

# Perspectives

ON BROWN COAL

JUNE 2012 – ISSUE 2

OFFICIAL NEWSLETTER OF BROWN COAL INNOVATION AUSTRALIA

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## CEO'S UPDATE



Dr Phil Gurney  
BCIA CEO

### Low Emissions Developments

Australia's brown coal resources are vast – almost half of all Australia's coal is brown coal - and yet, if we are to use these resources in an emissions-constrained world, we will need to develop and adapt technologies to enable cost effective CO2 reductions.

Victoria's massive coal reserves, low mining cost and recent Government announcements have led to significant international interest in Australian brown coal developments.

This was demonstrated at the Second International Low Rank Coal Symposium, held in Melbourne in April, which attracted representatives from 23 low rank coal using countries.

BCIA is seeking to build and extend international cooperation in R&D for environmentally responsible coal use – the Japan Coal Energy Centre (JCOAL) is a member of BCIA, and a number of international organisations are taking part in our research program.

Research collaboration with the EU should soon receive a boost with a recent EU announcement regarding a funding mechanism designed to build cooperation with Australia on carbon capture technologies. My trip to the USA in June also confirms that there are significant synergies between the research agendas that are being pursued there and here.

In this issue of Perspectives on Brown Coal, we highlight two projects that BCIA is co-funding in the area of emissions reduction. CO<sub>2</sub> separation from gas streams is a proven technology that has been applied in the natural gas processing industry for years.

However to apply this technology to the capture of CO<sub>2</sub> from power station flue gas will require scale-up, cost reductions and also consideration of a safe working regime for capture solvents. Alicia Reynolds details some of the initial work being undertaken on her PhD program in this area.

Lian Zhang provides an update on an alternative low-emissions technology, oxy-combustion, that can produce an almost pure stream of CO<sub>2</sub> without the need for solvents. This work is being funded by BCIA through our partnership with ANLEC R&D and the project includes partners from Australia, China and Japan.

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## FUNDING

### Global Funding Opportunities - Science and Industry Endowment Fund

**Documentation relating to Science and Industry Endowment Fund (SIEF) Research Projects, Stage one Expression of Interest (Eoi) is now available, with a deadline of 23 July for submission for the latest round of funding.**

The SIEF provides grants to science and scientists for the purposes of assisting Australian industry, furthering the interests of the Australian community and contributing to the achievement of Australian national objectives. In 2009, the funding arrangement received a substantial gift from CSIRO facilitating the rejuvenated Fund to be a mechanism for significant support of science in Australia.

Priority areas have been identified for Round 4 Research Projects to ensure that projects funded by SIEF are addressing a broad spread of national challenges for Australia and across SIEF's Special Purpose areas. These are:

- Plant and Animal Production and Primary Products;
- Mineral Resources;
- Energy;
- Manufacturing;
- Construction;
- Transport; and
- Information and Communication Services.

All proposals for Research Projects must align with the SIEF Primary Purpose and at least one Special Purpose Area as well as with the priorities of the requesting institution.

The SIEF Special Purpose Areas (SPAs) relevant to SIEF Research Projects are Emerging Science, Strategic Science and Supporting Science, which fall within the SIEF Primary Purpose. These SPAs represent different stages of development/maturity of the science being undertaken.

The aim is that Research Projects funded by SIEF address a broad spread of development stages, and therefore a strong preference will be given to the SIEF SPA of Supporting Research (SUR) for Round 4 Research Projects, with some scope for support in the Emerging Research SPA should outstanding proposals be received.

Eligibility is extended to national and international\* universities, other Publicly Funded Research Agencies (PFRA), and other research focused institutions, (\*subject to the funded research meeting the SIEF Primary Purpose of benefit to Australia) with collaborative proposals preferred.

The funding grants for research projects will be up to the value of \$1-2 million per annum for a term of 3-5 years with proponents encouraged to co-invest resources (may be as in-kind).

More information regarding priority areas, preferred Special Purpose Areas, other eligibility criteria, assessment criteria and the EoI form is available at the SIEF Research Projects webpage:

[www.sief.org.au/FundingActivities/Research-Projects.html](http://www.sief.org.au/FundingActivities/Research-Projects.html)

**The closing date for Round 4 of the Science and Industry Endowment Fund (SIEF) is 23 July 2012.**

SOURCE: Science and Industry Endowment Fund website

## Global Funding Opportunities - Work Program for the FP7-Energy-2013

The European Commission's 2013 work program for the FP7-Energy-2013 call will soon be published.

