

The logo consists of a red circle containing the words "action" and "matters" stacked vertically in white, lowercase, sans-serif font.

action  
matters

The background image shows an industrial facility with several large, cylindrical, corrugated metal storage tanks. One tank in the center has a blue circular label with the number "331". A worker in a blue hard hat and orange safety vest is visible on a yellow staircase leading up to the tank. The scene is reflected in a pool of water in the foreground. The sky is blue with scattered white clouds.

# NSW Climate Change Fund

Annual Report 2016–17

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Cover photo: Koppers Carbon Materials & Chemicals (Koppers) is an industrial manufacturer in Mayfield in the Hunter region of New South Wales. Koppers received \$28,586 from the Climate Change Fund for three gas efficiency and maintenance projects that will reduce their gas bills by almost 10% (Photo: Quentin Jones, Jonesphoto)

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# Minister's foreword

The NSW Climate Change Fund (the Fund) helps NSW households and businesses to save energy and money, unlock the benefits of clean energy and make our communities more resilient to a changing climate.

We are proud of our recent track record in helping households and businesses to save energy and money. In August 2016, we launched the Appliance Replacement Offer as part of the \$26.8 million Home Energy Action program. Through this program we are also partnering with community housing providers, the community services sector and industry to deliver energy efficiency improvements to households in energy hardship and to improve household comfort, health and wellbeing.

We have continued to support gas-intensive businesses to save on energy costs with two new rounds of funding for gas efficiency and maintenance projects. Over 50 businesses are now saving an estimated \$3.3 million a year off their energy bills and 5% of their combined annual gas use.

To improve the resilience of our communities to flood risks, we committed \$58 million to implement Phase One of the Hawkesbury–Nepean Valley Flood Risk Management Strategy from 2016–17 to 2019–20. This first phase includes community engagement activities that will increase flood risk awareness for improved community preparedness.

The switch to a low carbon economy is well underway. Our renewable energy generation reached 19.6% in 2016. Solar panels are now commonplace – over 350,000 households in New South Wales have installed solar PV systems.

In November 2016, the NSW Government released our *NSW Climate Change Policy Framework*. It outlines the Government's role in reducing emissions, and helping New South Wales adapt and become more resilient to the impacts of climate change. It also commits New South Wales to an aspirational target of net-zero emissions by 2050.

At the same time, we consulted on a *Draft Climate Change Strategic Plan*, which set out priority investment areas and potential actions using \$500 million of new funding from the \$1.4 billion Climate Change Fund over the next five years. This investment will help us transition to a net-zero emissions future and adapt to a changing climate.

We also consulted on a *Draft Plan to Save NSW Energy and Money* – a plan to meet the NSW Government's ambitious energy savings target to achieve 16,000 gigawatt hours of energy savings a year by 2020.

Following stakeholder feedback on these draft plans, the NSW Government will finalise new programs and actions to help deliver its climate change objectives.

With the help of the Fund, the NSW Government will continue to boost energy security, help households and businesses to save energy and money, and make sure our local communities can weather storms, floods, heatwaves and bushfires.



Gabrielle Upton

Minister for the Environment

# Climate Change Fund highlights for 2016–17

- The Home Energy Action program formed five new partnerships worth \$2.8 million to retrofit 1400 properties with energy efficiency measures, collectively saving \$388,000 a year off energy bills for community housing providers and their tenants.
- The NSW Government launched the Appliance Replacement Offer in August 2016. More than 17,600 new energy efficient fridges and televisions have been delivered across New South Wales, collectively saving low-income households more than \$2.5 million a year off their energy bills.
- The Clean Energy Strategies for Business program provided 20 businesses with a total of \$200,000 to develop clean energy strategies to transition to 100% renewable energy or net-zero emissions.
- Through the Gas Efficiency Funding program, 63 applicants were offered a share in \$1.2 million of funding to implement gas monitoring, efficiency and maintenance projects to reduce gas consumption and energy costs.
- The NSW Government established the Hawkesbury–Nepean Flood Risk Directorate in Infrastructure NSW to oversee and coordinate implementation of the Hawkesbury–Nepean Valley Flood Risk Management Strategy, which aims to improve community preparedness and response to current and future flood risk in Western Sydney.
- Through Climate-KIC Australia, which launched in April 2017, the Fund supported the development of Australia’s first business accelerator program dedicated to clean energy start-up companies.

# 1 Delivering government priorities

## 1.1 Overview of the NSW Climate Change Fund

The NSW Climate Change Fund (the Fund) was established in 2007 under the *Energy and Utilities Administration Act 1987* (the Act) and is administered by the NSW Office of Environment and Heritage (OEH).

The Fund supports activities that will help homes, businesses, communities and government agencies manage the impacts of climate change and reduce energy consumption, water use, greenhouse gas emissions and utility bills.

The Fund supports the implementation of the 2013 NSW Energy Efficiency Action Plan, 2013 NSW Renewable Energy Action Plan and other government priorities (see Figure 1).

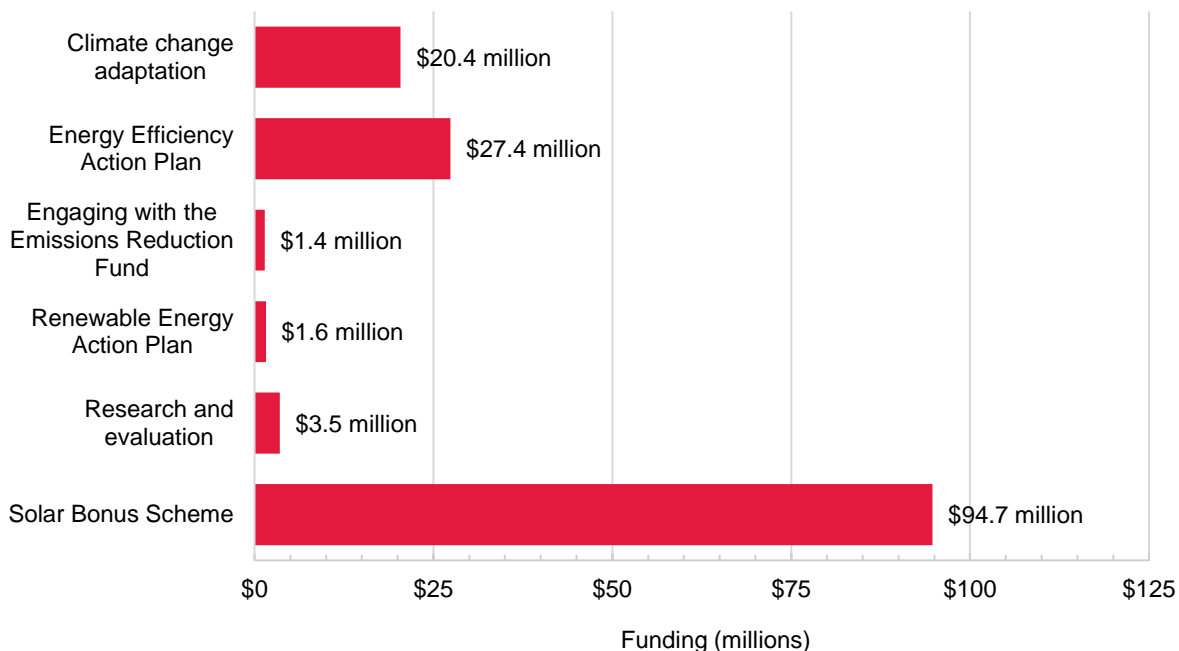


Figure 1: Fund support for NSW Government priorities in 2016–17<sup>1</sup>

## 1.2 NSW Climate Change Policy Framework

The NSW Government released the *NSW Climate Change Policy Framework* in November 2016. The policy framework provides the strategic framework for NSW Government action on climate change and sets two objectives:

- achieve net-zero emissions by 2050
- make New South Wales more resilient to a changing climate.

<sup>1</sup> Does not include administration, national energy regulation or other minor programs/projects. For a full breakdown of funding refer to Table 2 in section 2.1.

The NSW Government also released the *Draft Climate Change Fund Strategic Plan* and a *Draft Plan to Save NSW Energy and Money* as the first step to implementing the policy framework. These draft plans described potential actions to be funded by the Fund over five years from 2017–18 to 2021–22.

The draft plans were developed following workshops with independent energy and climate change experts, including members of the NSW Climate Change Council. The workshop outputs were developed into potential actions and tested against criteria such as addressing market barriers and producing benefits likely to outweigh costs.

OEH consulted on the draft plans from November 2016 to February 2017. This included a call for submissions on the public consultation documents, 20 stakeholder workshops (including five in regional New South Wales), four webinars, a public information session with the Minister for the Environment and 10 in-depth workshops on specific actions.

OEH received over 3000 submissions on the draft plans. These will inform new programs and actions to help deliver the Government's climate change objectives.

For more information, see the *NSW Climate Change Policy Framework*:  
[www.environment.nsw.gov.au/topics/climate-change/policy-framework](http://www.environment.nsw.gov.au/topics/climate-change/policy-framework)

### **1.3 Energy efficiency**

The 2013 Energy Efficiency Action Plan includes 30 actions to grow the energy efficiency products and services industry in New South Wales. The Fund supports programs that help reduce energy costs for households, businesses and government. These programs contribute to the NSW Government target to deliver 16,000 gigawatt hours of energy savings a year by 2020. The NSW Energy Savings Scheme is the biggest contributor to the target.

Investment from the Fund in 2016–17 helped households and businesses use energy more efficiently and reduce bill stress.

For more information, see the *2013 NSW Energy Efficiency Action Plan*:  
[www.environment.nsw.gov.au/energyefficiencyindustry/energy-efficiency-policy.htm](http://www.environment.nsw.gov.au/energyefficiencyindustry/energy-efficiency-policy.htm)

### **1.4 Saving emissions**

The 2013 Renewable Energy Action Plan includes 24 actions to build community support, attract renewable energy investment and grow renewable energy expertise in New South Wales. The Fund is playing an important role in advancing national emissions reduction objectives by supporting increased NSW participation in the Australian Government's Emissions Reduction Fund.

Investment from the Fund in 2016–17 helped support households in the lead-up to the closure of the Solar Bonus Scheme and practical action to reduce greenhouse gas emissions.

For more information, see the *2013 NSW Renewable Energy Action Plan*:  
[www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/renewable-energy-action-plan](http://www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/renewable-energy-action-plan)

### **1.5 Adapting to climate change**

The NSW Government is committed to improving information about climate change impacts and leading the community to prepare for a changing climate. The Fund supports programs that help NSW households and businesses reduce their exposure to natural hazards and be more resilient to a changing climate.

Investment from the Fund in 2016–17 helped both state and local governments implement adaptation projects and encourage innovation from industry.



## 1.6 Measuring the performance of the Fund

This annual report has been prepared in accordance with the requirements of section 34H of the Act. Activities under the Fund are reported for its 10<sup>th</sup> financial year of operation, from 1 July 2016 to 30 June 2017.

As required by the Act, the annual report provides information on fund allocations and anticipated benefits, with reference to the Fund's key performance indicators (where possible):

- energy savings (megawatt hours per year)
- greenhouse gas emissions reduction (tonnes of carbon dioxide equivalent per year)
- annual bill savings (\$ per year)
- clean/renewable energy generated (megawatt hours per year)
- funds allocated (\$).

Funding recipients must report to OEH on the progress of projects and their success in achieving outcomes. Information on Fund programs and evaluation reports is published on the OEH website. OEH regularly reports on its progress in meeting NSW Government priorities and election commitments.

OEH is developing a new Climate Change Fund Evaluation Framework in line with NSW Government policies and international best practice. The framework will define requirements, standards, levels, types and governance of evaluations under the Fund. It will also outline how to obtain evidence to demonstrate the achievement of outcomes, anticipated benefits and key performance indicators to create a foundation for evaluating programs.

This annual report details the aim, delivery approach, program partners, achievements and regional coverage for each program and/or project supported by the Fund.

# 2 Administration and budget

## 2.1 Climate Change Fund budget

### Revenue

Licensed electricity distributors were required to contribute to the Fund through the gazettal of the annual Energy Contributions Order.

