energy assessment, install the free Power Savings Kit and provide advice on energy saving.

Local councils are often the hub of information and interaction within communities. Grants to 36 local councils across NSW have enabled them to actively promote the Home Power Savings Program and encourage their local communities to join and receive its benefits.

Invaluable program partners

To effectively engage with lower income households, the Home Power Savings Program has formed strong working relationships with local and state government agencies, non-government organisations and local community groups. The program also works closely with organisations that support culturally and linguistically diverse communities, as well as Aboriginal and Torres Strait Islander communities. Many of these groups deliver frontline services to households in need and provide invaluable guidance and advice through mechanisms such as the official Stakeholder Advisory Group.

The Stakeholder Advisory Group has representatives from:

- Aboriginal Housing Office
- Anglicare
- Brotherhood of St Laurence
- Department of Human Services
- Department of Veterans' Affairs
- Energy & Water Ombudsman NSW

- Ethnic Communities Council
- Financial Counsellors Association Australia and New Zealand
- Housing NSW
- Trade & Investment NSW
- Local Community Services Association
- Local Government and Shires Association of NSW
- NSW Aboriginal Land Council
- NSW Council of Social Services
- NSW Rural Assistance Authority
- Public Interest Advocacy Group
- Salvation Army.

A happy customer!

Mavis from South Wentworthville recently took part in the Home Power Savings Program after it was recommended by a neighbour. She is estimated to save up to $127 a year off her power bills.

"The energy expert was very good. He explained where I could make savings and how to seal my house from the cold air. I told all my friends about the service and a few months later I saw his car at another neighbour's house, so I think the word is getting around. I think it's great to help older people," Mavis said.

Case study

Households get energy smart

The Save Power Retail Program provides energy efficiency training to sales staff in whitegoods and appliance stores across NSW, so they can advise their customers on the long-term running costs of the different appliances available. Consumers are increasingly interested in energy efficiency, reflected in an increase in sales of energy efficient appliances.

Although many customers do consider energy efficiency, consumers prioritise the upfront ticket price and brand above energy efficiency, especially if energy efficient products cost significantly more than less efficient alternatives. Buyers often don't consider that more energy efficient products cost less to run in the long term.

Save Power Retail Program staff and customers can access energy calculators to help them understand the real cost of ownership and make informed decisions when buying air conditioners, dishwashers, dryers, freezers, fridges, televisions and washing machines.

The calculators are an important tool in informing consumers about the true cost of less efficient products, rather than just focusing on the upfront ticket price and brand. For example, every extra star rating on a fridge or freezer will save 23 per cent of the running costs over its life, which could be many years.

Participating retail stores include David Jones, The Good Guys, Harvey Norman and Myer.

In total, 142 stores across NSW are engaged in the program, with 97 per cent of staff in participating stores aware of the program, over 80 per cent of staff trained in the program and 92 per cent of participating stores reporting they are extremely satisfied with the program.

Visit www.savepower.nsw.gov.au for more information.

Power savings for businesses

173,000 MWh annual electricity savings
$33 million annual power bill savings
1.3 years average payback

To date, $44.5 million from the NSW Climate Change Fund has helped NSW businesses save an estimated 173,042 megawatt hours of electricity, 170,010 tonnes of greenhouse gas emissions, and $32.8 million off their power bills a year, as well as 26,594 kilowatts of peak demand.

The Fund has helped small, medium and large businesses in both regional NSW and metropolitan Sydney achieve significant savings by transforming operations and increasing knowledge, skills and capacity.

As at 30 June 2012, 17,185 businesses that spend up to $20,000 a year on power bills or employ up to 10 full-time staff have joined the Energy Efficiency for Small Business Program. These businesses receive an energy assessment, a tailored action plan and matched funding of up to $5,000 to make energy improvements. Businesses that have participated to date are expected to save 37,396 megawatt hours of electricity, 39,640 tonnes of greenhouse gas emissions and $10.8 million off power bills a year.

The combination of financial incentives, access to information and support from service providers has assisted small business owners overcome barriers to implement energy saving measures. An independent program evaluation revealed that up to 91 per cent of participants acknowledge the Program gave them the ideas, confidence and skills to make energy efficiency improvements.

The program also improves service delivery to the small business sector by encouraging assessors and product suppliers to access financial incentives and expand their services. This often results in other ancillary benefits such as sector or technology specific advice and expanding their reach to regional NSW.

