

SYDNEY & NEW SOUTH WALES

# Clean Technology



New South Wales  
Government

[sydneyaustralia.com](http://sydneyaustralia.com)

A close-up photograph of a scientist, likely of Asian descent, wearing a white lab coat and blue nitrile gloves. He is focused on a task, looking down at a small, dark, rectangular component with a grid of blue solar cells. The background is a blurred laboratory setting with various pieces of equipment and shelves. The image is partially obscured by a large, light blue, curved graphic element that sweeps across the top and left sides of the page.

## WIPING THE STATE CLEAN

How New South Wales is fast becoming the home of 'Cleantech' in Asia Pacific.

When you've got the largest population in Australia, it's natural that you take clean energy seriously – as you've also got the largest energy market in the country.

It's why we're much more than just supporters of new investment in clean technology, we're actively driving it forward.

You'll find New South Wales (NSW) is home to a range of leading clean energy and environmental services companies – a genuine hub of capability and continuing innovation. A State that is full of opportunity and support for new cleantech businesses, investment and ideas.

We're setting our sights on a cleaner, greener future – and we look forward to having you join us.

### CLEAN UP IN NSW

If you're thinking about setting up a cleantech project, or moving or expanding such a business in Australia, talk to our business development agency, NSW Trade & Investment. We can help with information for business plans, benchmarking information, innovation programs to support technology commercialisation, export support programs, and much more.

# TARGETING A GREENER TOMORROW

By 2020 we want 20% of NSW electricity supply from renewable sources.

About A\$8 billion is spent on environmental goods and services in NSW each year. NSW has appointed a Parliamentary Secretary for Renewable Energy and is developing a Renewable Energy Action Plan.

Six Renewable Energy Precincts have been established across NSW to encourage renewable energy development.

There is plenty else happening in NSW:

- In 2010, hydropower accounted for 8% of electricity generation; over 800 GWh of power was generated from landfill gas and biowaste.
- The state's ethanol and biodiesel mandates are encouraging the development of biomass technologies and feedstocks.
- In 2010, wind power contributed over 460 GWh; over 8,000 MW of additional wind generation capacity is in planning.
- The Moree Solar Farm has been awarded Australian Government funding for a 150 MW solar photovoltaic power plant under the Solar Flagships program, with the NSW Government pledging A\$120 million.
- Opportunities are being pursued to develop Geothermal, Wave and Tidal Energy.
- Ausgrid's Smart Grid, Smart City project in Newcastle, Sydney and Scone will help lead advances in energy management and integration of renewable energy into electricity transmission and distribution networks, aided by A\$100 million in Australian Government funding.
- A Waste and Environment Levy has been introduced, with a recycling target of 66% of solid waste by 2014.
- We want 12% of Sydney's water recycled by 2015.
- We're aiming for 4,000 GWh of annual electricity savings by 2014, and have energy-efficiency training and funding programs for businesses, communities and Government agencies.
- The Building and Sustainability Index places energy and water standards on new residential buildings and the National Australian Built Environment Rating Scheme rates building energy performance. Large Government buildings are targeted for high energy and water efficiency ratings.
- Environmental Upgrade Agreements in commercial and large residential building retrofits allow equitable sharing of the resulting savings between landlords, tenants and financiers, through a voluntary local council charge.



# R&D'S GOT THE GREEN LIGHT

How we're supporting cleantech research.

We know how important research is to discovering new technologies, and improving current ones.

That's why NSW boasts world-class research and development in clean energy, energy efficiency and environmental technology. It's helping lead the charge towards a greener, cleaner environment. There's a huge number of initiatives underway within the State, all to change the way we source and use energy – and ultimately transform the way we live.

Take a look at some of the organisations and initiatives at the forefront of our push towards a cleaner, greener future.

## AUSTRALIAN SOLAR INSTITUTE

The \$A100 million Australian Solar Institute [ASI], based in Newcastle, was launched in 2009 to fast-track solar research and development.

The ASI aims to drive collaborative, focused research and development that will have a major impact on the efficiency and cost-effectiveness of solar technologies. It will also disseminate the results and learnings from solar research for the benefit of the Australian and global solar communities and the Australian public, and will act as a catalyst to champion Australia's leadership strengths in solar research and development.

To date, the ASI has helped fund 13 R&D projects at a cost of \$A44.5 million in the areas of photovoltaics and concentrating solar thermal.

[www.australiansolarinstitute.com.au](http://www.australiansolarinstitute.com.au)

## CSIRO ENERGY CENTRE

The CSIRO Energy Transformed Flagship, in Newcastle, provides a focal point for research into sustainable energy and the environmental impacts of energy, as well as research and development into environmentally acceptable fossil fuels.

