



# 2007 NSW / ACT Excellence in Energy Awards

## AWARD SUMMARIES

**Monday, 24 September, 2007  
5:30pm for 6:00pm Presentations**

Blake Dawson Waldron Function Room  
Level 36, Grosvenor Place  
226 George Street, Sydney  
(close to Wynyard Railway Station)

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# INTRODUCTION

24 September, 2007

Welcome to the AIE NSW & ACT Excellence in Energy Awards, 2007. We would like to thank you for participating in what we are confident will be a very successful function for the applicants, the AIE and our sponsors.

The Excellence in Energy Awards aim to recognise and reward those individuals and organisations that have made an outstanding contribution to the energy sector in NSW and/or the ACT.

The awards were open to individuals and companies involved in energy projects or activities that have a particular relevance to NSW or the ACT, and have been completed since 1 January 2002. The award applications were assessed by a panel of judges with a cross section of energy interests and experience, on each of the criteria listed below:

- Benefits to the community, including raising awareness of energy issues
- Innovation, as demonstrated by new products, processes and programs
- Efficient energy use in any sector
- Economic and environmental performance
- The human, natural and built environment.

Five awards will be offered in the following energy categories:

- **Energy in the Environment** – for improving the environmental performance of the industry
- **Achieving More with Less** – for promoting energy efficiency
- **Energy in Society** – for contributing to policy, law and the community
- **Innovation in Energy Science & Engineering** – for advancing technology
- **Young Achiever's Award** – for a young energy professional who has made a significant contribution to a project, activity and/or the general community

We would particularly like to take this opportunity to thank our sponsors, Austrian Energy & Environment, CSIRO, Cadden Crowe and our sponsor and hosts Blake Dawson Waldron whose generosity has made this function possible, and the Judging Panel for their time and effort. We also thank all the applicants for their involvement each of which were highly outstanding and encourage them to continue to strive for "Excellence in Energy".

Paul McGregor  
Chair  
AIE Sydney Branch  
On behalf of NSW & ACT Branch Committee

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### Excellence in Energy Awards 2007

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**Company:** *Individual*  
**Contact:** *Derek F Widley, OAM*  
**Project:** *Southern domestic reflectors and their application*  
**Category:** *Achieving more with less*

Southern reflectors are a new technology invented in Canberra around 2000 by the author, to enable otherwise unused free sunlight, heat and daylight to penetrate southern domestic windows at a calculated 47% efficiency and with no running costs (*refer to attached ANZSES 2006 paper*).

A few developmental models have been made, from which commercial models have now become available. They are applicable both to new house designs and as retrofits to existing houses, giving new life and extended usefulness to less-than-useful rooms.

The concept overturns about 6000 years of architectural design theory which has always assumed that sunlight is not able to penetrate windows facing away from the equator. This design limitation has meant that houses have always had room locations of differing values, depending largely upon solar availability.

This has meant that, in Australian cool temperate zones, broadly the area below the 30°S latitude, southern rooms in houses are traditionally colder and somewhat gloomy compared to northern rooms, leading to a reduced usefulness for the occupants in winter.

As sufficient sunlight can now penetrate both northern *and* southern windows, in effect enabling every room to receive sunlight for part or all of any sunny winter day, there is less need for east and west windows making terrace housing much more effective. This reduces heat losses and produces more economic construction.

The effects of southern reflectors not only assists better house design but has further ramifications upon site design and estate subdivisions, particularly with the increasingly tight planning created by economics and land availability - all of which makes terrace housing more appropriate for low-energy housing.

One further advantage, recognised by those who have installed southern reflectors, is that the psychological effect of penetrating sunlight gives incalculable benefit to the occupants in terms of human 'wellbeing'. Seasonally Adaptive Disorder could now be a thing of the past.

The southern reflector development has made the EcoSolar house possible - a design which incorporates the above advantages into a house for the 21st energy conscious century (*see supplementary pages describing the house*).

From the above it can be seen that a very simple concept can have significant physical and mental ramifications well beyond its eureka origin.