The Fund's revenue in 2016–17 was \$289.6 million. A breakdown of the Fund's revenue is shown in Table 1.

Additional revenue came from interest earned on cash balances.

**Table 1: NSW Climate Change Fund revenue 2016–17**

Source	Amount (\$)
Ausgrid	\$137,684,717
Endeavour Energy	\$87,333,710
Essential Energy	\$60,590,496
Interest	\$3,257,350
Miscellaneous revenue <sup>1</sup>	\$738,226
<b>Total</b>	<b>\$289,604,499</b>

<sup>1</sup> includes the recovery of training fees and audit costs for the Action Matters for Business program.

### Expenditure

The Fund's expenditure in 2016–17 was \$160.6 million.

Of this, 0.8% was for program administration. This funding provided administrative and technical support to the Fund, including resourcing support for administration, data analysis, program evaluation, legal advice, and coordination of the annual report.

\$782,000 was for the development of and consultation on the *Draft Climate Change Fund Strategic Plan* including technical, legal and policy advice and public consultation activities including 20 workshops held with industry and other stakeholders.

Expenditure for each of the Fund's priorities is shown in Table 2.

The difference between total revenue and total expenditure largely relates to repayment of the Treasurer's Advance for the Solar Bonus Scheme in 2011–12 and 2012–13.

**Table 2: NSW Climate Change Fund expenditure 2016–17**

<b>Program/component</b>	<b>Recipient</b>	<b>Amount (\$ excl. GST)</b>
<b>Climate Change Fund program administration</b>	Office of Environment and Heritage	1,306,653
<b>Climate Change Fund research and evaluation initiative</b>	Office of Environment and Heritage	3,545,541
<b>Climate Change Fund Strategic Plan and action plan development</b>	Office of Environment and Heritage	782,487
<b>Coastal management program</b>	Office of Environment and Heritage, councils	135,814
<b>Contribution to national energy regulation and Australian Greenhouse and Energy Minimum Standards</b>	Australian Energy Market Commission, Australian Government Department of Environment and Energy	9,144,411
<b>Climate-KIC</b>	Climate-KIC Australia Ltd	400,000
<b>Emissions Reduction Fund outreach</b>	Office of Environment and Heritage	160,582
<b>Energy efficient public lighting</b>	Office of Environment and Heritage	244,689
<b>Energy Savings Scheme consumer campaign</b>	Office of Environment and Heritage	5,940
<b>Enhanced Bushfire Management Program – capital</b>	National Parks and Wildlife Service	1,149,782
<b>Enhanced Bushfire Management Program – recurrent</b>	National Parks and Wildlife Service	12,092,132
<b>Hawkesbury–Nepean Valley Flood Risk Management Strategy</b>	Infrastructure NSW	5,982,000
<b>Public lands pilot</b>	National Parks and Wildlife Service	392,306
<b>Rangeland research</b>	Department of Primary Industries	890,000
<b>Statewide science for coastal reform – marine mapping</b>	Office of Environment and Heritage	646,131
<b>Energy Efficiency Action Plan programs<sup>1</sup></b>		
<b>Energy efficient business</b>	Business	6,361,237
<b>Energy efficient government</b>	Government	1,217,614
<b>Energy efficient homes</b>	Households	1,636,276
<b>Gas efficiency funding</b>	Business	1,242,789
<b>Home Energy Action</b>	Households	12,517,222
<b>Markets and finance</b>	Business and households	909,669
<b>Policy development</b>	Various	1,408,456
<b>Program evaluation</b>	Various	584,739
<b>Statewide delivery</b>	Various	1,491,817
<b>Renewable Energy Action Plan programs</b>		
<b>Regional Clean Energy Program</b>	Communities	1,606,351

Program/component	Recipient	Amount (\$ excl. GST)
Solar Bonus Scheme Expiry Project	NSW Department of Industry <sup>2</sup>	445,000
Solar Bonus Scheme Reimbursement Program	Office of Environment and Heritage	94,278,478
<b>Total</b>		<b>160,578,115</b>

<sup>1</sup> Includes capital expenditure

<sup>2</sup> Responsibility for this project passed to the Department of Planning and Environment in March 2017.

## 2.2 Climate Change Fund administration and market regulation

### Governance and funding arrangements

Under the Act, the Minister for the Environment requires licensed electricity distributors to make contributions to the Fund via the annual gazettal of a Contributions Order. The Minister seeks the concurrence of the Minister for Energy and Utilities and the Treasurer when preparing the Contributions Order.

The Minister for the Environment approves payments from the Fund if satisfied that projects promote a purpose outlined in section 34F of the Act.

### National energy regulation

The Fund provides the NSW Government contribution to national energy regulation initiatives, as provided for under section 34H of the Act.

Under established funding arrangements agreed between relevant jurisdictions, New South Wales is responsible for 37.2% of the Australian Energy Market Commission's budget.

New South Wales paid \$8.2 million as its share of the Australian Energy Market Commission's operating budget.

# 3 Enhancing the Energy Savings Scheme

## **Aim:**

To implement recommended Energy Savings Scheme Rule changes and expand the range of energy efficiency actions that deliver savings to NSW households and businesses.

## **Approach:**

- The NSW Government conducts a major review of the Energy Savings Scheme Rule every three years and makes minor annual updates to the Rule to incorporate new products and revisions to savings calculations.
- The Fund provides resources for a dedicated team to review the Energy Savings Scheme, conduct public consultations and commission experts to provide advice on enhancements to the scheme.
- The team also manages the directory of accredited certificate providers and the Project Impact Assessment with Measurement and Verification (PIAM&V) Tool, which help businesses to obtain energy savings certificates and reduce energy costs.
- The Independent Pricing and Regulatory Tribunal and the OEH–ESS Portal allow the dedicated team access to data on implemented energy savings activities to enable continual review and development of Energy Savings Scheme methods.

**Investment from the Fund in 2016–17:** \$527,391

## **2016–17 milestones:**

- Amendments to the Energy Savings Scheme Rule commenced on 28 April 2017 following publication in the NSW Government Gazette. These enhancements included:
  - enabling the sampling sub-method under the PIAM&V method
  - adding new ways to measure gas savings under the High Efficiency Appliances for Business sub-method
  - opening up the Home Energy Efficiency Retrofit sub-method to more small businesses, reducing the co-payment requirement and removing the minimum saving threshold for high cost activities
  - a new NABERS for public hospitals sub-method.
- Consultation commenced in May 2017 on the 2017–18 Energy Savings Scheme Rule change, with the first public invitation to stakeholders to submit new ideas for energy savings activities for inclusion in the Energy Savings Scheme Rule. This is now part of the annual process that the NSW Government has communicated to stakeholders.
- The first activities under implementation of the Home Energy Efficiency Retrofit sub-method have occurred, and there are now three accredited certificate providers delivering energy and bill saving activities to NSW households, such as upgrading to efficient LED lighting.

# 4 Action Matters at Home

The Fund supports the delivery of programs that help families to access household energy efficiency services and make energy efficient choices.

## Key programs and projects supported by the Fund in 2016–17:

- Home Energy Action
- Voluntary energy ratings for homes
- Smarter Choice
- Housing Stock Mapping Project

## 4.1 Home Energy Action

### Aim:

- To improve access to energy efficiency for low income households through community housing upgrades and more affordable appliances.

### Approach:

- The \$26.8 million Home Energy Action program is working in partnership with community housing providers, the community services sector and industry to deliver energy efficiency improvements to households in energy hardship and to improve household comfort, health and wellbeing. The program operates three streams:
  - Community housing – a co-investment model with community housing providers across the state to install energy efficiency retrofit measures on community housing dwellings for the benefit of their tenants. Retrofit measures include solar photovoltaic panels, ceiling insulation, draught proofing, LED lighting, heat pump hot water systems, split system air-conditioning, ceiling fans and energy performance upgrades for new build projects.
  - \$4 million Appliance Replacement Offer – financial support to replace old fridges and televisions with new energy efficient models at discounted prices, available to vulnerable households directly or through community service organisation partners.
  - \$500,000 Clean Energy Pilot – a pilot project to deliver subsidised solar panels, in partnership with major energy retailers, to their energy hardship customers who are tenants of community housing or homeowners.
- The Fund supports co-investment in a range of energy savings products to assist low income households to overcome barriers to accessing energy efficiency opportunities. This includes the split incentive barrier, where tenants lack the ability to make improvements to their properties, and the financial barrier, where households do not have the capacity to pay for the higher upfront cost.
- All energy efficiency measures included in the Home Energy Action program are subject to a cost–benefit analysis test to ensure a good return on investment for the NSW Government and program participants.

**Investment from the Fund in 2016–17:** \$12,517,222

### 2016–17 milestones:

- OEH formed five new partnerships, worth \$2.8 million, with community housing providers to retrofit 1400 properties with energy efficiency measures: Hume Community Housing Association (November 2016); Community Housing Limited (February 2017); Housing Plus (February 2017); Twofold Aboriginal Corporation (June 2017); and Evolve Housing (June 2017). The Fund is contributing \$1.4 million to install solar panels, insulation and draught proofing, LED lights, heat pump hot water systems and energy efficient air-conditioning. These measures are estimated to

save more than 2000 megawatt hours of electricity and more than \$388,000 off energy bills a year for these community housing providers and their tenants.

- OEH has committed \$4 million in funding to support the Aboriginal Housing Office and Land and Housing Corporation to upgrade more than 1300 of their properties in western New South Wales with energy efficient air-conditioning and solar panels. These projects have a total value of more than \$15 million and are estimated to save tenants more than 5000 megawatt hours of electricity and \$884,000 off energy bills a year.
- The NSW Government and AGL Energy Limited formed a new partnership to co-invest \$380,000 each to install solar panels on about 200 community housing properties that are part of AGL's energy hardship program. The project will initially focus on tenants in Land and Housing Corporation owned properties, and Kildonan UnitingCare have been engaged to conduct home visits to assist tenants to achieve the most energy savings from their solar systems.
- The NSW Government and Enova Community Energy Ltd formed a new partnership to co-invest \$70,000 each to install solar panels on 50 North Coast Community Housing properties. Enova will assist tenants to achieve the most energy savings from their solar systems through a range of education initiatives.
- The NSW Government launched the Appliance Replacement Offer in August 2016, enabling eligible households to receive a 40% subsidy to replace their old fridges and a 50% subsidy to replace their old televisions. Low income households can check if they are eligible and apply here: [Appliance replacement offer](#).
- More than 14,900 households have received new energy efficient appliances, which are estimated to save more than \$2.5 million off energy bills a year (see Table 3). More than 48% of participating households are in regional New South Wales.
- OEH has continued to work with Urbis on the evaluation of the Home Energy Action program. Urbis delivered an interim evaluation report in February 2017, which is informing improvements to the delivery of the program. The interim evaluation found that the Appliance Replacement Offer has achieved good representation of Aboriginal and Torres Strait Islander people, people with a disability and people living in major cities, regional and remote areas. Importantly, 74% of participants are broadly aligned to the bottom two income quintiles, which confirms the program has been successful in targeting those in need. The final program evaluation is due to be delivered in March 2018.
- OEH has engaged the NSW Federation of Housing Associations to assist with communication to its members and their tenants about the program's benefits, and to scope needs and suggest options for training on energy efficiency for community housing provider staff and their tenants.

**Table 3: Appliance Replacement Offer savings 2016–17**

Appliance type	Number of appliances	NSW Government investment (\$)	Estimated electricity savings (MWh/yr)	Estimated GHG savings (tCO <sub>2</sub> -e/yr)	Estimated bill savings (\$/yr)	Potential cost effectiveness (\$/MWh) <sup>1</sup>
Televisions	5,844	\$1,222,905	2,750	2,613	\$635,859	\$44.46
Fridges	11,816	\$3,481,644	8,095	7,691	\$1,871,901	\$35.84
<b>Total</b>	<b>17,660</b>	<b>\$4,704,549</b>	<b>10,846</b>	<b>10,303</b>	<b>\$2,507,760</b>	<b>\$37.74</b>

<sup>1</sup> Refer to Appendix B for methodology; the lifetime of the savings is assumed to be 10 years for televisions and 12 years for fridges.