Over 40 per cent of program participants are based outside Sydney, due in part to the Office of Environment and Heritage's work with peak bodies and industry to target specific sectors such as dairy and poultry farmers. By partnering with Dairy NSW, 448 dairies have received energy assessments. The Office of Environment and Heritage has also partnered with the Australian Meat Industry Association, Foodworks, IGA and NSW Farmers to identify other energy saving opportunities in their respective sectors.

The Energy Saver Program provides subsidised energy audits and support for medium-to-large businesses and government sites to identify and implement cost effective energy savings. Two hundred and six medium and large businesses have joined the program, resulting in 292 site audits. These audits have identified average potential energy savings of 28 per cent and cost savings of 31 per cent of the businesses' baselines. Businesses participating in Energy Saver are estimated to achieve savings of 36,246 megawatt hours of electricity, 148,517 gigajoules of natural gas, 48,154 tonnes of greenhouse gas emissions and $10.1 million off power bills a year.

The Energy Saver program has also developed sector guides that are helping businesses understand common energy saving opportunities and promoting sector benchmarking.

Since 2009, the Climate Change Fund has provided over $1 million to co-fund the Sustainability Advantage Program. During this time, the Resource Efficiency module of Sustainability Advantage has

Table 3 Business power saving projects and programs

Estimated savings as at 30 June 2012

Program	No. of projects or participants	Funding allocated	Estimated electricity savings	Estimated greenhouse gas savings	Estimated utility bill savings	Cost effectiveness
		$	MWh/year	tCO_2-e/year	$/year	$ per MWh
CCF grant projects	43	16,249,662	91,191	70,766	9,544,478	17.82
Energy Saver Program	292	9,249,663	36,246	48,154	10,061,965	25.52
Sustainability Advantage Program – Resource Efficiency module	165	1,035,000	8,209^	11,452^	2,422,354^	12.61
Energy Efficiency for Small Business Program	15,214	17,958,385	37,396	39,640	10,807,447	48.02
Total		**$44,492,710**	**173,042**	**170,010**	**$32,836,245**	**$25.71**

^This represents 22 percent of the total water and energy savings achieved by the Sustainability Advantage Program, which is proportional to the amount of co-funding provided by the Climate Change Fund.

For reference, the cost of new electricity infrastructure is $114 per MWh

helped 165 businesses save an estimated 37,312 megawatt hours of electricity, 1.8 billion litres of water, 190,760 gigajoules of natural gas and $16.2 million a year off bills.

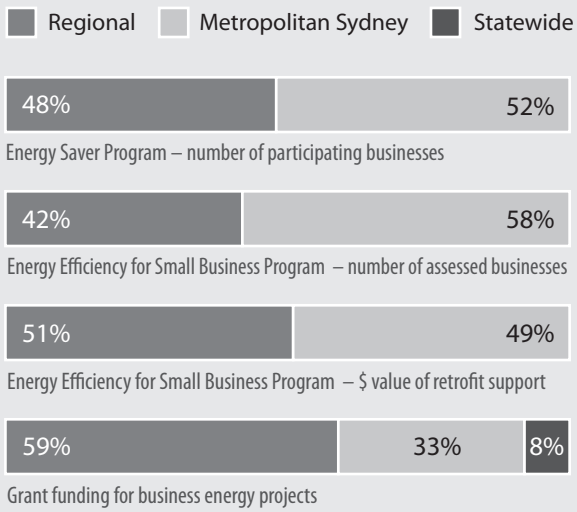
Initiatives to boost energy efficiency knowledge and skills have helped 500 key business professionals, such as facility managers, as part of the Energy Saver Program. Six thousand accountants, builders, electricians, engineers, facilities managers, plumbers and service providers (for example IT professionals and retailers) have also benefited from targeted, practical training, with 19 new vocational training and university courses as part of a joint partnership between the Office of Environment and Heritage and the Department of Education and Communities. Under this partnership, the University of Wollongong is saving almost $200,000 each year through IT technology and behaviour changes; and NSW Clubs such as Oak Flats Bowling and Recreation Club and Wingham Services Club are achieving energy savings of up to 20 per cent, partly through training that helped deliver savings opportunities.