Derek F. Wrigley, OAM  
LFDIA, FRAIA, ARIBA, DA(Manchester)

Solar architectural consultant

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**Company:** *UTS*  
**Contact:** *Geoffrey Smith*  
**Project:** *Innovations in coatings and materials for energy efficiency*  
**Category:** *Innovation in Energy Science and Engineering*

A new paradigm in solar driven lighting, novel general lighting and display, along with new practical approaches to much improved thermal performance in buildings has been enabled by the work of Geoff Smiths group. Lighting and attractive visual surrounds are a core human need but the complexities of lighting science, and in particular the many difficulties in using our abundant daylight resource, especially in warm climates, has meant that there remains vast scope for better lighting in terms of energy efficiency, visual comfort, appeal and versatility. The DayRay light piping product recently presented at AusBuild and supported by a Commercial Ready grant from AusIndustry, is quite revolutionary and will not only improve the quality of building spaces but enable large energy savings.

The massive potential for novel paints and better windows in energy savings is also surprisingly poorly understood. Nanoscience has created new opportunities in lighting and thermal control and Geoff Smith has been one of the first to realise its potential for high performance, at low enough cost to become an everyday commodity as needed for large energy savings and 100's of millions of m<sup>2</sup> of product per annum. He has a unique understanding of the ability to fine-tune optical and thermal response of coatings and polymers using nano-systems. This he then utilised to make optimum use and control of the subtle combination of the solar spectrum, the atmospheric transmission spectrum, the spectral and glare response of the human eye, and the thermal emission properties of surfaces. These products are thus simple to look at yet intrinsically multi-functional.

His technologies are based on high level optical and materials science, customised to make the resultant products easy to produce and use, while visually attractive to ensure large markets. Geoff's perspective in this regard is rare, but important in making an impact. The result has been several exciting business opportunities for partner companies and a diverse range of products.

This work *lowers the energy used for lighting and air conditioning, while at the same time making working and living spaces more pleasant, enjoyable and healthy*. Energy saving products with intrinsic additional benefits mean the large market needed for very serious carbon emission reductions are more easily achievable. There is currently vast latent demand world-wide for affordable products like this. They are needed to help buy time for new sources of energy to be developed and their cost is attractive to developing countries. Many less developed nations lie in warm climate zones where these advances are of most benefit.

**Company:** *BHP Billiton - Illawarra Coal*  
**Contact:** *Patrick Booth*  
**Project:** *Illawarra Coal and WestVamp – mining for the future*  
**Category:** *Energy and the Environment*

#### **ILLAWARRA COAL AND WESTVAMP – MINING FOR THE FUTURE**

BHP Billiton Illawarra Coal is serious about reducing greenhouse gas emissions and it has a long history of successfully using waste coal mine methane gas for power generation.

The Company's \$30 million investment in the West Cliff Ventilation Air Methane Project (WestVAMP) takes its commitment even further and maintains its position as the industry leader in reducing greenhouse gas emissions from underground coal mining activities.

Rolled out with the support of an Australian Greenhouse Office contribution through the Greenhouse Gas Abatement Program, WestVAMP is capable of mitigating a significant portion of greenhouse gas emissions from operations, generating electricity at the same time.

#### **KEEPING THE MINE SAFE**

For almost two decades Illawarra Coal has been capturing and utilising the methane gas which, for safety reasons, is drained from coal seams prior to mining. The gas has been piped to gas engine power plants near the townships of Appin and Douglas Park since 1995, reducing the Company's annual greenhouse gas emissions by 2.5 million tonnes and producing enough energy to power around 60,000 homes each year.

However, not all the methane associated with the coal seam is able to be drained and small percentages of methane are present in ventilation air which is exhausted from the underground operations.

To address this, BHP Billiton Illawarra Coal, in partnership with international emission control specialist MEGTEC Systems AB, established a pilot plant at its Appin site to trial the use of VOCSIDIZER® technology to use methane in the ventilation air for electricity generation. The success of this pilot led to the establishment of WestVAMP which has a wide potential application for global methane abatement and power generation.

#### **THIS IS WHERE THE WESTVAMP PROJECT COMES IN**

WestVAMP, a new type of power plant, will use the extremely dilute methane in the ventilation air from West Cliff mine to generate electricity. It will use up to 20 per cent of the mine ventilation air to achieve a further reduction in greenhouse gas emissions for BHP Billiton Illawarra Coal of 250,000 tonnes of carbon dioxide equivalent every year – the same as eliminating emissions from 45,000 cars each year or producing enough electricity for 20,000 homes...or rather a lot of cows! (A cow emits 50-100 kilograms of methane each year while a coal mine shaft in comparison can emit some 50,000 tonnes of methane.)