## 4.2 Investigation of a voluntary energy rating system

### Aim:

- To investigate a voluntary rating system to make energy efficient homes stand out at the point of sale or lease.

### Approach:

- The NSW Government is committed under the 2013 Energy Efficiency Action Plan to investigate a voluntary rating system to disclose energy efficiency information at the point of sale or lease of residential properties.
- From 2014 to 2016, OEH contributed to the EnergyFit Homes Initiative led by the Cooperative Research Centre for Low Carbon Living in partnership with 12 industry and research partners. This project took a consumer and industry-led approach to understand consumer and industry needs and develop a potential pathway for a national voluntary rating system for homes.

**Investment from the Fund in 2016–17: \$121,715**

### 2016–17 milestones:

- The Fund supported OEH to conduct stakeholder consultation between August and September 2016 with two working groups focusing on user experience and technical specifications for an energy rating scheme in New South Wales.
- OEH carried out an expression of interest process between November and December 2016 to test market interest and capabilities in delivering a residential energy rating scheme for New South Wales.
- OEH developed a conceptual scheme design for a home energy rating scheme validated by a small group of identified subject matter experts and started dialogue with the Victorian Department of Environment, Land, Water and Planning to identify collaboration and partnership options regarding their recently launched Residential Efficiency Scorecard scheme.
- OEH also participated in the National Energy Productivity Plan working group discussions on residential building ratings and disclosure. In December 2016, the COAG Energy Council agreed to a national collaborative approach to residential building ratings and disclosure.

## 4.3 Tools, training and information

### Aim:

- To help households make informed decisions and become more energy efficient.

### Approach:

- Smarter Choice is a collaborative partnership between OEH, Sustainability Victoria and the Australian Government's Equipment Energy Efficiency (E3) Program. The program is delivered nationally through partnerships with appliance and hardware retailers including Harvey Norman, The Good Guys, Myer, David Jones, JB Hi-Fi, Bunnings Warehouse and Mitre 10.
- Online training has been developed for retail staff to better educate them about energy and water efficiency, enabling them to pass this knowledge on to customers. The program also provides online content such as the Energy Rating Calculator to help consumers make educated and informed decisions when purchasing, using and disposing of appliances, and to empower sales staff.
- OEH and the University of Wollongong's SMART Infrastructure Facility and the Sustainable Buildings Research Centre are collaborating on a research project as part of the Collaborative Sustainable Housing Initiative to build a database of residential housing stock characteristics and sustainability features in New South Wales. Phase 1 of the project (\$78,000) was a pilot in the Illawarra completed in March 2016 to test the data and approach. Phase 2 (\$90,000)



commenced in July 2016 to expand the project across the state. The University of Wollongong has also made significant in-kind contributions.

#### **Investment from the Fund in 2016–17: \$138,650**

- \$100,000 for Smarter Choice
- \$38,650 for the Housing Stock Mapping Project

#### **2016–17 milestones:**

- The Fund supported updates to online training content and improvements to the OEH website to make Smarter Choice content more useful and engaging for consumers.
- Three major retailers (Myer, Bunnings Warehouse and Mitre 10) have implemented the online training with their staff, and another three major retailers (Harvey Norman, JB Hi-Fi and David Jones) are expected to make it available to their staff soon.
- The Fund enabled the Housing Stock Mapping Project to deliver:
  - a BASIX validation pilot study, which compares planned construction data contained within the ePlanning BASIX certificates database and final submitted construction information contained within Development Applications and Construction Certificates, to assess the standard of compliance
  - a discussion paper outlining recommendations for standardising the collection and formatting of housing stock data, considering a wide range of Australian and state government data sources that contain housing attributes.

## **Case study 1 – Smart appliances cut energy bills for tenants**

The \$26.8 million Home Energy Action program supports energy efficiency upgrades and appliances in community housing and vulnerable households. The energy savings from Home Energy Action contribute to the NSW Government target to save 16,000 gigawatt hours of energy a year by 2020.

### **Appliance replacement offer driving down costs**

The Appliance Replacement Offer gives eligible households a 40–50% discount on selected new energy efficient fridges and televisions to replace old inefficient models.

Replacing inefficient appliances helps to reduce greenhouse gas emissions and is one of the easiest ways to cut energy bills. Replacing a fridge can save families up to \$200 a year on energy bills.

### **17,600 appliances driving down costs**

Since the Appliance Replacement Offer launched in August 2016, the NSW Government, in partnership with appliance retailer The Good Guys and several community service organisations, has delivered more than 17,600 appliances to achieve combined savings of \$2.5 million a year off household energy bills. This has further reduced around 10,300 tonnes of greenhouse gas emissions, the equivalent to taking more than 2500 cars off the road.

### **More for household essentials**

Families on tight household budgets are benefiting from energy savings and more money for household essentials.

Widow and mother of five, Teresa from South Western Sydney, accessed the offer to replace her worn out old fridge which was not keeping her food cold. The offer to buy a new fridge at a discounted price came just at the right time. 'I would have probably bought a second-hand fridge if not for the program and I am looking forward to saving on energy bills so I have more money for my family', said Teresa.

## Where to next?

Due to strong uptake in its first year, the Appliance Replacement Offer is continuing to enable more households to access discounts on fridges and televisions. Support from community and peak body organisations including the Energy & Water Ombudsman NSW and migrant resource centres will continue to reach households in need across the state, with a focus on regional New South Wales.



**Figure 2: Ian Hunter, Executive Director of OEH Regional Operations Division with Home Energy Action staff and Michelle McGrath, The Good Guys, at the Appliance Replacement Offer launch event in Caringbah, NSW (Photo: Sylvia Liber, OEH)**

# 5 Action Matters in the Community

The Fund helps provide access to information and resources and build the capacity of local communities to adopt energy efficiency and renewable energy initiatives.

## Key programs and projects supported by the Fund in 2016–17:

- Regional Clean Energy Program
- Statewide and place-based delivery

## 5.1 Community engagement in regional areas

### Aim:

- To provide information and bring new jobs, investment and technological advances to regional communities.

### Approach:

- Through the \$8.5 million Regional Clean Energy Program, regional coordinators work closely with local communities, industry and the NSW Renewable Energy Advocate to effectively engage stakeholders with renewable energy and energy efficiency projects by providing them with information and links to NSW and Australian Government programs.

**Investment from the Fund in 2016–17:** \$1,606,351

### 2016–17 milestones:

- The Fund supported research to identify evidence that NSW community-owned renewable energy groups are facilitating the creation of a greater social licence for renewable energy technologies, particularly large-scale renewable energy.
- Regional coordinators delivered workshops on solar irrigation and energy essentials to over 90 attendees in the Hunter and North West regions to foster collaboration with industry and local government and build capacity in the local community.
- Regional coordinators also attended many industry and community events, field days, forums, local government meetings and Community Consultative Committee meetings to promote and develop local energy efficiency and renewable energy initiatives.

## 5.2 Statewide and place-based delivery

### Aim

- To assist the delivery of 2013 Energy Efficiency Action Plan and 2013 Renewable Energy Action Plan actions.

### Approach

- The Fund supports ongoing development of the OEH digital platform, which consists of online communication and engagement tools that provide customer-focused information to drive better energy management and reduce energy bills.
- Place-based delivery uses best practice engagement and collaboration techniques to identify resource efficiency challenges and opportunities in regional areas and uses local understanding and partnerships to deliver program objectives in a scalable and flexible way.
- The Thriving Regional Networks program supports the regional delivery of 2013 Energy Efficiency Action Plan and 2013 Renewable Energy Action Plan actions and works with a place-based partnership model, leveraging the networks of locally embedded partners to achieve regional energy efficiency outcomes for businesses, households and communities.

**Investment from the Fund in 2016–17:** \$1,544,648

**2016–17 milestones:**

- The OEH digital platform received approximately 1.3 million page views from 320,000 users, sent targeted email campaigns to more than 19,000 customers and hosted 31 new videos about resource efficiency.
- The Fund contributed \$50,000 towards a regional partnership between Thriving Regional Networks and Skillset Environment to support community-led ideas for energy efficiency in the Central West region. This partnership resulted in the design and delivery of the Spark Tank Campaign, through which 10 organisations received NSW Environmental Trust grants in November 2016 to deliver innovative and collaborative energy efficiency projects in locations such as Bathurst, Dubbo, Orange and Wagga Wagga.
- As part of an ongoing partnership between Thriving Regional Networks and Western Sydney Community Forum, the Fund contributed \$59,000 towards the development of the Blacktown Energy Initiative Leadership Group, comprising multi-sector organisations interested in working together towards making Blacktown a leader in energy efficiency and renewable energy transition. During Phase 1, Western Sydney Community Forum worked with 44 local leaders in energy efficiency and sustainability to identify cross-sector project opportunities. Phase 2 resulted in two organisations, Western Sydney University and Dharma Karta, receiving \$50,000 from the NSW Environmental Trust to engage with the local community through behaviour change programs to increase resource efficiency.
- The Fund supported the delivery of 23 Home Energy Basics workshops across the Hunter, Illawarra and southern New South Wales to assist local residents to save energy and understand the challenges and opportunities around using solar power and battery storage. The workshops were attended by more than 380 participants. Based on the positive feedback from attendees, OEH is developing a video of the workshop to disseminate more broadly through established regional networks.

## **Case study 2 – Demystifying Solar in the Illawarra**

OEH’s Resource Efficiency Team in South East New South Wales investigated the needs and wants of their residents and businesses and found that the local demand for credible solar advice far outstrips the supply.

The solution was found by OEH resource efficiency specialist Lisa Miller. She developed a simple seminar which drew on valuable data from the Australian Photovoltaic Institute. Regional locations with low penetration of solar were targeted for the seminars.

### **Short, sharp and to-the-point**

Each seminar covered energy technologies such as solar panels and inverters, along with pricing trends and tips and tricks of the trade. During each seminar, participants also had the opportunity to have their energy bills analysed, and were offered a free solar assessment.

One participant in Young, who was interviewed as part of the project’s evaluation, said ‘the presentation was extremely useful. Great clarity. Easily Understood. Rating 11/10. Unravelled all of the issues for me!’

### **Remarkable uptake in the region**

The Resource Efficiency Team extended the reach of the seminars across southern New South Wales regions by working closely with the Regional Clean Energy Program.

‘These local contacts and networks were critical for ensuring the success of the seminar’, says Lisa. ‘Working with the Regional Clean Energy Program team really helped us generate interest as trust is a key aspect of any communication and their knowledge and relationships with local people was vital to the success of the program.’

A total of 750 participants attended the seminars, with 50% of attendees representing local businesses and 19% from other businesses and households.

### **Long-term impact**

An external program evaluation was completed by Human Matters showing a strong conversion rate. More than half of attendees are purchasing solar and a quarter of participants have installed solar since the seminar, with a further one-third seeking quotes or intending to install solar in the future. Survey respondents have installed a total of 564 kilowatt potential (kWp). A whopping 100% of respondents now feel more confident about their knowledge of solar and 92% say they would recommend solar to others; a further 32% would like more information on solar.

# 6 Action Matters for Business

The Fund supports programs that improve productivity and reduce the cost of doing business in New South Wales.

## Key programs and projects supported by the Fund in 2016–17:

- Gas Efficiency Funding
- Action Matters for Business program

## 6.1 Incentives for gas efficiency

### Aim

- To provide assistance to gas-intensive businesses in New South Wales to implement quick gas efficiency opportunities in ways that provide publicly available gas savings data and build the market for gas-efficient products and services.