The Fund has also provided seed funding to seven major councils in all the major commercial business districts within NSW to assist with implementing Environmental Upgrade Agreements (EUAs). EUAs provide access to finance for environmental improvements to existing commercial, industrial, multi-unit residential and strata scheme buildings in NSW. Under this agreement, a finance provider lends funds to a building owner for water, energy and other environmental upgrades. The loan is repaid through a local council charge on the land. Being channelled through council rates means the loan repayment has statutory priority and a different status to a conventional loan. This additional level of security enables lenders to offer more competitive, longer term interest rates. A partnership between the building owner, bank and local council drives new investment in energy efficiencies and helps building owners and tenants reduce their utility bills.

The Fund provided $16.2 million in grant funding to businesses to implement 43 projects under the Green Business Program, the Public Facilities Program and the former Energy Savings Fund.

Regional focus

Figure 2 Power savings for business



These projects will help save an estimated 91,191 megawatt hours of electricity, 70,766 tonnes of greenhouse gas emissions and $9.5 million off power bills a year. Thirty-eight projects have already been completed as at 30 June 2012. These projects include energy efficiency, education, generation (including cogeneration) and power factor correction initiatives. Technologies include absorption chillers and high efficiency compressors in industrial processes, multi-level lighting systems, and the installation of utilities management systems and efficient speed drives.

Case study

Foundry finds further ways to reduce energy

Sustainability and power conservation have been a priority for Uralla's Phoenix Foundry for many years now. So when an Energy Saver audit identified opportunities to reduce the company's power use by a further 10 per cent – and for very little outlay – the management team was delighted.

The company, which was named Business of the Year by the Armidale Chamber of Commerce in 2010, is a founding member of the Northern Inland Sustainable Business Network.

CEO Ian Mitchell says finding the right balance between minimising energy and optimising production can be tricky.

"As a business, we're committed to reducing our carbon footprint," said Mr Mitchell, who joined Phoenix 10 years ago and has been CEO since 2005.

"The planet will face a bleak future if companies don't do their bit to protect the environment. You can't just continue to rely on old, outmoded methods of doing things. At the same time, you need to ensure that efficiency changes don't negatively impact production."

Established in 1983 in the northern NSW town of Uralla, Phoenix Foundry is Australia's leading home-grown supplier of cast bronze plaques. The niche company derives 85 per cent of its income from cemeteries, but also creates custom signage for other clients (for example, NSW Parliament House's coat of arms). In recent years, Phoenix has ventured into offshore markets and now derives 20 per cent of its business from exports, primarily to Canada and the UK.

Phoenix began operating in the historic Uralla foundry and moved to its present site in 1989. It currently occupies 1,000 square metres of factory space – including a pattern-making area, maintenance workshop, production facilities and an induction furnace building – plus 130 square metres of office space.

In 2007, Phoenix replaced its gas-fired furnace with a high-frequency induction model. While this step significantly decreased the company's overall energy consumption, its electricity use increased.

When Mr Mitchell heard about the Office of Environment and Heritage's Energy Saver audits, he was immediately interested. Phoenix's recent audit identified a number of cost-saving opportunities that will help reduce the company's electricity bill by 10 per cent.

"It's great to have a fresh pair of eyes take a look at how you do things," said Mr Mitchell. "We were pleasantly surprised by the results of our Energy Audit, which revealed that our operations were already fairly efficient.

"The audit helped us identify where our power consumption was coming from," he continued. "For example, we didn't realise that our underfloor heating consumed nearly as much energy as our induction furnace."

Phoenix is implementing a number of projects recommended by the audit, which will cost little or nothing to put in place, including:

- reducing the area for underfloor heating to just the pattern room, where resin drums are stored
- setting computer monitors to go into power saving mode
- installing motion sensors for lights in infrequently used areas
- fitting a light sensor in the furnace shed and main foundry – so lights only come on when there isn't enough natural light.

Mr Mitchell says the foundry's energy initiatives have generated considerable interest among its 40 employees. As a member of the Office of Environment and Heritage's Sustainability Advantage Program, Phoenix has obtained a Power Savings Kit that it loans to staff members. The kit contains a number of tools, including a meter to plug into individual appliances to measure electricity consumption, and a laser thermometer to identify hot and cold spots.

"The kit is very popular," said Mr Mitchell. "Raising the energy awareness of our employees at work has had knock-on effects at home also."

Case study

Bioreactor energy audit slashes power bill

The Woodlawn Bioreactor, located just outside of Goulburn, will reduce its electricity consumption by more than 17 per cent, cut carbon emissions by more than 200 tonnes and nearly halve its annual power bill after implementing the recommendations from a recent Energy Saver audit.