Methane concentrations in mine ventilation air are typically less than 1.25 per cent by volume, which is not freely combustible with conventional combustion systems.

#### **How does it work?**

The technology is based on the VOCSIDIZER® technology pioneered by Swedish emission control specialist MEGTEC Systems AB. It works by merging two conventional technologies - emission control technology and a steam cycle power plant. The boiler process is based on flameless, single bed, regenerative oxidation in a unit called the VOCSIDIZER®.

WestVAMP converts low concentration methane to carbon dioxide and water vapour through an oxidation, or flameless combustion process. High efficiency heat exchangers recover the large levels of thermal energy released to produce high quality steam. This steam is used to drive a conventional steam turbine – generating six megawatts of electricity for use within the West Cliff mine.

**ILLAWARRA COAL IS MAKING THE LARGEST SINGLE CONTRIBUTION**  
Illawarra Coal's WestVAMP and its previous initiatives reduce the amount of methane that would otherwise have been vented directly to the atmosphere. By reducing greenhouse gas emissions by about 2.5 million tonnes of carbon dioxide equivalent each year during the past five years, Illawarra Coal provides the largest single contribution to greenhouse gas emission reduction in NSW.

**Company:** *Macquarie Generation*  
**Contact:** *Colin Duck*  
**Project:** *Low pressure turbine upgrade*  
**Category:** *Energy and the Environment*

During the years of 2003 to 2005 the Low Pressure (LP) Turbines at Liddell Power Station were retro fitted with modern designs. This was accomplished on programme and on budget and resulted in an increase in efficiency and capacity of Liddell Power Station, saving over 350,000 tonnes of CO<sub>2</sub> per annum.

A contract was established with Hitachi in 2001. The contract was for four sets of LP Turbines to be installed in each of Liddell's four units. Each set was to be installed in eight weeks and it was expected they would deliver an efficiency improvement of 3.0%.

The design of the turbine incorporated a range of innovative techniques in modelling to establish the optimum flow of steam through the turbine. This combined with modern manufacturing techniques allowed the turbine to be built to exacting dimensions.

Macquarie Generation, Hitachi and Alstom worked in an unofficial tri-party arrangement to ensure success. Each turbine was installed within the outage programme. The fixed-price contract was finalised within the original budget.

The replacement of the LP turbines resulted in an improvement in efficiency of Liddell Power Station of over 3.3%. It also increased electrical output of the station from 2000MW to 2060MW.

The improved design resulted in an extremely robust turbine. This significantly reduces the frequency of inspections and maintenance required.

The upgrading of the LP Turbines at Liddell Power Station reduces the emissions of CO<sub>2</sub>, a greenhouse gas, by over 350,000 tonnes per year. This results from a saving of over 180,000 tonnes of coal required to produce the normal annual output of the station. A reduction in water usage of over 400,000 tonnes per year is also achieved through the improved efficiency.

The increase in capacity of each unit provides greater energy security for the National Electricity Market. The extra 60MW provide essential spinning reserve to call upon if required.

**Company:** *The Australian National University*  
**Contact:** *Vernie Everett*  
**Project:** *2<sup>nd</sup> Generation sliver technology*  
**Category:** *Innovation in Energy Science and Engineering*

SLIVER Technology was conceived in 2000 by Dr Klaus Weber and Professor Andrew Blakers with financial support by the Australian Research Council and Origin Energy, and subsequently advanced in the Centre for Sustainable Energy Systems at The Australian National University with the recent development of a 2<sup>nd</sup> generation of SLIVER Technology.

SLIVER cells are long, narrow, thin mono-crystalline silicon solar cells capable of high (>20%) efficiencies. Rather than fabricating a single solar cell *on the surface* of a wafer, several thousand individual SLIVER solar cells are fabricated *within the volume* of a single wafer, allowing for better than a tenfold reduction in silicon usage, and a 20- to 40-fold decrease in the number of wafers processed. Research at The Australian National University has developed a 2<sup>nd</sup> generation of SLIVER Technology aimed at simultaneously reducing three of the four main cost areas (i) material costs, (ii) manufacturing costs, and (iii) module efficiency.