### Approach

- Financial incentives are available under the Energy Savings Scheme for businesses to reduce gas consumption and energy costs. Accredited certificate providers can now use newly introduced Energy Savings Scheme deemed methods to create energy savings certificates from implementing steam boiler and water heater upgrades. Eligible activities already included project-based methods for larger projects like process heat recovery and fuel switching; and residential and small business activities for space heating and hot water upgrades.
- The \$3.5 million Gas Efficiency Funding program provided up to \$40,000 for sites that use more than 1000 gigajoules of gas a year to implement gas monitoring and efficiency projects such as installing gas sub-meters and recovering waste heat from steam boiler exhaust gases; and funding of up to \$10,000 for maintaining gas equipment such as replacing or repairing steam traps and insulating steam and hot water pipes, tanks and valves.
- Data collected from these projects has assisted OEH to improve and develop the new deemed methods for calculating gas savings under the Energy Savings Scheme.

**Investment from the Fund in 2016–17:** \$1,242,789

### 2016–17 milestones:

- Thirty-two successful applicants were offered total funding of \$979,000 under Round 2 of Gas Efficiency Funding in July 2016, of which 21 projects have been or are being implemented. These projects include furnace control systems, blowdown heat recovery and optimisers. Around 40% of these projects are in regional New South Wales.
- OEH received 39 applications for Gas Efficiency Maintenance Funding, which closed in April 2017. Thirty-one successful applicants were offered total funding of \$212,000 in April 2017, of which 29 projects have been or are being implemented. Projects include steam trap repairs and lagging. More than 40% of these projects are in regional New South Wales.
- In total, the Fund has contributed \$1.5 million to more than 50 businesses to implement 70 gas efficiency projects worth \$8.9 million, which are estimated to save more than 345 terajoules of gas and \$3.3 million off energy bills a year (see Tables 4 and 5).
- OEH has also partnered with energy service providers to deliver 10 workshops on understanding gas bills and savings opportunities, with over half of these held in regional New South Wales.
- Eight newly introduced Energy Savings Scheme deemed methods are available for industry to create energy savings certificates from implementing steam boiler and water heater upgrades.

**Table 4: Energy savings from Gas Efficiency Funding projects 2016–17**

Status	Number of projects	Funding (\$)	Estimated gas savings (GJ/yr) <sup>1</sup>	Estimated GHG savings (tCO <sub>2</sub> -e/yr)	Estimated bill savings (\$/yr)	Cost effectiveness per GJ (\$) <sup>2</sup>
Complete	14	\$422,586	84,500	4,386	\$804,270	\$0.50
In progress	27	\$850,311	158,091	8,248	\$1,605,280	\$0.54
<b>Total</b>	<b>41</b>	<b>\$1,272,897</b>	<b>242,591</b>	<b>12,634</b>	<b>\$2,409,550</b>	<b>\$0.52</b>

<sup>1</sup> Gas savings include natural gas and liquefied petroleum gas (LPG).

<sup>2</sup> Refer to Appendix B for methodology; the average lifetime of the savings is assumed to be 10 years.

**Table 5: Energy savings from Gas Efficiency Maintenance Funding projects 2016–17**

Status	Number of projects	Funding (\$)	Estimated gas savings (GJ/yr) <sup>1</sup>	Estimated GHG savings (tCO <sub>2</sub> -e/yr)	Estimated bill savings (\$/yr)	Cost effectiveness per GJ (\$) <sup>2</sup>
Complete	10	\$45,120	32,883	1,735	\$279,226	\$0.14
In progress	19	\$156,911	70,171	3,676	\$578,305	\$0.22
<b>Total</b>	<b>29</b>	<b>\$202,031</b>	<b>103,054</b>	<b>5,411</b>	<b>\$857,531</b>	<b>\$0.20</b>

<sup>1</sup> Gas savings include natural gas and liquefied petroleum gas (LPG).

<sup>2</sup> Refer to Appendix B for methodology; the average lifetime of the savings is assumed to be 10 years.

## 6.2 Targeted energy efficiency audits and support

### Aim:

- To accelerate the uptake of energy efficiency projects and deliver significant savings to NSW businesses.

### Approach:

- The Action Matters for Business program delivers targeted technical support and best practice resources and consumer guides to help businesses identify, implement and verify energy efficiency opportunities and transform the NSW energy market.
- Ongoing collaboration agreements with peak bodies and industry associations such as the NSW Irrigators' Council, NSW Business Chamber and Australian Food and Grocery Council allow for preferential delivery of energy efficiency services to their members and continue to provide OEH with channels for targeted communication and energy efficiency projects.
- The Energy Efficiency Professional Services panel comprises 87 pre-qualified energy efficiency service providers that businesses can engage to deliver high quality, profitable and competitive services such as energy efficiency auditing, technical engineering support and measurement and verification.
- A partnership between OEH and the Energy Efficiency Council supports NSW candidates to become certified professionals under the Energy Efficiency Certification Scheme.

- Between February 2017 and June 2017, the Clean Energy Strategies for Business program – a joint initiative between OEH and the NSW Department of Industry<sup>2</sup> – made funding of up to \$10,000 available to businesses to develop clean energy strategies. Participating businesses were required to co-invest \$5000.

**Investment from the Fund in 2016–17:** \$2,439,459

#### 2016–17 milestones:

- The Fund supported the delivery of 56 targeted audits, eight technical implementation support projects and four measurement and verification studies; of which 45% were conducted in regional New South Wales.
- NSW businesses have saved an estimated \$35 million a year in energy bills from implementing projects that were identified through more than 780 energy efficiency audits (see Table 6).
- The Fund provided twenty businesses with a total of \$200,000 to help them develop clean energy strategies to transition to 100% renewable energy or net-zero emissions. Half of the successful applicants are based in regional New South Wales.
- OEH is leading the development of a national energy auditor accreditation scheme. The Energy Efficiency Council has been contracted to deliver the work during 2017–18, and they have convened a national steering committee to start to scope the scheme. This will overcome a large credibility and skills gap in this service market by creating a pathway to accreditation. The Fund is supporting this activity with \$15,000, and has leveraged another \$15,000 from Sustainability Victoria.
- The Fund has provided \$50,000 to support the Australian Alliance for Energy Productivity (A2EP) to deliver two projects. The first is a feasibility study into energy savings through temperature sensing in the cold food chain. The second is an investigation into the feasibility of commercialising high temperature heat pumps in Australia. This work has national implications, and is also supported by Sustainability Victoria.

**Table 6: Fund support for medium-to-large business energy audits completed 2009–2017**

Number of audits <sup>1</sup>	Funding (\$)	Estimated electricity savings (MWh/yr)	Estimated natural gas savings (GJ/yr)	Estimated GHG savings (tCO <sub>2</sub> -e/yr)	Estimated bill savings (\$/yr)	Cost effectiveness per MWh (\$) <sup>2</sup>
784	\$27,618,955	161,519	242,655	169,053	\$35,271,023	\$11.22

<sup>1</sup> Includes technical implementation support projects and measurement and verification studies.

<sup>2</sup> Includes electricity and natural gas. Refer to Appendix B for methodology.

## 6.3 Tools, training and information

#### Aim:

- To help business owners, site managers and staff identify and implement energy efficiency opportunities and apply best practice information to their own circumstances.

#### Approach

- The Action Matters for Business program assists NSW businesses to improve their energy efficiency via a practical and interactive capacity building program. Attendees gain the

<sup>2</sup> The division of the Department of Industry responsible for this partnership transferred to the Department of Planning and Environment in March 2017.



behaviours, skills and knowledge to implement ongoing and effective energy management in their own businesses.

- The program builds capability in energy efficient technologies and energy management practices for key decision-makers in participating organisations. Best practice information in the form of case studies, guides and tools supports businesses to identify and implement opportunities to save energy.
- Post-training support grants of up to \$3000 are available for training participants to help their senior management overcome barriers to the implementation of energy efficiency projects.
- Ongoing partnerships are formalised by OEH signing collaboration agreements with key stakeholders for co-design and co-delivery of this capacity building program.

**Investment from the Fund in 2016–17: \$3,891,307**

**2016–17 milestones:**

- In December 2016, OEH and the Australian Institute of Refrigeration, Air conditioning and Heating (AIRAH) signed a new agreement for national delivery of OEH's energy efficient heating, ventilation and air-conditioning (HVAC) and refrigeration training courses. This commitment will enhance the HVAC sector's capacity to deliver energy efficient services to businesses in all Australian states and territories.
- In December 2016, OEH and the Energy Efficiency Council reached an agreement for national delivery of all (other than HVAC and refrigeration) OEH energy management training courses, including Introduction to Energy Management and Battery Storage for Business. This commitment will enhance the energy management capability of Australian businesses and the energy sector's capacity to deliver energy efficient services to businesses in all Australian states and territories.
- OEH co-developed an Energy Management Competency Framework for Facilities Managers with the Facilities Management Association of Australia and the property industry to inform the formal education pathway for facilities managers.
- The Fund supported the development and publication of the following battery storage information guides, launched in November 2016:
  - *Battery storage guide: a business buying and usage handbook* – to help businesses understand different battery storage systems and whether they are a good fit for their facilities
  - *Battery storage for business: the essentials* – an overview of the technology including how battery storage systems work
  - *Battery storage for business: an investment decision tool* – gives businesses a snapshot of installation requirements and the expected return on investment from installing a battery storage system
  - *Price estimate template* – for business owners who wish to obtain quality quotes for the supply and installation of a battery storage system.

Download the free guides and tools at: [Battery storage for business](#).

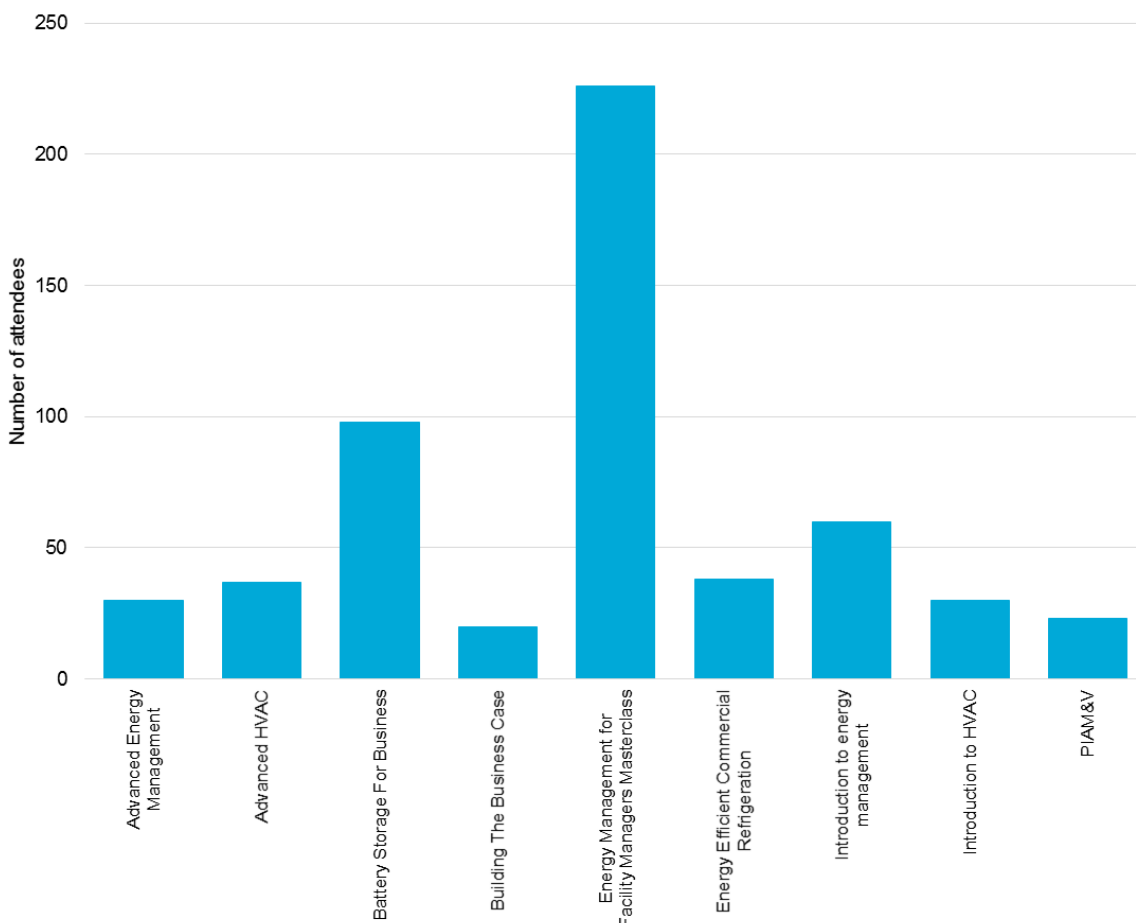
- The Energy Efficiency Council launched [Your Quick Reference Guide to Energy Auditing](#) in May 2017, which received \$23,500 from the Fund in 2015–16. The guide aims to help manufacturers and commercial building owners reduce their energy costs.
- More than 560 professionals and energy efficiency service providers attended 32 training courses to increase their knowledge and skills in battery storage, building business cases, energy management and implementing energy efficiency projects (see Figure 3). A quarter of the training courses were delivered in regional New South Wales.
- The Fund supported the completion of 17 post-training support projects, of which 12 were in regional New South Wales.