The European Union (EU) must follow a special procedure to fund projects (around 1 year between publication of the call to start of projects) and therefore the EU FP7 energy research program is implemented through annual work programs.

Each work program includes research topics and is implemented with open and competitive calls for proposals (published) with a peer-review carried out by independent experts.

Early in December last year, an expert team from the EU visited Australia on a fact finding mission to identify cooperation possibilities between EU and Australia within carbon dioxide capture and storage (CCS).

The EU team met with Australian counterparts and discussed topics of mutual interest for twinning arrangements suitable for future calls of the EU Framework Program of Research and the corresponding mechanisms for R&D support in Australia; further discussions followed.

As a result, the EU-Australia twinning topic 'ENERGY.2013.5.1.2: New generation high-efficiency capture processes' was included into the work program.

The draft 2013 work program is published on the EC's Participant Portal under FP7 Documents/Orientation Papers 2013/Cooperation. Calls for proposals are expected to be published in July with a project start in 2013.

More information on the EC's 2013 work program for the FP7-Energy-2013 call can be found by visiting their website: <http://ec.europa.eu/research/participants/portal/page/home>

SOURCE: European Commission's website above

## RESEARCH



### Pilot-Scale Oxy-Fuel Combustion of Victorian Brown Coal

By Dr Lian Zhang, ARC Future Fellow, Department of Chemical Engineering, Monash University

Oxy-fuel combustion is a process of burning coal in the mixture of high purity oxygen and recirculated flue gas (RFG) to deliver a CO<sub>2</sub>-rich gas stream that is ready for direct storage/sequestration. It has the potential to be more cost-effective than existing subcritical brown coal-fired boilers coupled with CO<sub>2</sub> capture by amine solvents.

In Australia, commissioning of the first stage of a pilot-scale 30MW black coal oxy-fuel boiler is under way at the Callide A power station in central Queensland. In the USA, the FutureGen 2.0 project is committed to commencing a 200MW full-scale oxy-fuel plant by 2014-18.

Monash University has been a leader of research in the oxy-fuel combustion of Victorian brown coal since 2007. Our current project with BCIA involves collaboration with a Chinese boiler manufacturer (Shanghai Boiler Works Co Ltd), three local power generators (TRUenergy Australia and IPHR-GDF SUEZ Australia (Hazelwood and Loy Yang B)), and two international research institutes (Chubu University, Japan and Shanghai Jiao Tong University, China).

One of the challenges of Victorian brown coal is its high moisture content, typically 60-65% by weight. As a result, brown coal-fired boilers are typically 2-3 times larger than black coal boilers of the same capacity, and are thus more expensive. They also produce more greenhouse gas emissions, for example, ~1300kg-CO<sub>2</sub>/MWh-electricity sent out, compared to ~900kg-CO<sub>2</sub>/MWh for Australian black coal-fired power plants.

Oxy-fuel combustions has great potential to improve the efficiency and cost-effectiveness of power generation from Victorian brown coal. For example, *Figure 1* shows that using a high oxygen fraction, such as 30%, with a coal containing 65% moisture, can reduce the flue gas volume by 50%. Such a dramatic reduction helps reduce the boiler size and capital cost.

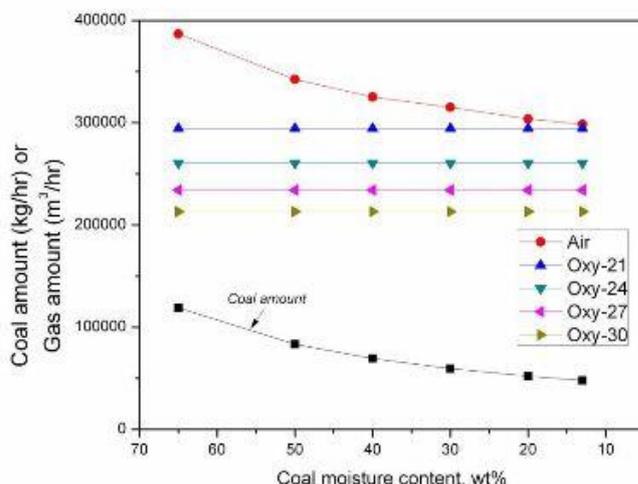


Figure 1. Coal and flue gas amounts for a 100 Mwe oxy-fuel boiler as a function of coal moisture content

With oxy-fuel combustion, the high moisture content of brown coal can even be an advantage, since the steam produced can function as a diluting agent, and hence, the recycle ratio for flue gas can be as low as 20% to achieve an oxygen content of 30% in inlet gas, see *Figure 2*.