The bioreactor captures gases, including the harmful greenhouse gas methane, from decomposing waste, and converts them into power. It has generated more than 54,000 megawatt hours of electricity since 2004.

The facility stores waste in the pit of a former open cut mine and uses an extensive network of pipes to extract the biogas. Other pipes circulate nutrient-rich water within the waste, speeding up decomposition and the production of biogas. Veolia Environmental Services owns and operates the bioreactor.

Recently, Veolia reviewed electricity use across all its NSW sites through the Office of Environment and Heritage's Sustainability Advantage Program. The company was looking for ways to reduce its energy use and costs. With an annual electricity bill topping $250,000, the bioreactor was a prime candidate for an Office of Environment and Heritage Energy Saver audit.

Operations & Environment Manager Henry Gundry says the audit revealed that equipment which was only used occasionally, such as stormwater pumps and evaporators, accounted for around 16 per cent of electricity use.

"It doesn't rain here often, but when it does it buckets down," said Mr Gundry, who has worked onsite for five years.

"The land is still contaminated from its mining days, so effective stormwater management is essential. The audit's recommendations will help us reduce our power load and expenditure during heavy rain periods.

"Some recommendations were relatively simple, like installing timers on the evaporators and pumps in our dams to take advantage of off-peak power. They were previously being turned on and off manually during the day.

"Big ticket items included installing a demand management system to easily shut down non-essential equipment during high-load periods, when the stormwater pumps were running."

Project Manager Stephen Bernhart, who conducts environmental monitoring, said the audit shed light on some perplexing issues.

"We knew power-factor correction was needed, but didn't know exactly what was involved or the savings that could be achieved," said Mr Bernhart. "Around 20 per cent of our electricity was being wasted.

"The Energy Saver auditors helped us to create a business case for the $22,000 expenditure for power-factor correction, which will save us more than $20,000 each year. The auditors also recommended we install a larger, more energy efficient compressor, which will reduce our annual power bill by $24,000."

Mr Gundry says Veolia plans to implement most of the audit recommendations in the next 12 months, at a total cost of just over $400,000.

The expected payback period is 3.3 years, which Veolia will reduce further by creating and trading Energy Saving Certificates.

Other projects will include replacing a number of pumps with smaller units; installing a smaller transformer at the site's dam; fitting motion or daylight sensors in infrequently used office rooms; replacing metal halide high-bay lighting with compact fluorescents in the workshop; optimising air conditioning settings; and replacing the electric hot water system with a heat pump.

Power savings for communities

14,000 MWh annual electricity savings
$3 million annual power bill savingss
2 years average payback

To date, $6 million from the NSW Climate Change Fund has helped NSW community groups save an estimated 14,394 megawatt hours of electricity, 15,551 tonnes of greenhouse gas emissions and $2.9 million off their power bills a year, as well as 34 kilowatts of peak demand.

The Climate Change Fund allocated $6 million in grant funding for community groups to implement 256 projects under the Public Facilities Program and former Energy Savings Fund. These projects are estimated to save 14,394 megawatt hours of electricity, 15,551 tonnes of greenhouse gas emissions and $2.9 million off power bills a year. As at 30 June 2012, 236 projects have already been completed.

Under the Community Savers stream of the Public Facilities Program, 250 community organisations have received financial support to reduce their energy consumption and power bills by implementing simple, low cost energy upgrades in their facilities such as lighting upgrades, and installing more efficient hot water systems, ceiling insulation and skylights. Essential community services such as not-for-profit preschools, aged care groups, disability and support services, sport and recreation clubs, and religious facilities have all been recipients.

Six large community organisations have also received funding for energy upgrades and community education initiatives under the Energy Saver Scheme and the Demonstration stream of the Public Facilities Program. Facilities such as community halls and education centres have received insulation, lighting upgrades, optimisation of HVAC and installation of chillers. The projects also implement education initiatives such as events and workshops, signage, education brochures and websites to engage the community and encourage more savings.

Visit www.environment.nsw.gov.au/grants/ccfund.htm for details of the community power saving projects funded under the Climate Change Fund.