- NSW businesses, community organisations and local councils are saving an estimated \$724,000 a year in energy bills from implementing energy efficiency projects that received post-training support (see Table 7).
- An evaluation of four flagship energy efficiency training courses completed by research consultants AMR showed that they were effective in generating positive energy efficiency outcomes for participating businesses. Of the surveyed training participants, 93% of attendees from Introduction to Energy Management and 78% of attendees from Introduction to HVAC courses observed energy savings as a result of actions they took following the training course. Average cost savings ranged from \$40,000 to \$200,000 and 78% of respondents reported that they have passed on some of the knowledge acquired during the training to colleagues and/or professional networks.

**Table 7: Fund support for post-training grants completed 2014–2017**

Number grants	Funding (\$)	Estimated electricity savings (MWh/yr)	Estimated natural gas savings (GJ/yr)	Estimated GHG savings (tCO <sub>2</sub> -e/yr)	Estimated bill savings (\$/yr)	Cost effectiveness per MWh (\$) <sup>1</sup>
120	\$500,223	4,166	96	3,964	\$723,754	\$11.06

<sup>1</sup> Includes electricity and natural gas. Refer to Appendix B for methodology.



**Figure 3: Breakdown of attendance at energy efficiency training courses held in 2016–17**

## Case study 3 – Businesses responding to rising gas prices

Koppers Carbon Materials & Chemicals (Koppers) is an industrial manufacturer, and their Mayfield site is celebrating 50 years of operation distilling hydrocarbon by-products, providing feedstock to local industry. Distilling and storing products on site requires constant heating, making it a large energy using site. The site uses a lot of gas, and the nature of their operations means that for the time being, they will need to continue.

### You can manage what you measure

Koppers already had gas and steam meters installed that they use to monitor their energy use and manage costs. Like many manufacturers, they are investigating energy efficiency projects.

As a result, Koppers were looking to install an oxygen trim control on their boilers, to more efficiently produce steam to heat their tanks. When OEH announced its Gas Efficiency Funding, Hugh MacCallum, their Process Plant Engineer, saw his chance:

‘This year we installed oxygen trim on our boilers. It’s something we had looked at in the past, but the payback was borderline so other projects always ended up being higher priority. OEH’s funding made it a no brainer and made it easily worthwhile.’

Hugh used their meters to verify gas savings from this gas efficiency project. With Fund support the payback halved to one year. During high production, the project will save even more.

### Regular maintenance can reduce gas use by up to 10%

After this successful project, Koppers were looking for more opportunities. When OEH launched Gas Efficiency Maintenance Funding highlighting significant energy savings that can be achieved by regular maintenance, Hugh submitted two applications:

- an innovative use of lagging to insulate tank vents, achieving 3% gas savings and a 0.6-year payback
- a thorough audit to repair and replace steam traps, achieving 6% gas savings and a 0.4-year payback.

These maintenance projects mean they use less steam, and make their steam system operate more efficiently, reducing the amount of gas used on site. ‘We’re chasing savings in the order of 10%, and the paybacks halved with OEH funding’, explains Hugh.

### Understand opportunities to save gas

Koppers also hosted one of OEH’s Gas Efficiency Workshops for a wide range of their staff to understand gas bills, gas contracts and efficiency upgrade options. This meant they could all discuss issues and the options they could pursue.

‘The workshop was really good because it gave us the opportunity to invite electricians to supervisors, our finance manager, and operators who are working on the factory floor... and it gave them a good insight as to what we’re facing.’

### New incentives for gas efficiency upgrades

All up, the Fund has enabled OEH to support 41 Gas Efficiency Funding projects, 29 Gas Efficiency Maintenance Funding projects, and 10 Gas Efficiency Workshops.

Close to half these activities were at regional sites. By installing metering and attending workshops, staff understand options to make informed decisions. By installing upgrades that save gas in the short and long term, they are getting quick wins and seeing longer-term results.

Using learnings from the Gas Efficiency Program, OEH also included eight new activities in the Energy Savings Scheme. These incentives are an example of the NSW Government’s ongoing

commitment to support business, and will help businesses control costs and increase energy productivity when gas prices are rising.



**Figure 4: Process Plant Engineer Elizabeth O'Brien, testing air pump performance at Koppers Carbon Materials & Chemicals, Mayfield (Photo: Quentin Jones, Jonesphoto)**

# 7 Action Matters for Government

The Fund is helping the NSW Government to lead by example by investing in energy efficiency and renewable energy.

## Key programs and projects supported by the Fund in 2016–17:

- Energy Efficient Government Program
- Government Resource Efficiency Policy
- Public street lighting

## 7.1 Support to implement energy efficiency projects

### Aim:

- To achieve energy bill savings of up to \$55 million a year from energy efficiency upgrades initiated at government sites.

### Approach:

- The Energy Efficient Government Program provides government agencies with access to tools and the expertise of a team of dedicated energy efficiency specialists to identify and implement cost effective energy efficiency projects.
- A panel of pre-qualified Energy Service Companies (ESCOs) streamline the procurement process.
- Repayable capital advances to fund energy efficiency upgrades are available through the Government Finance Facility.

**Investment from the Fund in 2016–17:** \$1,217,614

### 2016–17 milestones:

- The Energy Efficient Government Program helped agencies apply for \$22 million in funding from the Government Finance Facility for energy efficiency projects at 30 government sites, including hospitals and laboratories. The sites will implement various energy efficiency measures including lighting, solar, HVAC, pan sanitisers and building management systems that are estimated to save 14,000 megawatt hours of electricity, 1900 gigajoules of natural gas, 13,500 tonnes of greenhouse gas emissions and \$3.3 million a year in utility and maintenance bills.
- Through the Energy Efficient Government Program, agencies have identified a further 22 energy efficiency projects in development worth \$48 million covering energy performance contracts for lighting upgrades and solar installation.
- ESCo panel members attended the second annual workshop event with representatives from the Energy Efficiency Council and from the South Australian, Victorian and ACT governments. The workshop provided an opportunity to share experiences and lessons learnt across jurisdictions, and improve future delivery of energy services to government agencies.
- OEHL has undertaken a review process to assess the future of the ESCo panel, and recognised the need to diversify the panel's services. Along with the energy performance contracting services, agencies will be able to access services from pre-qualified providers offering the design and installation of energy efficiency solutions. OEHL has finalised the procurement strategy and the tender documentation, and the new panel will be set up during 2017–18.
- The Energy Efficient Government Program has been collaborating with the Energy Efficiency Council to develop a certification for energy efficiency providers specialising in single technologies (e.g. lighting providers). The certification will contribute to increasing the quality of

services provided in the energy services market, and will be a requirement to join the ESCo panel.

- In collaboration with the Energy Efficient Government Program, the NSW Department of Justice has developed a lighting standard specification. The specification provides a performance framework for the application of safe, energy efficient and fit-for-purpose lighting, and it will be used to support the rollout of multiple lighting upgrades throughout the Justice assets portfolio.
- The Energy Efficient Government Program has launched a program improvement framework and a customer charter, with the aim of establishing processes for continuous improvement, and ensuring high quality standards for delivery and engagement with key stakeholders.
- The Energy Efficient Government Program developed and launched the program's first video case study and an accompanying blog on the OEH website in April 2017. The video and blog represent a new engagement tool for actively promoting and sharing good practice in energy efficiency across government agencies. In the short time since the launch, the video has received over 320 unique views, and has led to a request from a government agency previously unengaged with the program to scope potential energy efficiency projects. View the [blog](#) and video: [NSW Hospitals shine a light on energy savings](#).

## 7.2 Facilitating the Government Resource Efficiency Policy

### Aim:

- To drive resource efficiency in government operations and reduce the NSW Government's operating costs.

### Approach:

- The OEH Sustainable Government Team establishes and maintains close working relationships with government agencies committed to implementing the Government Resource Efficiency Policy. The tools, resources and projects delivered are identified through collaboration and co-design with agencies.
- The Government Resource Efficiency Policy applies to more than 100 NSW Government agencies and contains 13 measures across energy, water, waste and clean air with the aim of making resource efficiency standard practice in government operations.
- Agencies are required to report performance against the policy by publishing annual data on their energy and water consumption and expenditure, waste streams and compliance with minimum standards.
- OEH provides ongoing support and advice to NSW Government agencies in their self-assessment of the suitability of their sites for a solar power purchase agreement (PPA).

### 2016–17 milestones:

- In November 2016, OEH published the first GREP whole of government progress report, giving details of government progress over the first year of the policy. View the report here: [Government Resource Efficiency Policy](#).
- Solar power will soon be available to NSW Government agencies through an innovative PPA. Under a solar PPA, a solar service provider designs, builds, owns, operates, monitors, and maintains a solar PV system, and the agency hosts the system on its roof or elsewhere on its property and buys the power produced by the system for a predetermined period and price. OEH developed a solar PPA contract and head agreement in consultation with 12 relevant industry organisations and 10 state and local government agencies. OEH issued a tender in June 2017 to establish a panel of suppliers to provide solar PPAs, which will be finalised later in 2017.

- The Fund is also supporting OEH to develop a range of tools to help agencies assess the best options for solar projects at government sites.

## 7.3 Public street lighting

### Aim:

- To accelerate the uptake of energy efficient public street lighting by working with licensed distributors and building the capacity of local councils.

### Approach:

- The Fund is providing resources to help local councils gain the necessary knowledge and tools to make informed decisions around key issues related to the upgrading of public lighting infrastructure.
- The NSW Government is working with licensed distributors to accelerate the rollout of energy efficient LED public lighting.

**Investment from the Fund in 2016–17:** \$244,689

### 2016–17 milestones:

- The Fund supported OEH engagement with councils and Joint Organisations on strategies to accelerate investment in energy efficient public lighting technologies and remove barriers to implementation.
- OEH has been working with Joint Organisations to identify approaches to undertaking public lighting upgrades collectively across regions and has commenced discussion with licensed distributors on implementation strategies to undertake accelerated public lighting upgrades.
- OEH has also engaged Local Government Procurement in Local Government NSW to streamline council access to procurement services.
- The Fund is supporting the development of a capacity building program to support councils and Joint Organisations to:
  - understand cost structures associated with their public lighting assets
  - understand and calculate the asset residual value of their lighting assets
  - help build the business case for accelerating energy efficient technology upgrades and identify appropriate financing options
  - understand the multiple benefits of energy efficient lighting (e.g. bill savings, road and pedestrian safety).

# 8 Saving emissions

The Fund is investing in innovative programs that help increase renewable energy capacity and save emissions in New South Wales.

## Key programs and projects supported by the Fund in 2016–17:

- Solar Bonus Scheme
- Direct Action Plan – Emissions Reduction Fund

## 8.1 Solar Bonus Scheme Reimbursement and Expiry Project

### Aim:

- To verify and pay claims for reimbursement and to inform customers of the scheme's closure on 31 December 2016.