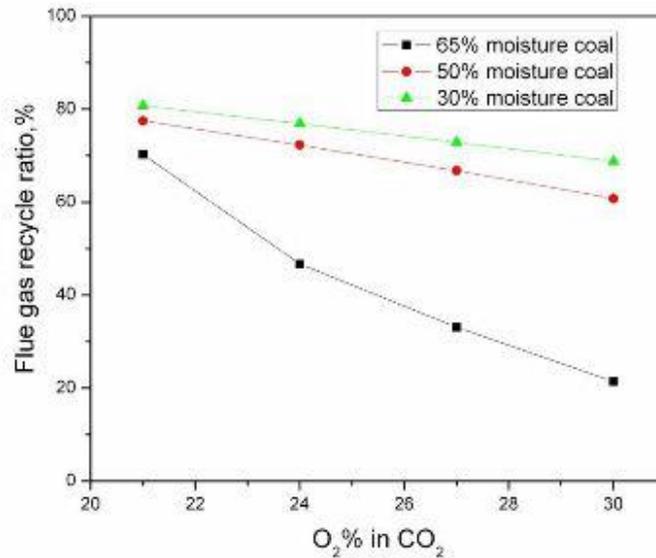


Figure 2. Flue gas recycle ratio as a function of coal moisture content and O<sub>2</sub> fraction

More importantly, the oxygen-enriched gas atmosphere in an oxy-fuel boiler ensures a more efficient combustion of brown coal, creating efficient, high-temperature supercritical/ ultra-supercritical conditions, which helps to offset the energy penalty of oxygen production.

We have found that Victorian brown coal burns very efficiently under oxy-fuel conditions. *Figure 3* illustrates typical flame propagation results, showing that oxygen concentrations of around 30% result in stable combustion.

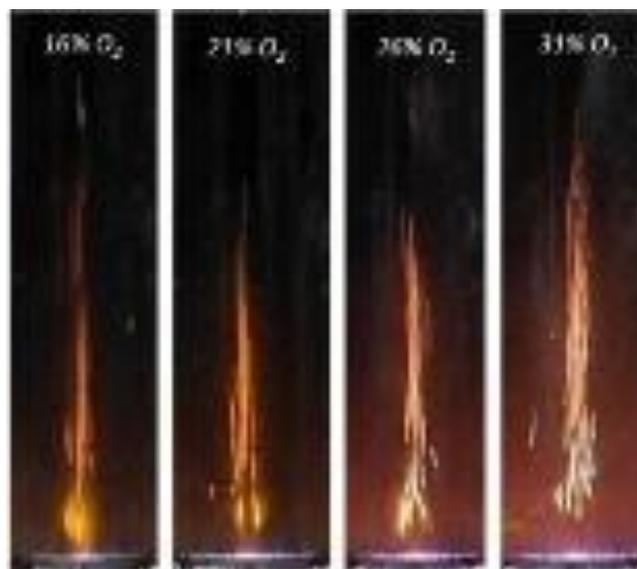


Figure 3. Flame pattern for wet coal (30 wt% moisture) burning in oxy-fuel mode

# PERSPECTIVES ON BROWN COAL

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Working with our project partners, we plan to demonstrate the feasibility of oxy-fuel combustion of Victorian brown coal at pilot scale. We have already shipped bulk samples of brown coal from three mines in the Latrobe Valley to our collaborators in China and Japan. Pilot-scale boiler trials will be conducted in a 3MWh boiler at Shanghai Boiler Works (*shown in Figure 4*) in August/September this year.