With 59 distinct processing steps, the 1<sup>st</sup> generation of SLIVER Technology was longer, by a factor of 3, than sequences for conventional cells. We have developed a simplified sequence of only 32 steps, which utilises fewer pieces of equipment, to fabricate SLIVER cells with efficiencies exceeding 20% using the 2<sup>nd</sup> generation ANU SLIVER Technology optimised cell-processing sequence. We believe 22% lab efficiencies, with production efficiencies of 21% are possible.

A SLIVER module contains between 5,000 and 10,000 cells per square metre, compared with 60 to 80 conventional solar cells. Obviously, a radically different assembly process is essential to process in the order of 150 SLIVER cells per second, 24/7, 360 days per year. It is a significant engineering challenge to devise a method for separating, testing, binning, assembling, and electrically interconnecting this very large number of solar cells in a rapid, reliable, and cost-effective manner.

Our sub-module approach provides a simple means for the low-cost separation, handling, assembly, and electrical interconnection of groups of SLIVER cells to form a conventional solar cell analogue called a "Raft", comprising planar arrays, comparable in size to a conventional solar cell, of SLIVER cells fixed to a supporting medium which can be transparent or opaque, flexible or rigid. SLIVER Rafts can be produced at high speed using low cost equipment and entirely conventional materials, without pick & place systems, vision systems, or robots. High-efficiency sub-assemblies, called "Sheets", constitute abutting adjacent cells providing 100% area cover sub-modules.

Sheets and Rafts can use solder, deposited by a wide variety of methods, to form the electrical interconnections as well as providing the mechanical structural support for the sub-assembly. Pilot demonstrations produce reliable, uniform connections at the rate of several hundred per second. Soldered Rafts and Sheets provide an elegant solution to the most difficult challenge.

We have demonstrated the broad framework for a complete 2<sup>nd</sup> generation of SLIVER Technology. Using high-efficiency SLIVER cells the 2<sup>nd</sup> generation of SLIVER Technology incorporating the Rafts and Sheets process can: Cut the cost of SLIVER handling and assembly equipment by an order of magnitude; Increase SLIVER cell throughput by an order of magnitude; Dramatically simplify assembly and handling processes, with commensurate increases in yield; Modularise the

process-line operational flow, providing easy line balancing, buffered line input and output stages; Establish electrical connections at a rate at least two orders of magnitude faster than prior art methods; all in a simplified process, and at dramatically reduced cost compared with earlier processes.

**Company:** *Energetics Pty Ltd*  
**Contact:** *Meg Wrixon*  
**Project:** *Energetics' One-2-Five® continuous improvement approach to energy and environmental management*  
**Category:** *Achieving more with less*

Nine years ago, Energetics took its first steps to transform the traditional, technically focused approach generally used in energy savings programs for businesses and government. The company developed a continuous improvement, business-based process for managing energy.

This 'One-2-Five®' approach integrates with, and parallels, the methodology of processes already used widely by business to manage quality, safety, environment and reliability. Today, Energetics continues to build and refine management commitment and planning tools like One-2-Five®, business practice benchmarking and implementation tools. The tools support organisations to prioritise, plan and improve key aspects of their energy supply and usage. Further, One-2-Five® has been transformed to help businesses manage their water, waste and sustainability using this integrated business management approach.

Though initially designed for large organisations, Energetics has also created a tool applicable for small to medium sized businesses; the 'Achiever®' range of sustainability management products.

The tool has proven itself effective in securing top level management buy-in. The One-2-Five® process supports organisations to build competency in managing energy and the environment; i.e. teach the person to fish, rather than just supply them with fish (or rebates). The process guides companies to set operational staff accountabilities, performance metrics (and rewards), and establishing formal practices and training. It assists them to identify new cost and environmental savings in their day-to-day operations, driving down costs and changing business culture.

Also, by addressing equipment procurement and new design procedures, the methodology ensures that opportunities to improve environmental efficiency in the investment cycle are captured. The traditional technical audit becomes an early stage informational tool to identify low hanging fruit in this integrated and holistic change management process.

Even though this approach is not unusual in organisations for managing other business inputs, the methodology marked a radical departure from orthodoxy within the energy industry. Energetics has had to evangelize the approach, often battling strongly embedded resistance from an industry focused on hardware fixes and financial incentives.