### Approach:

- The NSW Department of Industry<sup>3</sup> administered the Solar Bonus Scheme. Scheme participants received a feed-in tariff for the electricity they exported to the grid between 1 January 2010 and 31 December 2016. The scheme is now closed.
- The Fund supported OEH to verify and pay claims for reimbursement to licensed distributors for payments made to energy customers under the scheme.
- The Solar Bonus Scheme Closure Communication Program informed customers of the scheme's closure and what they needed to do before the 31 December 2016 to maximise the benefits of their solar PV systems. The program supported several key policy objectives including:
  - informing Solar Bonus Scheme customers about their options when the scheme ends
  - contestable metering and the market-led rollout of smart meters
  - encouraging uptake of new technologies and energy efficient appliances and products supporting industry to inform the market of the new technologies.

### Investment from the Fund in 2016–17: \$94,723,478

- Solar Bonus Scheme Reimbursement Program: \$94,278,478
- Solar Bonus Scheme Closure Communication Program: \$445,000

### 2016–17 milestones:

- Small-scale systems connected to the scheme generated 205,000 megawatt hours of renewable electricity and the Fund provided \$94.3 million in reimbursement payments (see Table 8).
- The Fund supported the NSW Department of Industry to:
  - Distribute two letters to all Solar Bonus Scheme customers informing them of the scheme's impending closure and highlighting options to maximise the benefits of their solar PV systems once it had closed. This included information relating to metering arrangements and energy efficiency.

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<sup>3</sup> The division of the Department of Industry responsible for the Solar Bonus Scheme transferred to the Department of Planning and Environment in March 2017.



- Host 22 energy opportunity workshops across the state to inform customers of what to do in the lead-up to the scheme's closure and how to maximise the benefits of their solar PV systems once it had closed. These workshops were attended by more than 2400 people and incorporated an animated video developed by the Department of Industry and advice from independent energy experts. The workshops proved highly successful with 88% of attendees surveyed indicating they felt better informed on how to maximise the benefit of their solar systems after attending a workshop.
- Engage Service NSW to provide call centre support services to scheme customers. This service was accessed by more than 4000 callers.
- Develop additional resources for the Solar Bonus Scheme website. These resources include a metering fact sheet, updated frequently asked questions, infographics, the digital explainer animation and a full video of one of the energy opportunity workshops. See the [Solar Bonus Scheme web portal](#).
- Commission the Independent Pricing and Regulatory Tribunal to release a series of fact sheets to help participants prepare for the closure of the scheme and to establish a 'fair and reasonable' unsubsidised benchmark range for feed-in tariffs for the solar energy added to the grid by small-scale generators for the financial year 2017–18.
- Release a print advertising campaign in areas of high scheme uptake in July, October and December 2016 and a social media advertising campaign from July to December 2016.

**Table 8: Estimated electricity generation from the Solar Bonus Scheme**

Year	Number of new systems <sup>1</sup>	Total reimbursement (\$)	Estimated electricity generation (MWh)
Jan 2010 – June 2011	139,059	138,253,239	247,825
2011–12	9,135	211,841,253	380,682
2012–13	-	197,934,670	415,600
2013–14	-	205,093,881	424,872
2014–15	-	197,671,326 <sup>2</sup>	404,088 <sup>2</sup>
2015–16	-	192,876,712 <sup>3</sup>	400,911 <sup>3</sup>
2016–17	-	94,278,478	204,968
<b>Total</b>	<b>148,194</b>	<b>1,237,949,558</b>	<b>2,478,946</b>

<sup>1</sup> New systems are based on the connection date reported by the distributors for systems eligible for the scheme. Previously the number was based on the year notification was received from the distributor.

<sup>2</sup> The cost and generation for 2014–15 has been updated in this report to account for a refund provided by one of the distributors for incorrect billing.

<sup>3</sup> The 2015–16 Climate Change Fund Annual Report showed a total reimbursement amount of \$201,875,882, which included an accrual for the last quarter. Following standard financial end of year adjustments, the final 2015–16 amount was \$192,876,712. The reimbursement and generation figures have been adjusted in this report accordingly.

## 8.2 Engaging with the Direct Action Plan

### Aim:

- To maximise NSW investment in carbon abatement projects under the Australian Government's Emissions Reduction Fund.

### Approach:

- The NSW Government has allocated funding to increase NSW participation in the Emissions Reduction Fund.
- OEH promotes Emissions Reduction Fund methods to key industry sectors and within government. Where emissions abatement opportunities are not covered by Emissions Reduction Fund methods, OEH seeks to have the Australian Government develop suitable methods.
- The Fund has allocated the National Parks and Wildlife Service (NPWS) with \$4 million to undertake a range of land rehabilitation projects in national parks and reserves.
- Six new land rehabilitation projects on national parks and reserves were successful at the Australian Carbon Auction in April 2016. Combined with previous successful bids, this will see the NPWS receive approximately \$1.4 million from the Emissions Reduction Fund over the next 10 years, with pro rata payments made annually.
- The NSW Department of Primary Industries is examining the impacts on biodiversity, resource condition, and economic and community resilience resulting from land-use change under current Emissions Reduction Fund projects in the western NSW rangelands. The Fund is providing \$890,000 over two years to examine the quantum abatement within Emissions Reduction Fund project areas, the influence of climate change and the feasibility of new rangelands methods.

### Investment from the Fund in 2016–17: \$1,442,887

- \$160,582 for Emissions Reduction Fund outreach
- \$392,306 for the NPWS public lands pilot
- \$890,000 for rangeland research.

### 2016–17 milestones:

- NPWS committed \$1.57 million in January 2016 to undertake environmental (tree) planting 'pilot projects' at the following reserves:
  - Gwydir Wetlands State Conservation Area (229 hectares)
  - Brindabella National Park (46 hectares)
  - Kosciuszko National Park – 'Merambagao' (157 hectares)
  - Kosciuszko National Park – 'Kalkite' (45 hectares)
  - Willi Willi National Park (30 hectares)
  - Tinderry Nature Reserve (37.5 hectares).
- NPWS prepared a new contract for an additional \$1.5 million worth of environmental (tree) planting projects in NPWS reserves. These projects were successfully registered under the Emissions Reduction Fund by CO2 Australia Limited, which is NPWS' appointed agent for dealing with the Australian Government on carbon market processes. The new project sites are:
  - Arakoola National Park (60 hectares)
  - Capertree National Park (115 hectares)
  - Everlasting Swamp National Park (45 hectares)
  - Hat Head National Park (20 hectares)

- Lachlan Valley National Park (260 hectares)
- Kwiambale National Park (40 hectares).
- The Fund supported OEH to develop five NSW-specific financial business cases for Emissions Reduction Fund waste management methods, such as landfill gas capture and organic waste recycling. OEH then delivered 12 workshops on these methods to all NSW local councils to build their capacity to effectively consider and participate in the Emissions Reduction Fund.
- The Department of Primary Industries has established collaborative research links with OEH, CSIRO, University of Southern Queensland and Local Land Services Western Region and completed all field-based studies. The Department of Primary Industries is developing manuscripts and reports about the project scheduled for completion in early 2018.

# 9 Climate change adaptation

The Fund is helping local councils and communities in New South Wales to adapt to climate change by investing in programs that help reduce exposure to natural hazards and other climate risks.

## Key programs and projects supported by the Fund in 2016–17:

- Coastal and Estuary Grants Program
- Building Resilience to Climate Change grants
- Climate-KIC Australia
- Enhanced Bushfire Management Program
- Hawkesbury–Nepean Valley Flood Risk Management Strategy.

## 9.1 Coastal management and reforms

### Aim:

- To support local government and communities in managing the risks from coastal hazards.

### Approach

- The NSW Government's coastal reforms provide for adaptation to current coastal hazards and potential future climate change through a modernised legislative framework and state environmental planning policy. The reforms include a revised coastal management manual and additional funding to support coastal management.
- Investment in statewide science and technical advice to help councils to identify and assess the vulnerability of coastal areas and evaluate possible management actions to prepare their communities and assist them to respond effectively.
- The Coastal and Estuary Grants Program provides up to 50% funding to local councils to implement coastal zone management plans, develop coastal management programs, undertake hazard assessments and implement works to mitigate risks and improve the health of NSW estuaries, wetlands and littoral rainforests.

### Investment from the Fund in 2016–17: \$781,945

- \$135,814 for the Coastal Management Program
- \$646,131 for marine mapping.

### 2016–17 milestones:

- OEH undertook statewide regional mapping of erosion and inundation hazards and offshore mapping of the Wollongong sediment compartment.
- One project was completed under the Coastal and Estuary Grants Program. Northern Beaches Council carried out a distributional analysis to assess the benefits, such as avoided loss in land and property values and avoided loss of infrastructure, of building coastal protection works at Collaroy–Narrabeen Beach. A further three coastal management projects are underway (see Table 9).

**Table 9: Funding for Coastal and Estuary Grants in 2016–17**

Recipient	Project name	Total funding awarded (\$)	Funding paid in 2016–17 (\$)	Status
<b>Northern Beaches Council</b>	Collaroy–Narrabeen protective works benefit distribution analysis	\$12,500	\$12,500	Complete
<b>Port Macquarie-Hastings Council</b>	Illaroo Road stormwater redirection detailed design	\$25,000	\$3,618	In progress
<b>Kempsey Shire Council</b>	Management action 11 – Kempsey CZMP – Investigate and design foreshore concept plan	\$15,000	\$2,850	In progress
<b>Parramatta City Council</b>	Parramatta River seawall audit and options investigation	\$35,000	\$19,925	In progress

## 9.2 Building Resilience to Climate Change grants

### Aim:

- To address identified climate change risks and vulnerabilities facing NSW councils.

### Approach:

- The Building Resilience to Climate Change (BRCC) contestable grants program provides funding for activities that develop community resilience to climate change.
- The program is administered by Local Government NSW in collaboration with the Impacts and Adaptation Team in OEH.
- Grants of between \$15,000 and \$80,000 are available to NSW local government organisations to invest in climate change adaptation projects that address regional or sectoral climate risks and vulnerabilities.

### 2016–17 milestones:

- The BRCC grants round opened in August 2016, offering up to \$80,000 for projects that protect vulnerable communities or adapt priority infrastructure. OEH received 37 applications seeking funding totalling more than \$2.4 million.
- The grants were appraised by an independent technical committee in October 2016, and seven projects were selected for a total funding amount of \$497,000, with more than half of the projects located in regional New South Wales (see Table 10).

**Table 10: Building Resilience to Climate Change grants in 2016–17**

Recipient	Project name	Project summary and objectives	Funding (\$)
<b>Dubbo Regional Council</b>	Dubbo CBD heat island amelioration	This project will increase tree canopy in the Dubbo central business district medical precinct by 300% to increase shading and reduce ambient heat. This will protect patients and elderly pedestrians and will incorporate the use of diverted stormwater to provide supplementary water to the trees.	\$80,000
<b>Eurobodalla Shire Council</b>	Building adaptive capacity against rising coastal groundwater	This project will assess the potential risks that groundwater infiltration and salinity presents to infrastructure in the Eurobodalla Shire now and under projected climate change scenarios. It also aims to identify mitigation and adaptation measures to protect coastal infrastructure and community assets.	\$80,000
<b>Northern Beaches Council</b>	Building resilience into infrastructure assets	In partnership with the Institute of Public Works and Engineering Australia (IPWEA) this project will develop a Climate Change Addendum to the draft Useful Life of Infrastructure Assets Practice Note. It will guide council engineers to assess adaptation options for each infrastructure asset class and inform infrastructure planning. Climate change projections will be incorporated into infrastructure asset life information to prevent greater financial, social and environmental costs to the community in the future.	\$80,000
<b>Sydney Coastal Councils Group</b>	Adapting priority coastal recreational infrastructure for climate change	This project will include the development and application of an assessment method in the form of a checklist and decision framework for priority recreational coastal infrastructure assets. Assets include wharves, jetties, beaches, promenades, parks, pools, pathways and boat ramps.	\$80,000
<b>Cobar Shire Council</b>	Cobar Airport climate resilient master plan	This project will ensure the Cobar airport facilities can meet operational requirements to withstand climate change stresses, by ensuring an all-weather, durable airstrip in the region. This is vital to support health and emergency services, as well the viability of regional businesses and community needs.	\$60,000
<b>Wagga Wagga City Council</b>	Adaptation action plans for priority infrastructure and vulnerable communities	This project will develop an online interactive mapping tool that identifies priority council infrastructure and assets in relation to their use and service to vulnerable communities. This will be used to inform renewal and maintenance schedules and prioritise funding of adaptation projects through the development of Adaptation Action Plans for Priority Infrastructure to ensure ongoing resilient service and operations.	\$58,756
<b>Tweed Shire Council</b>	Northern Rivers emerging vector response plan	This project will develop and trial a Northern Rivers Emerging Vector* Response Plan. It aims to build a cross-scale network of local health and community decision-makers to provide integrated mechanisms to ensure rapid and advanced responses to a potential vector outbreak. It will include a response manual, a mock outbreak scenario and region wide communications and coordination. <i>*A vector control is any method to limit or eradicate the mammals, birds or insects which transmit disease pathogens.</i>	\$58,400

## 9.3 Climate-KIC Australia

### Aim:

- To transform the way Australia and NSW saves emissions and adapts to climate change.