It also incorporates an energy-generation suite developed for efficiency and to showcase available technologies.

## CSIRO'S NATIONAL SOLAR ENERGY CENTRE

Also in Newcastle is CSIRO's National Solar Energy Centre (NSEC). It's currently developing solar thermal technologies and is home to the largest high concentration solar array in the Southern Hemisphere.

## ENVIRONMENTAL BIOTECHNOLOGY COOPERATIVE RESEARCH CENTRE

The Environmental Biotechnology Cooperative Research Centre at the Australian Technology Park in Sydney develops advanced technologies based on biological systems that improve efficiency, and reduce or utilise waste, to benefit a wide range of industries as well as the natural environment.

It concentrates its research and commercial efforts in three core areas: biofilm prevention and dispersal; rapid in-field microbial detection and control; and bioprocesses (such as bioremediation and industrial wastewater treatment).

[www.ebcrc.com.au](http://www.ebcrc.com.au)

## NEWCASTLE INSTITUTE FOR ENERGY AND RESOURCES

The Newcastle Institute for Energy and Resources (NIER) addresses national priorities in sustainability and energy, producing a range of solutions for sustainable production and energy use. NIER is located at the former BHP-Billiton Newcastle Research Laboratories, adjoining University of Newcastle's Callaghan campus. Collaborating with national and international partners, NIER advances research in clean energy production, energy efficiency and the minimisation of carbon emissions.

[www.newcastle.edu.au/research/newcastle-institute-for-energy-resources/](http://www.newcastle.edu.au/research/newcastle-institute-for-energy-resources/)

## UNIVERSITY OF NEW SOUTH WALES SCHOOL OF PHOTOVOLTAIC AND RENEWABLE ENERGY ENGINEERING

The University of New South Wales' [UNSW] School of Photovoltaic and Renewable Energy Engineering is internationally recognised for its research in the field of photovoltaics. It is focusing on the key challenges facing the field of photovoltaics over the next 20 years, as well as spin-off applications in microelectronics and optoelectronics.

UNSW's solar cell technologies have been licensed to solar cell makers around the world, including Suntech-Power, BP Solar and Samsung.

[www.pv.unsw.edu.au/research/advancedsilicon.asp](http://www.pv.unsw.edu.au/research/advancedsilicon.asp)

## UNIVERSITY OF NEWCASTLE PRIORITY RESEARCH CENTRE FOR ENERGY

The PRCfE brings together academics at the University of Newcastle who have research interests in the reduction of greenhouse gases, and in clean and sustainable energy production. It aims to provide new opportunities from the interaction between industry, government agencies and university researchers interested in clean and sustainable energy.

[www.newcastle.edu.au/research-centre/energy/](http://www.newcastle.edu.au/research-centre/energy/)