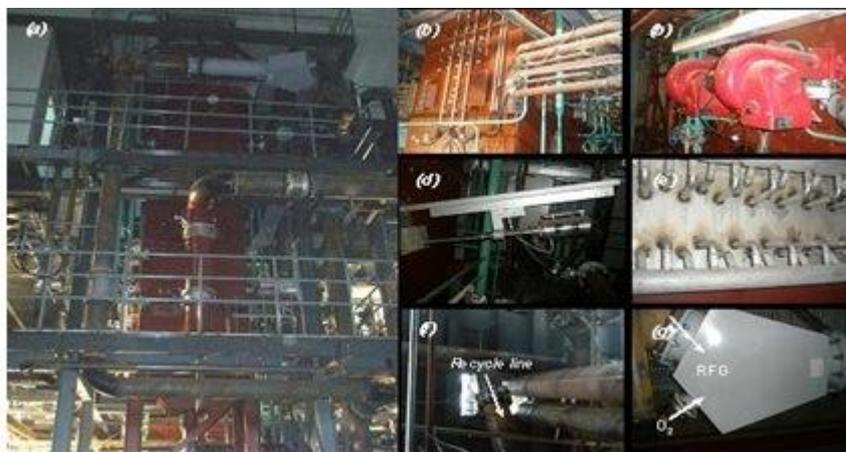


Figure 4. Photos of the 3MW pilot-scale facility. From (a) to (g) are front view of furnace, bottom four coal-fired burners with sampling /measurement of gases/particle above them, natural gas burners, flame TV supervision device, convective heat exchanger, flue gas recycling pipelines and mixer of O<sub>2</sub> and RFG

These tests will help us to better understand the combustion characteristics of both dry and wet brown coal in oxy-fuel mode. We will be looking at potential pollutant emissions and their control requirements, as well as ash deposition, fouling and slagging propensity during operation. By working closely with local power generators and a major oxy-fuel boiler manufacturer, our project will support the commercialisation of this low emissions technology in Victoria.



Positioning brown coal for  
a low-emissions future

## Update from BCIA Postgraduate Research Scholars

BCIA's annual program of postgraduate research scholarships is part of our commitment to strategic investment in skills development to secure the scientific, engineering and trades expertise required for the development of new low-emissions brown coal technologies.

To date, BCIA has awarded six research scholarships to PhD candidates at top-ranking Australian universities. In the last edition of Perspectives on Brown Coal, Adam Rady from Monash University provided an update on his project titled 'Evaluation of Victorian Brown Coal as Fuel for Direct Carbon Fuel Cells (DCFC)'.

This month, Alicia Reynolds, a BCIA scholarship recipient from Monash University provides the following update on her project: 'Understanding the Effects of Post-Combustion CO<sub>2</sub> Capture on the Environment'.

## Understanding the Effects of Post-Combustion CO<sub>2</sub> Capture on the Environment

By Alicia Reynolds, Monash University PhD Candidate and BCIA Research Scholar



Globally, brown coal-fired power stations are an important source of reliable, secure and affordable electricity. CO<sub>2</sub> Capture and Storage (CCS) is one of the technologies that is currently being developed to reduce CO<sub>2</sub> emissions and associated environmental consequences, while also maintaining energy security and reliability. Both the International Energy Agency and the Intergovernmental Panel on Climate Change have identified CCS as an important technology for reducing anthropogenic greenhouse gas emissions in the medium term. Research teams around the world are working together to maximise the efficiency, effectiveness and safety of the technologies available for capture, transport, utilisation and storage of CO<sub>2</sub>.

The most matured technology for separating CO<sub>2</sub> from flue gases generated by coal-fired power station is Post-Combustion Capture (PCC) by chemical absorption in aqueous amines. This process was originally patented in the 1930s and is an established process for separating acid gases (including CO<sub>2</sub>) from natural gas. More recently, a number of pilot plants established around the world have demonstrated that chemical absorption with aqueous amines is suitable for separating CO<sub>2</sub> from flue gas generated by coal-fired power stations. A significant advantage of this PCC technology is that it can be retrofitted to brown coal-fired power stations.

One major complication is that oxygen, SO<sub>x</sub>, NO<sub>x</sub> and residual fly ash present in coal-fired power station flue gases are capable of degrading aqueous amines solvents. Four main degradation pathways have been identified in laboratory experiments: reactions with SO<sub>x</sub> to form corrosive, heat-stable salts, oxidative degradation, carbamate polymerisation and thermal degradation. These reactions reduce the efficiency of the aqueous amine solvent and create a challenge for waste solvent treatment that needs to be effectively managed.

While many of the solvents currently used for PCC are also safely used as stabilisers in cosmetics, anti-corrosion agents in boiler water and for industrial gas treatment, it is important that any potential risks to the environment are identified and mitigated before PCC is widely deployed for capturing CO<sub>2</sub> from coal-fired power stations. To ensure that PCC is deployed safely, the following questions are being addressed by researchers worldwide:

- What compounds are likely to be emitted to the atmosphere in the CO<sub>2</sub> depleted flue gas? What treatment and monitoring techniques will be needed to ensure CO<sub>2</sub> depleted flue gas is safe to emit to atmosphere?
- How often will the aqueous amine solvent need to be regenerated or replaced? What opportunities exist to safely reuse or recycle spent solvent?
- Is waste water produced during PCC harmful to the environment? How should the water be treated to ensure safe discharge to the environment?