### Approach:

- The Australian Climate Knowledge and Innovation Community (Climate-KIC Australia) is a public–private innovation partnership that offers a new way to link research, business, entrepreneurs, investors and government to facilitate systemic change. This partnership addresses the challenges and harnesses the opportunities of climate change.
- Climate-KIC Australia is built on the successful Climate-KIC Europe model and is being adapted to the Australian context, focusing on net-zero carbon energy, sustainable resilient cities and regions in transition.
- Climate-KIC Australia is partnering with EnergyLab to provide tailored support for early stage cleantech companies. The Fund is supporting the pilot of the Acceleration Program in New South Wales prior to national rollout.

**Investment from the Fund in 2016–17:** \$400,000

### 2016–17 milestones:

- Climate-KIC Australia launched in April 2017 and now has 12 core partners: Curtin University; EnergyLab; OEH; South Australian Department of Environment, Water and Natural Resources; South Pole Group; Suncorp; University of Adelaide; University of Melbourne; University of Technology Sydney; Victorian Department of Environment, Land, Water and Planning; Wattwatchers; and WWF.
- The Fund provided \$200,000 to support the establishment of Climate-KIC Australia and its core operational costs, including the development of the 2017–18 Business Plan. This funding enabled OEH to join Climate-KIC Australia as a core founding partner with a role as an independent director on Climate-KIC Australia’s board.
- The Fund also provided \$200,000 to fund the EnergyLab Acceleration Program in New South Wales. Four companies were accepted into the program in April 2017 and received a range of support including workshops covering business fundamentals such as business model development, legal and financial advice, identifying customers, developing a marketing strategy, and access to networking events (see Case study 4).

## 9.4 Enhanced Bushfire Management Program

### Aim:

- To address expected worsening fire weather conditions due to climate change by increasing hazard reduction operations and improving bushfire response capabilities.

### Approach:

- The Fund has provided \$76 million over six years that has more than doubled the NPWS bushfire hazard reduction program.
- NPWS has a strategic approach to adapting to bushfire risk from climate change. This is achieved by prioritising and targeting bushfire prone areas for hazard reduction to minimise the risk to the community.
- The Enhanced Bushfire Management Program has a five-year rolling average commitment of treating 135,000 hectares of bushland annually through mechanical and prescribed burning activities.

- The NPWS Rapid Aerial Response Teams (RART) provide New South Wales with increased rapid response capacity through the provision of additional remote area fire crew resources in high risk bushfire ignition areas. The RART has the following key performance indicators:
  - respond to 90% of wildfires within 30 minutes of detection
  - keep 80% of fires responded to below 10 hectares in size.

**Investment from the Fund in 2016–17: \$13,241,914**

- \$9,716,245 for hazard reduction activities
- \$2,375,886 for rapid response
- \$1,149,782 for capital expenditure to purchase assets, plant and equipment to support program delivery.

**2016–17 milestones:**

- The NPWS treated 88,576 hectares in 1313 mechanical and 143 prescribed burning activities.
- RART was activated 178 times and responded 201 times. The key performance indicators were exceeded in that 95% of responses were within 30 minutes of detection and all fires were kept below 10 hectares in size.



**Figure 5: A RART member being winched in New England National Park (Photo: Sean Leathers, NPWS)**



## 9.5 Hawkesbury–Nepean Valley Flood Risk Management Strategy implementation

### Aim:

- To build community resilience to current and future flood risk to life and property in the Hawkesbury–Nepean Valley, Western Sydney.

### Approach:

- The NSW Government has committed \$58 million to implement Phase One of the Hawkesbury–Nepean Flood Risk Management Strategy (Flood Strategy) from 2016–17 to 2019–20. Phase One implementation is the responsibility of a number of state and local government organisations, coordinated and led by a Directorate based in Infrastructure NSW.
- Phase One of the Flood Strategy includes: community engagement activities that increase flood risk awareness for improved community preparedness, response and recovery; easier access to flood risk information; actions to integrate emergency, land-use and road planning; as well as work for the approval and consultation for raising Warragamba Dam wall by around 14 metres for flood mitigation.
- State and local intergovernmental working groups will deliver and oversee the implementation of the Flood Strategy.

### Investment from the Fund in 2016–17: \$5,982,000

- \$1,816,000 for the Hawkesbury–Nepean Valley Flood Risk Management Directorate strategy coordination and oversight
- \$731,000 for Infrastructure NSW flood forecasting and monitoring, regional communications and engagement, and for flood risk information and decision support
- \$3,080,000 for Water NSW development works and environmental assessments for the raising of the Warragamba Dam wall
- \$180,000 for Department of Planning and Environment regional land-use planning
- \$175,000 for NSW State Emergency Service emergency planning and response.

### 2016–17 milestones:

- The NSW Government released the Flood Strategy in May 2017. More details on the Flood Strategy can be found here: [Hawkesbury-Nepean Flood Risk Management Strategy](#).
- The NSW Government established the Hawkesbury–Nepean Flood Risk Directorate (Infrastructure NSW) and a supporting intergovernmental working group to oversee coordination and implementation of the Flood Strategy across key state government organisations and local councils.
- A series of successful community engagement and awareness raising activities were carried out in collaboration with the NSW State Emergency Services, Hawkesbury City Council and others to commemorate the 150<sup>th</sup> anniversary of the 1867 flood – the largest flood on record in the Hawkesbury–Nepean Valley.
- Work commenced on the design, consultation and installation of evacuation route signage for the Hawkesbury–Nepean Valley.

## Case study 4 – EnergyLab: incubating Australia’s energy innovators

EnergyLab is Australia’s first and only dedicated cleantech accelerator program and is modelled on successful international predecessors like Climate-KIC Europe and Powerhouse in Oakland,

California. EnergyLab shares co-working spaces with Climate-KIC Australia, with whom they have collaborated to develop the acceleration program.

EnergyLab is a not-for-profit organisation dedicated to promoting renewable energy innovation projects. It fosters and nurtures a supportive and forward-thinking ecosystem for start-up success.

Since opening its doors in February 2017, EnergyLab has been offering a range of cleantech-specific programs designed to create pathways to connect investors, industry, research and entrepreneurs to accelerate the success of these start-ups.

Executive Director Piers Grove says industry-specific accelerator programs cater to the challenges of start-ups. Whether it's regulatory compliance, shared infrastructure or investment models, there are many benefits for entrepreneurs working within cohorts of likeminded business leaders.

## **First accelerator projects revealed**

### ***BlueVolt***

BlueVolt is building PV system products that will make high efficiency solar power lucrative, convenient, easy to understand, and enable its uptake anywhere on earth. Conventional PV rooftop systems are unbranded, hidden away, need technicians to install, and have no analytics or reporting. If you have a sub-optimal location, or you live in an apartment, or a developing country, you can't partake in the solar revolution. Solar installs have the highest margins in the PV value chain. A large opportunity exists to disrupt the solar PV installation business, whilst bringing solar power cheaply to wider society. The BlueVolt Home Solar Pack is a simple, sleek and self-installed home solar solution, consisting of small high efficiency solar panels, a novel versatile mounting system, integrated battery storage and a WiFi-connected display readout. The system is modular and expandable, with a product eco-system of additional solar panels, batteries, and mounts for every surface.

### ***Energy Assist***

Energy Assist is helping customers in hardship to reduce their energy bills. They assist customers to improve their energy efficiency by understanding their energy footprint and replacing energy inefficient appliances. Energy Assist will be an outsource solution for energy retailers to hand over hardship customers. As well as replacing inefficient appliances, Energy Assist will aid hardship customers by installing timing switches for off-peak use and the ability to monitor energy use through existing app technology. These changes will be paid through a micro-loan. Loan values are up to \$1500, depending on the household and repayment capacity. Expected energy reduction is from 30–80% depending on the customer's current energy use.

### ***Eveeh***

Eveeh is Australia's first electric car rental company and the first to offer the iconic Tesla Model S for rent. They are now expanding via creation of an electric-only car sharing platform to unite the community of electric vehicle owners and let more Australians experience what it's like to drive electric. Their mission is to make electric vehicles affordable and accessible to everyone and excite people about the future of transportation.

### ***IronMatrix***

IronMatrix is developing a reconfigurable, energy efficient, resilient, solar-ready housing system that can be built anywhere, by anyone. They believe that in the next 10 years there will be increased demand for homes that can be custom configured and reconfigured, expanded or resold. Their focus is on homes that integrate solar power generation, provide the option of a flat/ green roof and provide the flexibility to install clean energy utilities such as battery storage systems.

## **Where to from here?**

EnergyLab will welcome its second cohort of start-up companies in September 2017 and looks forward to expanding its program offering to a wider range of start-up companies. They also begin the important work of promoting New South Wales as a destination for international innovators to demonstrate their technology in our extremely appealing launch market.

# 10 Climate Change Fund research and evaluation initiative

## Aim:

- To ensure that a robust evidence base is available to guide the development, monitoring and evaluation of Fund programs and provide information on the likely impacts of climate change in New South Wales at scales relevant to local decision-makers.

## Approach:

- The Energy Efficiency Research Hub is supporting research into energy and resource efficiency program and policy design, and research to identify opportunities to save energy and emissions across New South Wales.
- The Human Health and Social Impacts of Climate Change Research Node will extend the work of the NSW Adaptation Research Hub by establishing dedicated research into the human health and social impacts of climate change in New South Wales.
- Examining the impacts of extreme climate events in New South Wales (extreme rainfall and winds, hail and lightning, flood and coastal inundation and erosion) and how the frequency, intensity and duration of these extreme events may change in the future is useful when integrating multi-hazards into risk assessments. This will assist emergency services, water resource and bushfire managers, and NSW businesses and communities to become more resilient to these events.
- Continued monitoring and evaluation of the quality of NSW climate projections delivered by the NSW and ACT Regional Climate Modelling (NARClIM) project will ensure that projections are based on the best available information and meet user needs.
- Collaborating with academic partners on operational research into the impacts of climate change on the alpine region of New South Wales helps to identify and integrate risks and optimise management plans.
- The establishment of a new OEH Enhanced Bushfire Research program will facilitate the delivery of scientifically robust information. Next generation decision support tools, based on the best available science, will assist with planning and operations to achieve effective emissions savings from fires.
- OEH is reviewing best practice standards for evaluating and monitoring the effectiveness of urban greening strategies. OEH is also developing fine-scale green cover maps for the Sydney Greater Metropolitan Area to create a baseline for evaluation. This work will inform current and future NSW Government urban greening programs.
- OEH is delivering social research to inform future program design and evaluation, and to evaluate the Fund's objective to increase public awareness and acceptance of the importance of climate change and water and energy savings measures.
- The development of a Climate Change Fund Evaluation Framework will ensure alignment with NSW Government evaluation policies and meet international standards and best practice.