Regional focus

Figure 3 Community power savings

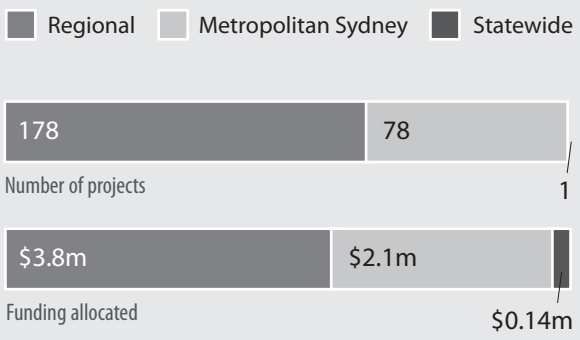


Table 4 Community power saving projects and programs

Estimated savings as at 30 June 2012

Program	No. of projects	Funding allocated	Estimated electricity savings	Estimated greenhouse gas savings	Estimated utility bill savings	Cost effectiveness
		$	MWh/year	tCO_2-e/year	$/year	$ per MWh
CCF grant projects	256	5,995,250	14,394	15,551	2,870,814	41.65

For reference, the cost of new electricity infrastructure is $114 per MWh

Case study

From wasteful electric to gas hot water

Kiama Leagues Club has taken advantage of recent club renovations to upgrade its hot water system and is now using less energy than before – despite longer operating hours and increased membership.

The project, which saw the replacement of seven old-style large electric storage hot water systems with five instantaneous gas hot water systems, was made possible by $24,600 in funding from the NSW Climate Change Fund.

The club was motivated to undertake this project by a desire to reduce greenhouse gas emissions by upgrading to gas. Since the upgrade, the club has reduced its annual electricity consumption by more than 5 per cent.

It's just the start of a bigger program of energy savings for the club, said Club General Manager, John Bambury.

"Without the grant, the club just would not have been able to find that amount of money in our budget to carry out these upgrades and we would have had to continue with a more inefficient system," said Mr Bambury.

"The savings certainly help. Had it not been for these upgrades we would certainly have been paying more on our electricity bill."

The popular Kiama club is also in the process of upgrading all its lighting, and has now replaced about 15 per cent of its quartz halogen lighting with more efficient LED (light-emitting diode) lighting.

The project is estimated to save 202 megawatt hours of electricity and 172 tonnes of greenhouse gas emissions in the first 10 years. The Club is already demonstrating savings even though it has extended trading hours and increased patronage – up by 24 per cent in 2011 to more than 5,700 members.

Power savings for government

93,000 MWh annual electricity savings
$17 million annual power bill savings
2.3 years average payback

To date, $40.8 million from the NSW Climate Change Fund has helped local and state government facilities and schools save an estimated 92,979 megawatt hours of electricity, 100,866 tonnes of greenhouse gas emissions and $17.4 million off their power bills a year, as well as 11,019 kilowatts of peak demand.

The $6.4 million Government Building Retrofit Program has assisted more than 100 small government service sites and 43 large government service sites to improve their energy efficiency and achieve financial savings which can be redirected into service delivery.

A pilot program to improve water and energy efficiency in government buildings in the Illawarra , Lower Hunter and Circular Quay assisted 111 sites, including ambulances stations, fire stations, courts, disability care residences, train stations and national park offices. Each site received an energy audit and action plan that identified small-scale retrofit opportunities such as energy efficient lights, water efficient showerheads and other water saving devices which result in power savings. The Fund also provided money to implement energy saving devices. The Program will save an estimated $625,877 off power bills annually, which can be reinvested into frontline service delivery.

The Fund also assisted 43 of the NSW Government's largest energy-using services to make energy savings. Services such as hospitals

Case study

Sydney Opera House kicks off government energy efficiency blitz

Sydney Opera House is one of Sydney's most iconic and visited buildings. As its operation uses large amounts of energy, the Sydney Opera House wanted to improve energy use and actively sought ways to reduce its consumption.

"The Sydney Opera House's environmental sustainability plan has an objective to reduce energy consumption by 15 per cent from 2000 levels by June 2013, and lighting upgrades were an opportunity to achieve part of that," said Sydney Opera House's Director Building Development and Maintenance, Greg McTaggart.

"We also wanted to make sure that we were using the most appropriate methods and technologies available to reduce energy use."

The Sydney Opera House's retrofit project received $890,000 from the Climate Change Fund to upgrade the lighting-control system across six key areas – Central Passage, Concert Hall and Opera Theatre foyers, Playhouse, Drama Theatre and Green Room.