## UNIVERSITY OF SYDNEY

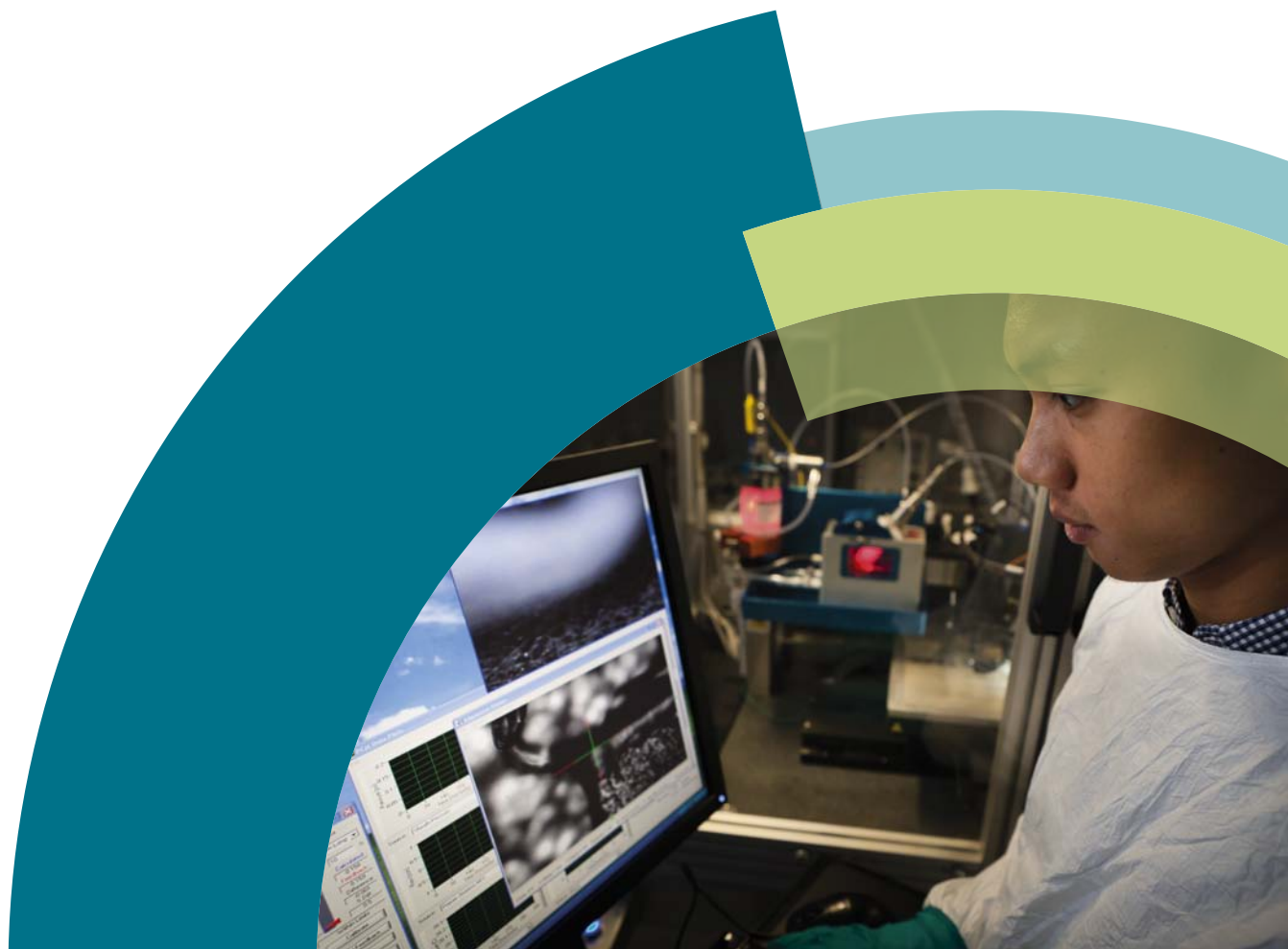
Sydney University offers world-leading research in solar thermal electricity, particularly solar materials and solar ray development, such as designs for evacuated absorber tubes, the first solar steam cooker with storage, a solar selective coating and solar hot water designs, some of which have been patented and commercialised in China.

## UNIVERSITY OF WOLLONGONG AUSTRALIAN RESEARCH COUNCIL [ARC] CENTRE OF EXCELLENCE FOR ELECTROMATERIALS SCIENCE

The new ARC Centre of Excellence for Electromaterials Science brings together eminent scientists from four research organisations.

[www.electromaterials.edu.au](http://www.electromaterials.edu.au)

- The Intelligent Polymer Research Institute (IPRI) – The IPRI is renowned for its expertise in the electrochemistry of organic conductors, especially in the applications of artificial muscles, photovoltaics, batteries, and biomedical applications
- The Institute for Superconducting and Electronic Materials (ISEM) – The ISEM explores superconducting and electronic materials including magnesium boride superconductors and has a large program looking at new materials for energy storage, including the design and composition of batteries.



# GREEN-COLLAR CORPORATES

How our organisations are thinking green.

Our State plays host to a wide range of cleantech businesses, some of which are profiled here.

## AGL

[www.agl.com.au](http://www.agl.com.au)

AGL, one of Australia's major energy utilities, is a leading integrated renewable energy company and Australia's largest private owner, operator and developer of renewable generation assets. It has major investments in hydro and wind, as well as ongoing developments in key renewable areas, which include solar, geothermal, biomass, bagasse and landfill gas.

AGL also operates retail, merchant energy and upstream gas businesses, and has over three million customer accounts. AGL has been operating in Australia for 170 years and was one of its first listed companies.

## BLUGLASS

[www.bluglass.com.au](http://www.bluglass.com.au)

BluGlass is a leading innovator in energy efficiency lighting and is commercialising an exciting semiconductor platform technology primarily for the LED and solar industries known as Remote Plasma Chemical Vapour Deposition [RPCVD]. RPCVD has the potential to be a lower cost, lower temperature, cleaner and more scalable manufacturing process for use in the production of ultra high efficiency devices such as next generation lighting technology, LEDs and high efficiency solar cells. BluGlass is now demonstrating the commercial capability of its technology as it pursues partnerships and sales to global manufacturing majors.