My project aims to complete two important steps towards ensuring the environmental safety of PCC. Firstly, robust analytical methods for monitoring chemical reactions and products in amine solvents will be developed. The analysis of trace components is challenging because most samples contain water and higher levels of amines. Therefore, none of the established standard methods for water or soils are directly applicable. Developing, validating and publishing robust methods for trace level organics analysis will facilitate investigations into the degradation of different PCC systems world-wide.

Secondly, I will use these methods to characterise the changes in solvent and waste water samples from CSIRO's pilot plant at Loy Yang power station in the Latrobe Valley. I will also seek to understand how the known degradation reaction pathways and rates in the pilot plant compare with laboratory experiments. In addition, I will investigate the possibility of catalytic degradation in the presence of brown coal fly ash and metal ions resulting from corrosion. I will also screen the samples for potentially toxic or environmentally sensitive compounds.

The close proximity of Loy Yang power station to our analytical laboratory at the Gippsland campus of Monash University mean that samples can be gathered, transported and analysed very quickly. This will minimise degradation or transformation of the sample prior to analysis. Working closely with CSIRO has enabled us to design a sampling plan for investigation of long-term degradation of solvent, accumulation of metals from corrosion and changes in the solvent during each CO<sub>2</sub> capture cycle.

The development of CCS is truly a global effort and communicating our findings with researchers worldwide is an important aspect of this project. One review paper has been published in Environmental Science & Technology and a number of conference presentations are planned. The results of my PhD project will support efforts to develop improved solvent management practices to ensure that PCC of CO<sub>2</sub> from coal-fired power stations is as safe and beneficial as possible.

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## SPOTLIGHT ON BCIA

### BCIA Board

BCIA is an independent, private, member-based company, governed by a Board of Directors.

The BCIA Board comprises Mr Gerry Morvell (Chair), Professor John Burgess, Ms Margaret Donnan, Mr Michael Hutchinson and Dr Noel Simento.

This edition of Perspectives on Brown Coal we introduce you to Margaret Donnan, Michael Hutchinson and Noel Simento. For more information on BCIA's Board of Directors and senior executives, visit our governance section <http://www.bcinnovation.com.au/Governance>.

### Board of Directors



#### **BCIA Director, Ms Margaret Donnan**

Margaret is Chief Executive of the Plastics and Chemicals Industries Association (PACIA) – the peak national industry association representing more than 170 member companies in Australia's third largest manufacturing sector.

Margaret has worked in both government and industry and is a recognised leader in best-practice major hazard control and in health, safety, security and environmental regulation in

complex and challenging industrial environments. She is committed to sustainability and industry leadership and has a strong track record in effective member/client relations, organisational representation and advocacy, and in working with Ministers, governments, industry, community and research sectors.



**BCIA Director, Mr Michael Hutchinson**

Michael is Director Operations and Construction, TRUenergy, and is responsible for development and implementation of the company's new energy projects including low emissions coal initiatives. He also manages the company's three billion dollar plus portfolio of electricity generation, coal mining, gas processing and storage assets (including brown coal facilities in Victoria's Latrobe Valley).

Michael has significant experience in power station operational management and recognised expertise in the development of future electricity generation project opportunities across a broad range of energy sources. Additionally, he has extensive experience in project management of new build and expansion projects in electricity generation and gas processing within Australia, New Zealand and throughout Asia.



**BCIA Director, Dr Noel Simento**

Noel is Managing Director of the Australian National Low Emissions Coal R&D (ANLEC R&D). ANLEC R&D has commenced a 150 million dollar research initiative over 6 years to accelerate and de-risk investment in demonstrating low emissions coal technologies in Australian conditions.

Noel has significant industry experience having held technical development roles in minerals processing and metal production operations. His research management experience includes technology transfer and corporate communication responsibilities for two black coal CRCs. He is passionate about research that is defined around clear paths to application.

Noel is a member of the ANLEC R&D Science Leadership Group, BCIA's Research Advisory Committee and CO2CRC's Operations and Program Advisory Committees.

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## WHAT'S NEWS AT BCIA?

During April, a major focus was the Second International Low Rank Coal Symposium held in Melbourne. BCIA was a major sponsor of the Symposium and participated in the program organising committee.

Also in April, BCIA held its annual Strategy Planning Day with participation by the Company's member organisations. Member representatives worked with BCIA Directors, Research Advisory Committee members and senior executives to identify opportunities and priorities for the coming year.

BCIA seeks to actively manage its research portfolio, and support its funding recipients. BCIA's Research Advisory Committee has met twice in recent months to review projects and advise on research priorities.