## Investment from the Fund in 2016–17: \$3,545,541

- \$879,188 for energy efficiency research
- \$717,755 for regional climate projections and extreme climate events
- \$260,890 for climate change impacts in the alpine region
- \$591,016 for human health and social impacts of climate change
- \$64,883 for urban heat and green cover and evaluation
- \$348,196 for monitoring and evaluation of bushfire management

- \$351,059 for social research
- \$332,554 for Climate Change Fund evaluation.

#### **2016–17 milestones:**

- The Fund supported the establishment of the Energy Efficiency Decision-Making Node as part of the Energy Efficiency Research Hub.
- OEH completed an end-user workshop and survey to identify priorities for health and social impacts of climate change research. Information obtained through these engagement activities was synthesised and prioritised by OEH to establish priority climate impact areas and cross-cutting research themes for the Human Health and Social Impacts Node.
- OEH initiated a partnership with the Australian Research Council Centre of Excellence for Climate Extremes, led by the University of NSW, aiming to better understand the impacts of climate extreme events on New South Wales and how the frequency, intensity and duration of these extreme events may change in the future.
- OEH commissioned the University of NSW to continue feasibility studies into how regional climate projections for New South Wales could be improved. This work included a literature review of the performance of global climate models in simulating observed climate for Australia and its surrounds.
- OEH undertook an integrated climate change impact assessment for the NSW alpine region including water availability, biodiversity, cropping, and soil erosion modelling.
- As part of the Enhanced Bushfire Research Program, OEH carried out quantitative estimation of the capacity for differing fire management strategies to reduce greenhouse gas emissions, an assessment of robust capacity to predict fire risks to key values, and an evaluation of the effectiveness of bushfire management in mitigating risk and estimating risk in the future. OEH also quantified risk mitigation 'trade-offs' likely to accrue from management to mitigate greenhouse gas emissions and new modelling capacity to support the optimisation of planned burning for risk mitigation.
- OEH created raw stereo imagery of the Sydney Greater Metropolitan Area that is now ready for conversion to a vegetation-cover baseline and commenced the development of a review of best practice in green cover strategy evaluation.
- OEH has made significant progress in developing a Climate Change Fund Evaluation Framework in line with NSW Government policies and international best practice. The framework will be published on the OEH website when finalised. The framework will define requirements, standards, levels, types and governance of evaluations under the Fund. It will also outline how to obtain rigorous evidence to demonstrate the achievement of outcomes and define thematic-level outcomes and key performance indicators to create a solid foundation for evaluating future programs.

# Appendix A – Legislative requirements

The Fund was established in 2007 under the *Energy and Utilities Administration Act 1987*. The Act describes the purposes of the Fund and a number of other requirements.

Relevant provisions in the legislation are provided below.

## Division 2 – Climate Change Fund

### 34F Purposes of Climate Change Fund

The purposes of the Fund are as follows:

- (a) to provide funding to reduce greenhouse gas emissions and the impacts of climate change associated with water and energy activities
- (b) to provide funding to encourage water and energy savings and the recycling of water
- (c) to provide funding to reduce the demand for water and energy, including addressing peak demand for energy
- (d) to provide funding to stimulate investment in innovative water and energy savings measures
- (e) to provide funding to increase public awareness and acceptance of the importance of climate change and water and energy savings measures
- (f) to provide funding for contributions made by the State for the purposes of national energy regulation.

### 34G Payments into Climate Change Fund

(1) There is payable into the Fund:

- (a) all money received from contributions required to be made to the Fund under Division 3
- (b) all money advanced by the Treasurer for the Fund
- (c) all money appropriated by Parliament for the purposes of the Fund
- (d) the proceeds of the investment of money in the Fund
- (e) all money directed or authorised to be paid into the Fund by or under this or any other Act or law
- (f) all money received from voluntary contributions to the Fund made by any other person or body.

Without limiting subsection (1)(f), state agencies are authorised by this section to make voluntary contributions to the Fund.

Subsection (2) does not authorise a state water agency or a distribution network service provider to refuse to pay a contribution to the Fund that is payable under Division 3.

### 34H Payments out of Climate Change Fund

(1) There is payable from the Fund:

- (a) any money approved by the Minister to fund all or any part of the cost of any measure that the Minister is satisfied promotes a purpose referred to in section 34F
- (b) any money approved by the Minister to fund all or any part of the contributions that the State is required to make for the purposes of national energy regulation
- (c) any money required to meet administrative expenses related to the Fund

- (d) any money required to meet administrative expenses of the Minister in connection with the Minister's functions under this Act in relation to savings action plans
  - (e) any money directed or authorised to be paid from the Fund by or under this or any other Act or law.
- (2) In exercising the Minister's functions under subsection (1) (a) (but without limiting the generality of that paragraph), the Minister may:
- (a) approve selection criteria from time to time to be applied to determine the kinds of water or energy savings measures that will be eligible for funding
  - (b) approve the funding of community grants from the Fund, being grants awarded based on their merit in advancing one or more of the purposes referred to in section 34F, established through a competitive selection process
  - (c) require a person or body seeking funding for a water or energy savings measure to do either or both following as a precondition to applying for or obtaining funding:
    - (i) to submit a water savings action plan or energy savings action plan (as the case requires) that includes details about the measure
    - (ii) to provide any other information requested by the Minister about the measure, and
  - (d) obtain and have regard to any advice, recommendations or other information provided to the Minister by a committee established by the Minister under Division 5, or by any other person or body, that the Minister considers relevant.
- (3) The Minister is to produce an annual report detailing Fund allocations and programs and anticipated benefits, by reference to key performance indicators, to be achieved in advancing any one or more of the purposes referred to in section 34F.
- (4) The annual report is to include an evaluation of the effectiveness of each program as it is completed under the Fund.
- (5) The annual report is to be tabled in each House of Parliament within six months after the end of the financial year to which it relates.
- (6) The Minister is to publish each annual report to promote, to the NSW public, schemes, technologies and processes that address climate change, and to inform the NSW public about consumer choices and procurement decisions.

# Appendix B – Tariffs and information sources

## Savings estimates

All program savings are conservatively estimated from the available information. Any apparent discrepancy in the totals shown is due to rounding.

Where possible, this annual report uses retail prices published by the Australian Energy Market Operator (AEMO) for National Electricity and Gas Forecasting. Bill savings for some programs such as Gas Efficiency Funding are site-specific.

Energy bill savings may include savings attributed from electricity, natural gas, LPG and operating and maintenance costs.

The cost-effectiveness of funding is calculated by dividing the funding allocated or expended by the lifetime of the savings, which varies by technology (e.g. 10 years for a television, 12 years for a refrigerator).

Greenhouse gas emission conversion factors are from the National Greenhouse Accounts Factors July 2017 (see Table 11).

**Table 11: Emissions factors**

Fuel	Unit	Factor
Electricity	tCO <sub>2</sub> -e/MWh	0.95
Natural gas	tCO <sub>2</sub> -e/GJ	0.06433
LPG	tCO <sub>2</sub> -e/GJ	0.0642

## Data sources and program evaluations

AMR 2017, *Energy Efficiency for Business Training Evaluation*, prepared for the NSW Office of Environment and Heritage.

Human Matters 2017, *Evaluation of the Demystifying Solar for Business Seminars*, prepared for the NSW Office of Environment and Heritage.

NSW Department of Planning and Environment 2017, *NSW (incl. ACT) Summary Generation by Fuel Type 2001–2016*, NSW Department of Planning and Environment, Sydney.

Urbis 2017, *The Home Energy Action Program Interim Evaluation Report*, prepared for the NSW Office of Environment and Heritage.

## Regions

Regional NSW is defined as the local government areas outside Greater Metropolitan Sydney. For more information see *Regional Plans*: [www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans](http://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans).

# Glossary

<b>the Act</b>	<i>Energy and Utilities Administration Act 1987</i> , under which the NSW Climate Change Fund is established
<b>BASIX</b>	Building Sustainability Index; a sustainable planning measure that aims to deliver equitable, effective water and greenhouse gas reductions across New South Wales
<b>cleantech</b>	An industry term for clean technology, which includes a broad range of technologies that reduce negative environmental impacts
<b>COAG</b>	Council of Australian Governments; the peak intergovernmental forum in Australia
<b>cost-effectiveness</b>	A cost per megawatt hour or other metric that is calculated by dividing the funding allocated by the energy savings over their lifetime
<b>efficiency (energy or water)</b>	Reducing the amount of energy or water required to provide a given level of service (e.g. for lighting, air-conditioning or toilet flushing)
<b>ESCO</b>	Energy service company
<b>ESS</b>	The NSW Energy Savings Scheme; financial incentive for organisations to implement energy savings projects, governed by NSW legislation
<b>feed-in tariff</b>	A premium rate paid for electricity fed back into the electricity grid from a designated renewable electricity generation source
<b>the Fund (or CCF)</b>	The NSW Climate Change Fund
<b>gigajoule (GJ)</b>	A joule is a unit of energy, equivalent to the power of one watt for one second; a gigajoule is 1000 million joules
<b>gigawatt hour (GWh)</b>	A gigawatt hour is equivalent to 1000 megawatt hours or one million kilowatt hours. Gigawatt hours are often used as a measure of the output of large electricity power stations (see definition under kilowatt hour)
<b>GHG</b>	Greenhouse gas, usually with reference to emissions
<b>hazard reduction</b>	In the context of bushfire management, hazard reduction provides areas of reduced fuel that can significantly reduce fire behaviour and aid fire suppression activities. Hazard reduction activities may include prescribed burning or mechanical clearing like slashing undergrowth, mowing or reducing the ground fuel by hand
<b>HVAC</b>	A heating, ventilation and air-conditioning (HVAC) system is commonly used to provide fresh air, indoor climate and comfort control services for interior building spaces
<b>HWS</b>	Hot water system
<b>kilowatt (kW)</b>	A unit of energy equal to 1000 watts (see definition under watt)



<b>kilowatt hour (kWh)</b>	A measure of energy use equivalent to consumption of 1000 watts for one hour
<b>LED</b>	Light-emitting diode; a type of energy efficient lighting
<b>liquefied petroleum gas (LPG)</b>	A type of fuel often used in industrial, commercial, agricultural and manufacturing applications
<b>megawatt (MW)</b>	A unit of energy equal to one million watts (see definition under watt)
<b>megawatt hour (MWh)</b>	A megawatt hour is equal to 1000 kilowatt hours (see definition under kilowatt hour)
<b>NABERS</b>	National Australian Built Environment Rating System; NABERS is managed nationally by OEH, on behalf of Commonwealth, state and territory governments
<b>NPWS</b>	The National Parks and Wildlife Service (part of the Office of Environment and Heritage within the Planning and Environment cluster)
<b>OEH</b>	The Office of Environment and Heritage (a separate agency within the Planning and Environment cluster)
<b>photovoltaic (PV)</b>	A form of solar energy that directly converts light into energy
<b>PIAM&amp;V</b>	Project Impact Assessment with Measurement and Verification; a method for verifying energy savings using internationally recognised measurement and verification principles
<b>PPA</b>	A power purchase agreement (PPA) is a financial arrangement in which a solar service provider owns and pays for the installation of a solar PV system, and a customer hosts the system on their property and purchases the energy it produces from the solar services provider for a predetermined period and price, usually cheaper than the retail electricity rate paid to the customer's energy retailer
<b>renewable energy</b>	Energy generated from renewable sources, including the sun, waves, waste, water (hydroelectricity) and wind, as opposed to fossil fuels that emit greenhouse gases
<b>retrofit</b>	Upgrading an existing system or building, typically to make it more energy or water efficient
<b>solar energy</b>	Solar power refers to the sun's potential to produce energy. Solar energy can be generated using a wide variety of methods, ranging from simple water recirculating systems used to heat homes and commercial offices, to sophisticated networks of solar cells that produce enough energy to supply small cities
<b>tCO<sub>2</sub>-e</b>	An abbreviation of 'tonnes of carbon dioxide equivalent', the internationally recognised measure of greenhouse gas emissions
<b>watt (W)</b>	The unit for measuring electrical power; the rate of energy consumption by an electrical device when it is in use is measured in watts