A number of considerations had to be addressed as part of the retrofit program, including consultation with stakeholders (commercial partners, hirers, lighting technicians, resident companies and tourism operators), and specific heritage and conservation requirements, such as maintaining the existing heritage fixtures and architectural aesthetics.

The completed lighting upgrade is estimated to save $110,000 each year off energy bills and around 870 megawatt hours of electricity, which is equivalent to 930 tonnes of greenhouse gas emissions.

Sydney Opera House is now looking to expand the lighting upgrades to other areas on the premises and to pursue other initiatives to reduce energy consumption, such as a major upgrade of its air conditioning systems.

"The success of this retrofit project has motivated Sydney Opera House to roll out further upgrades in the future," said McTaggart. "We also hope to inspire other building owners to take on the challenge to make their buildings more water and energy efficient."

The Government Building Retrofit Program was rolled out across government-owned and government-tenanted buildings in the Lower Hunter and Illawarra regions and the Circular Quay precinct in Sydney during 2011–12. The Sydney Opera House was the first project to receive funding from the pilot program.

received funding and access to technical expertise to develop a strong business case to implement energy saving measures with finance from a Treasury Loan Fund. Once implemented, these projects are projected to save the NSW Government an estimated $6.5 million a year at current energy prices.

Thirty-four government sites have joined the Energy Saver Program and committed to 78 site audits to help save 9,682 megawatt hours of electricity, 39,672 gigajoules of natural gas, 12,863 tonnes of greenhouse gas emissions and $2.5 million off power bills a year.

Under the Public Facilities Program, the Schools Energy Efficiency Program and the Energy Savings Fund, 154 projects are being implemented in schools, and local and state government sites, saving an estimated 40,443 megawatt hours of electricity, 41,245 tonnes of greenhouse gas emissions and $7.7 million off power bills a year.

Table 5 Government power saving projects and programs

Estimated savings as at 30 June 2012

Program	No. of projects or participants	Funding allocated	Estimated electricity savings	Estimated greenhouse gas savings	Estimated utility bill savings	Cost effectiveness
		$	MWh/year	tCO_2-e/year	$/year	$ per MWh
CCF grant projects – local government	14	5,441,048	18,264	19,110	3,418,376	29.79
CCF grant projects – state government	12	6,988,725	13,898	13,358	2,334,472	50.29
CCF grant projects – schools	128	20,276,121	8,280	8,777	1,987,314	244.87
Government Building Retrofit Program – small sites	111	5,048,462	4,095	4,442	625,877	123.29
Government Building Retrofit Program – large sites	43	1,192,037	38,759	42,316	6,473,731	3.08
Energy Saver Program	78	1,845,393	9,682	12,863	2,532,869	19.06
Total		**$40,791,786**	**92,979**	**100,866**	**$17,372,639**	**$43.87**

For reference, the cost of new electricity infrastructure is $114 per MWh

Case study

A simple lighting upgrade improves passenger safety and saves more than $50,000 a year off bills

With 307 railway stations across the RailCorp network, the cost of maintaining lighting standards for the safety of RailCorp's passengers is significant.

RailCorp sought to identify smarter ways to produce more lighting for customers at less cost. In response, RailCorp partnered with the Office of Environment and Heritage as part of the Government Building Retrofit Program to identify opportunities and trial technologies that would reduce energy use.

Glen Green, Manager Infrastructure Facilities at RailCorp, said the project has been a great success.

"The new LED lights are so far performing well and will result in some real cost savings in electricity and maintenance," he said.

Under the retrofit program, eight railway stations across the Illawarra and Hunter regions received a total of $495,000 from the Climate Change Fund for lighting upgrades. These upgrades will result in annual savings of approximately 352 megawatts of electricity and up to $50,000 off bills.

Across the eight stations, over 1,000 old-style fluorescent lights and floodlights were replaced with more efficient LED (light-emitting diode) lights.

The lighting upgrades are based on specifications developed by RailCorp following an earlier trial at Hurlstone Park railway station. Using these specifications allowed RailCorp to streamline the adoption of new technology and gave the organisation confidence that savings could be achieved without compromising light quality.

Compared with old-style fluorescent lights and metal-halide floodlights, LED lamps not only use less energy for the same light output, they are also more reliable and have a longer lifespan. As a result, the new lights will lower maintenance costs and keep passengers safe.

Participating in the trial upgrade project has provided RailCorp with an excellent opportunity to test the performance of the energy savings technology at its stations and lead the way for potential wider application.