## DELTA ELECTRICITY

[www.de.com.au](http://www.de.com.au)

Delta Electricity is one of Australia's largest electricity generator with over 5,000 MW of installed capacity, generating electricity from sources including coal, gas, hydro and biomass. Delta is focusing considerable investment into improving its sustainability with key initiatives including the new low emission Colongra gas turbine facility, a pilot project with CSIRO to remove CO2 from power station flue gases; funding a Chair of Sustainable Energy Development at the University of Sydney; reduction of water use and improved water recycling at all power plants; promotion of coal ash for use in cement and concrete to reduce greenhouse emissions; and trialling the potential of bio-energy fuels like mallee eucalypt to be harvested and processed for co-firing with coal to generate electricity.

## MACQUARIE GENERATION

[www.macgen.com.au](http://www.macgen.com.au)

MacGen is engaged in the expansion of its solar thermal energy project at Liddell Power Station in the Hunter Valley, NSW. Novatec Solar has been awarded the contract to build a new 9MWth solar field at Liddell, which will complement the existing plant, a world first integration of solar thermal technology with a traditional power station. Construction of the 18,000 square metre solar field is expected to be completed by 2012.

## MANILDRA GROUP

[www.manildra.com.au](http://www.manildra.com.au)

This Group owns and operates ethanol distilleries at Nowra and other locations in NSW. Manildra's Nowra distillery is the largest ethanol producer in Australia.

## SITA ENVIRONMENTAL SOLUTIONS

[www.sita.com.au](http://www.sita.com.au)

SITA provides weekly services to over 43,000 commercial and industrial clients and more than three million residents across Australia. SITA's services include domestic, commercial and industrial waste collection; waste assessments; resource recovery and recycling options; processing of organic materials into compost; renewable energy facilities; medical and hygiene services; waste treatment; and product destruction.

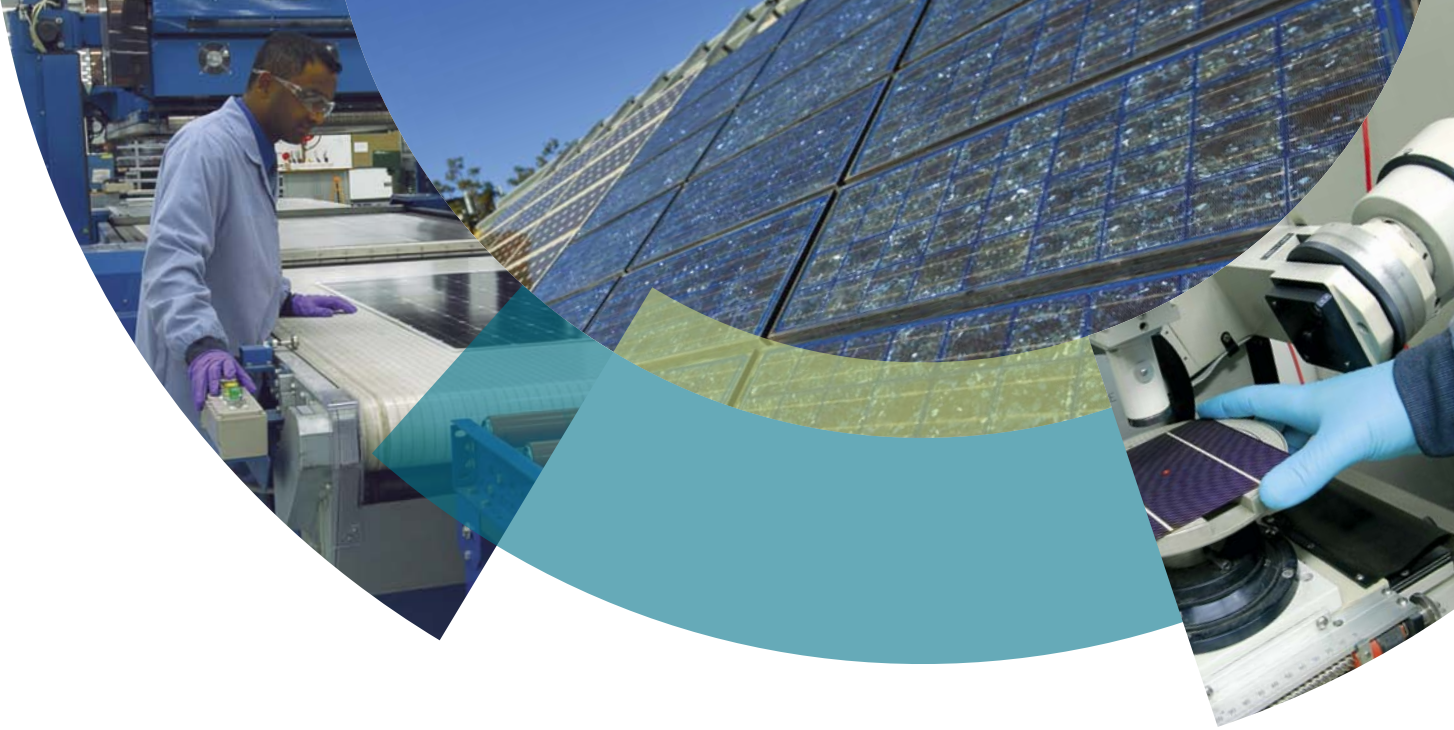
In addition to its engineered landfills, recycling facilities and transfer stations, SITA has Australia's largest range of advanced resource recovery technologies (ARRT) which assist councils and companies to minimise environmental impact, reduce costs and improve social responsibility. SITA is Frost & Sullivan's Asia Pacific 2009 Waste Management Company of the Year.