Despite this, in the past nine years, One-2-Five® diagnostics have been implemented directly by organisations, as well as through energy utilities and government agencies for use in their environmental management programs.

The One-2-Five® continuous improvement approach to environmental management is now included in Australian State and Federal government regulatory programs to manage energy and water. For example, continuous improvement management reviews are a requirement in the NSW ESAP and WSAP programs as well as the Federal Energy Efficiency Opportunities Program. To date, over 50 sites across NSW have used One-2-Five® Energy to conduct ESAP energy management reviews and the tool has been used by around 30 sites within the EEO program to baseline energy management systems at a corporate level and as part of site continuous improvement processes.

In this award application, Energetics will provide examples of how the One-2-Five® family has been used by two NSW Government agencies and many large businesses to successfully manage energy, water, waste and sustainability. The projects covered are from NSW only, but it should also be noted that Energetics' continuous improvement approach used by many leading organizations across Australia and globally.

Since its launch in 1998, the One-2-Five® continuous improvement process has continued to pave the way for effective management of energy, water, waste and sustainability. Overcoming initial scepticism, Energetics' leadership has transformed the way many organisations now manage their environmental risks. Due to the remarkable results achieved, business-practice focused, continuous improvement approaches to environmental management are now becoming a mainstream throughout Australia and globally.

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**Company:** *Mirvac*  
**Contact:** *Shauna Coffey*  
**Project:** *GridX Tri-Generation System at Mirvac Vision Estate  
Glenfield, NSW*  
**Category:** *Achieving more with less*

Traditional energy practices around the World are coming under increased scrutiny in respect of efficiency, security of supply and impact on climate. As concerns increase, innovation in more cost-effective, reliable and low emission energy technology is necessary in the immediate term to minimise the effects of climate change.

In a World first, Mirvac and GridX Power have pioneered a new approach for the mass replicable housing industry at Mirvac's Vision Estate at Glenfield, New South Wales.

Vision Estate, situated in Sydney's South-West, was launched in April 2007. This ground-breaking development uses tri-generation, a system producing electricity, heating and cooling from a single low-emission source which reduces greenhouse gas emissions by 33% compared with coal-fired electricity.

The GridX System consists of three on-site natural gas-fired generators, supplying electricity to 16 homes connected to a MiniGrid. Waste heat from the generators is harnessed to provide spatial heating for homes, along with the hot water system and a range of specially designed hydronic appliances. These appliances exhibit outstanding efficiency compared with traditional electricity alternatives.

Also installed at the site are super-efficient Turbocore chillers, designed to out-perform traditional inverted chillers. These chillers, also powered by the GridX on-site gas generators, are used to chill water for use in spatial cooling, while providing electricity reductions of over 26%.

Integral to the success of the system is its cost. Homes at Vision Estate come at no extra cost to buyers, compared to standard electricity grid-connected housing. In fact, the system guarantees efficiencies in electricity use, along with ongoing savings on energy bills – fixed at 10% below market price. Indeed even the hydronic appliances are provided at no additional cost. Costs for the estate are recouped through electricity sales to home owners and supply of cleaner energy back to the national electricity grid. The absence of an additional cost to the home owner for 'being green' is particularly significant in an industry where innovation is often constrained to ensure housing affordability.

Overall, the GridX System delivers an immediate 33% reduction in greenhouse gas emissions, and an energy conversion efficiency of 80%, at no cost to the home owner. Across the entire Vision Estate, GridX expects to achieve CO<sub>2</sub> emissions reduction of 300 tonnes in 2007; equivalent to removing 67 cars permanently from our roads each year.

The technology's key strength is that it is not limited to the residential housing sector, but has application on a larger scale to the broader property sector, and indeed the broader community. In fact, Mirvac is considering the application of

the technology for mass housing development in a number of urban and remote locations around Australia.

According to the World Business Council for Sustainable Development, the built environment comprises 40% of all CO<sub>2</sub> emissions worldwide with the residential property sector contributing 67% and commercial property sector 33% respectively. Considering this, the application of the GridX System on a broader scale has enormous potential to achieve emissions reductions.