BCIA also hosted visits from research stakeholders from Japan and Korea and Chief Executive, Dr Gurney, recently visited the United States where he presented BCIA's research program at the Florida Clearwater Coal Conference and met with a number of low emissions coal organisations including the US National Carbon Capture Center, the EERC and Lignite Energy Council in North Dakota, and with EPRI in California.

## RESEARCH AND DEVELOPMENT

BCIA funding has so far contributed to more than 20 research projects that rely on the involvement of local universities, research institutes, manufacturers and power companies, as well as significant overseas linkages. The research portfolio includes projects in the areas of higher efficiency power generation, capture of carbon dioxide emissions, and new products derived from brown coal.

One of BCIA's members, HRL Technology Pty Ltd, in collaboration with Monash University and local power generators, has recently completed a multi-strand project aimed at gaining an improved knowledge of the advanced materials and methods that will be needed to construct the next generation of high-efficiency brown coal-fired steam boilers. This project drew upon the specialist capabilities developed by HRL Technology as a consultant to the power industry.

The project involved very detailed studies of the changes that take place in advanced steel alloys during long-term exposure to high temperature steam environments, including the development of oxide film layers and changes in microcrystal structure. This required construction of a unique high-temperature steam oxidation facility utilising power plant conditions at Loy Yang B power station. The experiments allowed the development of sophisticated methods to estimate the thermal history of high-temperature pipework and assess the remaining working life of the equipment.

The project also involved the commissioning of an advanced testing facility to evaluate the slow deformation behaviour of advanced alloys under high-temperature conditions. Experimental observations were compared with various predictive modelling methods, leading to development of a method to estimate the remaining working life of metal components much more quickly than the existing procedure.

A further aspect of the project was to assess new welding techniques with the potential to substantially reduce the time lost for weld repairs during plant shutdowns. It was found that semi-automatic flux-core arc welding resulted in a weld of equivalent quality to conventional manual arc welding, but in a much shorter time. Further long-term testing is required to validate these results but the outcome suggests that significant value can be achieved by implementing new welding techniques.

This project was initially funded through the Victorian Department of Primary Industry's Energy Technology Innovation Scheme (ETIS) and was subsequently novated to BCIA. As well as creating valuable new knowledge that HRL Technology can use to the benefit of local power generators, the project also contributed to the training of some very promising young engineers.

## SKILLS DEVELOPMENT

BCIA's Postgraduate Scholarship award program is part of our commitment to strategic investment in skills development to secure the scientific, engineering and trade expertise required for the development of new low-emissions brown coal technologies.

BCIA is delighted to announce the appointment of our most recent PhD scholar, Joanne Moore. Joanne has commenced her PhD studies at the Department of Chemical Engineering, Monash University.

Joanne's project will investigate the potential for producing value-added products by gasification of brown coal. She comes to this project after working in industry and is keen to contribute to the development of new technologies for brown coal utilisation in Victoria.

BCIA is currently providing financial support for six postgraduate students. The five students who received scholarships from BCIA in 2010 have all successfully been confirmed as PhD candidates. This is a significant achievement in itself, demonstrating a high degree of research aptitude on the part of each student.

# PERSPECTIVES ON BROWN COAL

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During April, three of BCIA's Research Scholars were selected to participate in the Young Energy Professionals (YEP) program as part of the Low Rank Coal Symposium program. Candidates were required to submit a paper on their area of expertise with Adam Rady, Alicia Reynolds and Karen Little, each receiving sponsorship to participate in the Symposium.

Sponsored YEP delegates were also given the opportunity to exhibit a poster on their subject at the Symposium. The YEP sponsorship provided great networking and professional development opportunities and was supported by BCIA.

## NETWORKS AND STAKEHOLDER RELATIONS

BCIA sponsored both the 8th Annual Clean Coal Forum held in Beijing, China, in late March and the Second International Symposium on the Sustainable use of Low Rank Coal, held in Melbourne, in mid-April.

Approximately 300 Low Rank Coal stakeholders from around the world attended the Symposium; more than double the attendance of the inaugural conference. BCIA Chief Executive, Dr Gurney, addressed the Symposium on 'The future of R&D projects and technologies utilising Victorian brown coal' and BCIA Chair, Mr Morvell, welcomed delegates to the BCIA-sponsored Symposium networking event.

A number of Symposium delegates expressed interest in finding out more about BCIA membership and our inaugural newsletter was well received by both delegates at the Symposium and existing BCIA stakeholders.