## SNOWY HYDRO

[www.snowyhydro.com.au](http://www.snowyhydro.com.au)

The Snowy Mountains Hydro-electric Scheme is a complex integrated water and hydro electric power scheme, comprising 16 major dams, 7 major power stations, a pumping station, 145 kms of inter-connected trans-mountain tunnels and 80 km of aqueduct.

Snowy Hydro is Australia's largest source of renewable power, providing around 40% of all renewable energy



that is available to the National Electricity Market, as well as providing fast response energy to power the peak demands of Sydney, Melbourne, Brisbane, Adelaide and Canberra.

### **SYDNEY WATER**

[www.sydneywater.com.au](http://www.sydneywater.com.au)

#### **Cronulla Sewage Treatment Biogas Project**

This is a Biogas renewable cogeneration facility located in Cronulla, NSW. Sewage wastewater is treated aerobically or anaerobically. The anaerobic process produces methane, which is collected and used to generate renewable power to meet approximately 10 per cent of the power requirements of the Cronulla Treatment Plant.

#### **Malabar Cogeneration Facility**

This facility located in Malabar, NSW uses recovered heat from cogeneration to heat raw sewage sludge feed to digesters. Digested sludge is de-watered and used for agricultural biosolids. Digester gas is burnt in engines. The electricity produced is treated as "green power" and is consumed onsite for the sewage treatment plant.

### **THE FIRE COMPANY**

[www.ecosmartfire.com](http://www.ecosmartfire.com)

Based in Mona Vale, NSW, The Fire Company is a highly innovative designer and manufacturer of bioethanol fireplaces which it exports to the world. Ecosmart fires are fuelled by eco-friendly denatured ethanol, a renewable, clean-burning liquid fuel derived from agricultural and forestry products. The product burns with a natural flame, and radiates enough heat to warm the average living space with over 90 per cent fuel efficiency. There is no smoke or harmful emissions so there's no need for a chimney, flue, vent or utility connection.

### **VEOLIA ENVIRONMENTAL SERVICES AND TRANSPACIFIC INDUSTRIES GROUP**

[www.earthpower.com.au](http://www.earthpower.com.au)

A joint venture between Veolia Environmental Services and Transpacific Industries Group is all about producing electricity from food waste. Their EarthPower facility can produce enough electricity to power around 2,500 homes when operating at capacity, saving approximately 90,000 tonnes of greenhouse gas emissions and producing granulated organic fertiliser – just from food waste.

### **VISY PAPER**

[www.visy.com.au](http://www.visy.com.au)

Visy is a privately-owned packaging, paper and recycling company. It operates a 17,000kW power plant at its Tumut Kraft Mill in NSW, which uses local plantation timber sawmill residues and pulp wood materials, supplemented by domestic and commercial wastepaper to generate "green" energy on-site.

### **WSN**

[www.wsn.com.au](http://www.wsn.com.au)

Now owned by SITA Environmental Solutions, WSN provides environmental services to the Greater Sydney area and operates the Eastern Creek Alternative Waste Technology facility for processing household waste. Eastern Creek uses the UR-3R process, designed to capture up to 100% of biogas produced.

**NSW TRADE & INVESTMENT,  
A DEPARTMENT OF THE  
NEW SOUTH WALES GOVERNMENT**

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