**Company:** *NSW Department of Planning*  
**Contact:** *Jason Veale*  
**Project:** *BASIX, The NSW Government Building Sustainability Index*  
**Category:** *Energy in Society*

BASIX, the NSW Government's Building Sustainability Index  
NSW Department of Planning

BASIX, the Building Sustainability Index, is a web-based sustainability assessment tool that became compulsory for all new homes submitted for building approval in New South Wales from 1 July 2005, new multi-unit developments from 1 October 2005 and major new renovations from October 2006. It has been operational for new homes in Sydney since its introduction on 1 July 2004.

BASIX requires new homes, multi-dwellings, dual occupancy, villas and townhouses to use up to 40 percent less mains water (depending on location) and produce up to 40 percent less greenhouse gas emissions compared to the average NSW per capita benchmark. Once the design passes the specific targeted reduction below the benchmarks, the user is able to print a BASIX Certificate and can then submit this, with the development application, to council.

In addition to BASIX for new homes, the BASIX tool for multi-unit dwellings is vastly more detailed, covering a broad range of technologies and applications appropriate to developments of this size. The tool takes into account such details as central systems and common areas, car parks, pools, gymnasiums, spas, saunas and other communal facilities, lifts, on-site water recycling as well as heating, ventilation and air-conditioning systems. This ensures that the BASIX tool can be used for all types of multi-unit developments.

From the start, BASIX has distinguished itself as a radical departure from other residential environmental planning approaches.

Unlike most previous efforts, the BASIX tool:

- Supersedes all other water and energy sustainability requirements for new dwellings, setting one standard across NSW;
- Is web-based and adaptable;
- Is free and available for use 24-hours a day, seven days a week;
- Is based on real water and energy use and climatic data;
- Is flexible, allowing home builders to determine how they will meet the prescribed water and energy-saving targets;
- Is based on consultation with essential stakeholders across the state from the building industry to green groups;
- Sets equitable regionally-adapted water targets that reflect real environmental conditions state-wide;
- Can be monitored to show specific deliverables over time;
- Is adaptable, permitting new sustainability criteria to be added when needed;
- Can be used by other states and/or internationally based on a range of sustainability criteria.
- Addresses the intense energy use of many multi-unit developments;
- Encourages developers to speed the uptake of sustainability enhancing technologies not currently in use in Australia

After more than three years of application in Sydney, two years for all new single dwelling and dual occupancies in NSW, and almost two years of application to multiunit developments, BASIX has demonstrated its value as a unique and groundbreaking

approach to sustainable planning with the potential to be used on a much greater planning scale internationally in the future. Over the next ten years, BASIX for new residential developments in NSW is expected to save an estimated 7.5 million tonnes of greenhouse emissions and 240 billion litres of water.

**Company:** *Macquarie Generation (2)*  
**Contact:** *Errol Burton*  
**Project:** *Bayswater water treatment plant project*  
**Category:** *Energy in the Environment*

Macquarie Generation is currently embarking on a major project to upgrade the capacity and efficiency of its water treatment plant at Bayswater Power Station. On completion, the project will deliver improved water use efficiency, more efficient water treatment, and improvement in the water quality in Lake Liddell, which is one of Macquarie Generation's main water storages.

This project is submitted for consideration by the Australian Institute of Energy for the Excellence in Energy Awards in the categories of:

- Energy and the Environment
- Achieving More with Less
- Energy in Society

The project is expected to generate significant environmental benefits by improving water quality within Macquarie Generation's area of operation as an electricity generator and reducing the salt load in an extended reach of Hunter River.

The project will deliver more efficient water treatment with the introduction of new technologies which require less energy to operate. In addition, it will improve the efficiency of chemical usage for water treatment, i.e. less chemical will be required per mega litre of treated water produced.

Energy production requires significant quantities of water, which is a significant social issue particularly during periods of drought. This project will enable significant quantities of water to be saved by reducing water usage for salinity control and by reducing the quantity of water in waste streams.