In mid-April, BCIA conducted our annual Strategy Planning Day with participation by BCIA member organisations, our Board of Directors and Research Advisory Committee members, and organisation senior executives. The planning day was very productive and resulted in a refresh of the Company's five-year plan. Following approval by the BCIA Board, the updated plan will be published on BCIA's member web portal in coming months.

Also in April, BCIA hosted a brown-coal R&D stakeholder meeting at our regional office located at PowerWorks in the Latrobe Valley. The meeting was well attended with representation from generation companies, universities and industry. The purpose of this series of meetings is to provide a forum to discuss research progress, new opportunities and strategic directions. [Contact BCIA](#) if you wish to be informed about future meetings.

As mentioned previously, Dr Gurney recently visited the United States and met with the National Carbon Capture Center (NCCC). The NCCC is located just outside Birmingham, Alabama, and is sponsored by the US Department of Energy.

The NCCC has facilities for testing pre- and post- combustion capture technologies with slipstreams of flue and synthesis gas. These facilities are available for use by project partners (including international organisations) who wish to test novel capture technologies in a real-world environment. If your project could benefit from such a facility, contact BCIA for further information or to facilitate an introduction.

For stakeholders with a research interest in carbon capture technologies, now might also be a good time to look to [partnering with organisations in the EU](#). The EU is seeking to encourage cooperation between EU and Australian organisations in this important research area and a call for proposals is expected soon. As this is an EU initiative, Australian partners will need to identify their own funding.

BCIA will hold its next research symposium on Wednesday 18 July at CSIRO in Clayton. Visit our website [News and Events](#) section for more information and to register for this event; a reminder invitation will be sent to BCIA stakeholders soon.

In our final stakeholder news, Ignite Energy Resources (IER) was recently accepted as a member of BCIA. IER is a diversified Australian resource company with offices in Sydney and Melbourne and a Demonstration Plant for the Cat HTR technology at Somersby on the NSW central coast.

The primary focus of IER is the development of Exploration Licence 4416 ('EL 4416'), which covers an area in excess of 3,800km<sup>2</sup>, contains a multi-billion-tonne lignite resource and is prospective for a world-class biogenic coal bed methane ('CBM') resource.

## COMMUNICATIONS

In April, BCIA launched the first edition of our regular stakeholder e-newsletter. Printed editions of the newsletter were distributed at the Symposium on the Sustainable Use of Low Rank Coal and the Company's marketing collateral was also on show including new conference display banners.

Those of you who have flown Qantas airways in the last month or so may have heard BCIA's Chair, Gerry Morvell, talking on the in-flight business channel about our research program. Mr Morvell's interview with well-known Australian business commentator, Alan Kohler, proved a great opportunity for BCIA to share our message about progress towards a low emissions future.

The Victorian Government continues to drive considerable interest in new brown coal allocations. In April, Dr Gurney was invited to talk to a lunch time session at Parliament House on some of the challenges and opportunities for environmentally sustainable use of brown coal. In addition, BCIA's research activities and objectives were referenced in a front page article in Melbourne's The Age newspaper during the Low Rank Coal Symposium.

BCIA's research program has also received considerable international exposure in recent months. In addition to our sponsorship of internationally-renowned conferences held in Melbourne and Beijing, Dr Gurney was also part of a large Australian delegation at the Clearwater Coal conference in Florida. Dr Gurney took part in the conference as the Australian representative on a low-rank coal utilisation panel session, and also presented on progress in carbon capture in Victoria.

In addition, BCIA's research program was the subject of a feature article in the May edition of Australian Resources and Investment magazine. We are also continuing our program of regular briefings with senior journalists to inform news media and the Australian community about BCIA's research activities and progress towards a low emissions future for brown coal.

## BCIA MEMBERSHIP

As a member-based company, BCIA undertakes a range of programs of interest to brown coal stakeholders including industry, research and education providers, governments and international coal technology organisations.

BCIA industry stakeholders encompass a broad range of sectors including coal-fired energy operators, original equipment manufacturers, coal license holders, companies involved in the conversion of brown coal to value-added products and services organisations operating in the brown coal sector.

Membership enables BCIA's stakeholders to work with like-minded organisations to drive the future of the brown coal sector through active participation in our skills, networking and R&D programs.

On the [next page](#), you can read about this month's member in the spotlight, TRUenergy.

For more information about BCIA membership, visit the [membership section](#) of our website.