**Company:** *Austrian Energy & Environment Australia*  
**Contact:** *Graham Lowry*  
**Project:** *Conversion of a large steelworks coal fired boiler to blast furnace gas firing*  
**Category:** *Energy and the Environment*

Austrian Energy and Environment Australia (AE&E) have recently completed a conversion and efficiency upgrade of a large steelworks boiler from Coal and Coke Ovens Gas firing to Blast Furnace Gas firing giving the following benefits:

- Reduction in CO<sub>2</sub> emissions in excess of 400,000 tons/year.
- Reduction in NO<sub>x</sub> and SO<sub>x</sub> emissions from the combustion process by an order of magnitude
- Saving of around 100,000 tons/year Coal
- Allowing 250 GJ/h of Coke Ovens Gas to displace Natural Gas in the steel mill.
- Improved efficiency, operation and safety

Blast Furnace Gas is a low heating value by-product of the steelmaking process, and by burning the Blast Furnace Gas in the boiler, energy is recovered which would be enough to provide power for around 35,000 people. Prior to the conversion, this energy was lost by flaring the fuel to atmosphere.

AE&E with over 100 years of local experience and a dedicated team of engineering and project staff was able to complete the project from concept design through to detailed design, supply, construct and commissioning all the major components which included 8 large multi-fuel burners and associated piping and equipment, an economiser to reduce the fuel consumption, and upgraded controls and combustion safety system to meet modern requirements.

This project is typical of AE&E dedication in providing solutions to the power industry to improve the environment while maintaining lifestyle and economic prosperity

**Company:** *GridX Power Pty Ltd*  
**Contact:** *Craig Chambers*  
**Category:** *Young Achievers*

#### Personal Summary

Craig has more than 10 years working experience in energy industries in Australia and overseas. He has an in depth knowledge and skills associated with the technological aspects and business operations of electricity generation, transmission, distribution and retail as well as knowledge of natural gas reticulation including skills in energy project management. He also has a detailed understanding of the legislative obligations applicable to electricity generators and to a retailer of electricity and gas including the necessity for customer service standards to comply with legislative requirements. Craig has a sound understanding of structuring emissions revenue strategies, as well as skills for successfully managing and obtaining grant funding from the Sustainable Energy Development Authority and START Grant Governmental organisations.

Craig and Colin established GridX Power in 2001 for bringing sustainable energy and environmental solutions to Australian community. It is worthwhile to mention that resulting from the commitments of Craig Chambers for addressing environmental solutions for Australian electricity industry, GridX has become the proud winner of the 2007 Banksia Climate Award.

Pioneering Distributed Generation in the Australian market place, Craig has contributed in building the only tri-generation system within a residential estate in Australia, if not the world. Craig has also contributed to the changing and setting distributed generation licensing frameworks within NSW. He is one of the proud employers in Australian energy industry.

Craig has obtained a Master of Engineering from University of Technology Sydney, a Graduate Diploma in Sustainable Development from Macquarie University, and a Bachelor of Commerce from University of Sydney.

**Company:** *University of Technology, Sydney*  
**Contact:** *Angus Gentle*  
**Category:** *Young Achievers*

#### Personal Summary

Angus Robert Gentle is completing his Ph.D. at the Institute of Nanoscale Technology, University of Technology Sydney, Australia. He completed a double degree in Applied Physics and Electrical Engineering and an Honours degree in physics at UTS. His research is focused on preparing and characterizing novel composites and nanostructured coatings whose optical resonant phenomena can be precisely tuned at low cost to control the visible, solar and thermal radiation properties of roofs, walls, windows and skylights. He is already an author on more than 10 refereed journal and conference papers. His work has contributed to significant and exciting advances in solar control and radiative cooling for windows and paints and has aroused significant international interest. New approaches to active and passive cooling have been identified. His work has included modelling and simulation, sample production, thermal and optical characterisation, and verification of the performance of the various solar control technologies in prototype installations. Innovative aesthetics is integrated into some of his coatings to enhance their appeal and hence energy savings impact.

**Company:** *Austrian Energy & Environment Australia*  
**Contact:** *David Reynolds*  
**Category:** *Young Achievers*

#### Personal Summary

I am a Mechanical Engineer with a passion for the energy industry. Upon graduating, my first few years as an Engineer were spent designing pressure equipment, largely for clients in the energy industry.

Following this, an opportunity arose to make a significant contribution to the energy industry via a PhD project in the Solar Thermal Energy field. My research involved developing the transient thermal and hydrodynamic model for a novel Solar Thermal Collector concept. I am proud to say that my research is employed on the CLFR Solar Thermal Collector recently installed at Liddell Power Station in the Hunter Valley, and the technology is currently being promoted around the world.

Having completed my PhD, I sought work in the Energy industry and am currently employed as a Senior Design Engineer with Austrian Energy and Environment (Australia). This role involves me in industrial power projects within Australia and Asia.

My future goal is to become more heavily involved in the Energy industry, particularly in energy policy debate and involvement in organisations such as the Australian Institute of Energy.

Whether the drivers are economic or environmental, the Energy industry is set to undergo dramatic changes in the next few decades. Change brings with it exciting new opportunities, and I look forward to being part of the Energy industry in some capacity through this era.

**Company:** *University of Sydney*  
**Contact:** *Andrew Harris*  
**Category:** *Young Achievers*

#### Personal Summary

Dr Andrew Harris (33) is a lecturer in Chemical and Biomolecular Engineering at The University of Sydney and foundation director of the Laboratory for Sustainable Technology, a multidisciplinary research group of 24 (including 10 PhD students), whose objective is to create products and processes that maximise resource and energy efficiency, eliminate waste and cause no harm to the environment. He has active research programmes in renewable energy, the hydrogen economy, zero emission process design and large-scale carbon nanotube synthesis, and since 2004, has raised more than \$2.7 million in competitive funding to support this work. Andrew consults widely to industry, both in Australia and overseas, and is the cofounder of two start-up companies. He considers his most important work to be his contribution to the BioRegional MiniMill, a regional scale, sustainable pulp and paper technology. The MiniMill was described by the WWF as a “visionary approach to sustainable paper production”, and in 2007, won the Observer Magazine’s “Ethical Invention of the Year1” from more than 7000 entries.

Andrew received his PhD from the University of Cambridge in 2002 and is a Chartered Engineer and member of IChemE, Engineers Australia and the AIE. He has won more than 25 awards and prizes in his career including the 2006 Shedden Uhde medal as the leading early career chemical engineering in Australia and New Zealand.

<sup>1</sup> <http://observer.guardian.co.uk/magazine/story/0,,2097418,00.html>

**Company:** *Origin Energy*  
**Contact:** *Mary Whyte*  
**Category:** *Young Achievers*

#### Personal Summary

I am 25 years old and currently live in Randwick - although I hope shortly to buy a house somewhere in Sydney's beautiful eastern suburbs. I live a day's drive from my hometown on the NSW south coast, where my family still lives on a beachside farm I still refer to as home.

In 2004 I completed an Engineering Degree in Photovoltaic and Solar Energy at UNSW as part of the first graduating class in that specialty. This course was a first of its kind in Australia, championed by many of Australia's energy gurus from throughout the UNSW Engineering Faculty.

When I am not working I am a keen horse rider (although living in Sydney makes this passion difficult!), devoting time to the NSW Horse Trials Council as a Judge. Alongside my dad and my twin sister I helped develop the Mirrabooka Horse Trials, an annual event which provides an opportunity for people of all experiences to compete in a safe and competitive environment. I am also a keen soccer player and reader, attending when possible the 'Literary Feast' book club. I also love to travel to new places, with New York on the list for later this year!

**Company:** *University of Newcastle*  
**Contact:** *Renu Kumar Rathnam*  
**Category:** *Young Achievers*

#### Personal Summary

I have great passion in researching and innovating something in the energy sector. To begin with I started my undergraduate project in Solar energy. Solar energy along with other renewable energy sources can meet a greater portion of energy demands in countries like Australia. I learnt about renewable energy sources and that encouraged me to do my Masters project on fluidised bed combustion of Biomass fuels. Many European countries focus on using biomass for power generation and heating purposes. I had a wonderful experience working for my Masters project. My research on fluidised bed combustion of Casuarina wood introduced new data for modelling wood combustion. While renewable energy technologies might play a significant role in the future, current research needs are focussed towards using existing coal-based thermal power plants with drastic reduction in CO<sub>2</sub> emissions. I am currently working towards my PhD on the reactivity of pulverised coal under oxy-fuel combustion conditions. This is a current topic of high interest. My experience and passion have encouraged me all the way to achieve something in the energy sector and take up a career in the same sector. I have a great sense of contribution to the development of new energy technologies and this is just the beginning of my career.