***BCIA is delighted to announce that Ignite Energy Resources has joined as a member, extending BCIA's partner network.***

BCIA has updated our membership programs for 2012. Our current members include:



**BCIA MEMBER**  
Positioning brown coal for  
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## SPOTLIGHT ON BCIA MEMBER

### TRUenergy

TRUenergy is one of Australia’s largest generators and energy retailers.

#### About TRUenergy

As one of Australia’s largest energy companies, TRUenergy owns and operates a multibillion dollar portfolio of energy generation and storage facilities including coal, gas and wind assets. We service the energy needs of over 2.8 million households and businesses across New South Wales, Victoria, South Australia, Australian Capital Territory and Queensland.

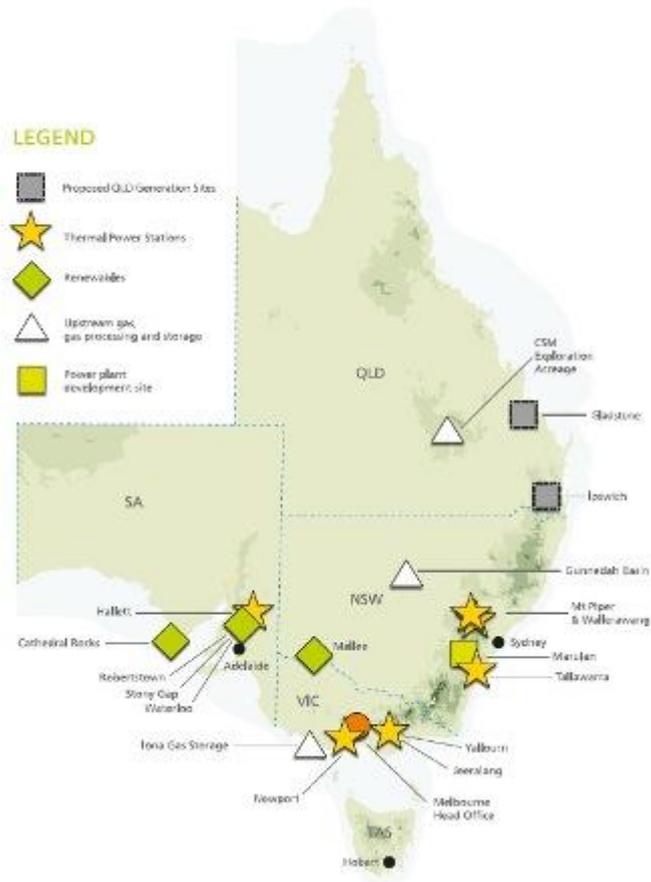
#### Our investments in low emission technology

As an investor, generator and retailer in Australia, recognise the importance of building a sustainable business. We were the first energy business in Australia to develop a Climate Change Strategy the goal of reducing our emissions by 60% by 2050 with interim goals along the way.

As a major coal miner and generator of electricity the Latrobe Valley through the operation of the Yallourn power station and mine, we acknowledge need to develop cleaner forms of coal fired generation and coal derived products. As part of strategy, we have been working with a number of partners to identify more efficient and cleaner of brown coal, including gasification, coal to oil, upgrading and various forms of carbon capture.

TRUenergy is taking an active interest in industry and R&D issues, including membership of Brown Coal Innovation Australia, representation on CCS & brown coal forums and participation in R&D projects with Monash University and CSIRO.

For more information, visit [www.truenergy.com.au](http://www.truenergy.com.au)



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## CALENDAR OF EVENTS

### 5 - 6 July 2012

#### **2012 APEC Symposium on Energy Efficiency of Low Rank Coal, Beijing, China.**

Sponsored by APEC (Energy Working Group) and National Energy Administration (NEA). Focused on maximizing the energy efficiency and clean utilisation of Low Rank Coals through innovative technologies in APEC Economies. By invitation only, contact Symposium Secretariat at [2012apeclrc@fuxienergy.com](mailto:2012apeclrc@fuxienergy.com)

### 17 July 2012

#### **BCIA Research Seminar: CO2CRC and HRL Technology Project Updates, Monash Clayton**

BCIA will host a seminar on Wednesday 18 July 2012 at CSIRO in Clayton, Victoria, with presentations from Barry Hooper, Chief Technologist CO2CRC and Fedir Woskoboenko, General Manager HRL Technology. Attendance is free, but registration is required. Visit <http://www.bcinnovation.org.au/NewsandEvents> for more information.

### September 2012

#### **Coal Tech 2012, Canberra, ACT Australia**

IIR's 6th Annual Coal Tech Conference will address clean coal and carbon sequestration technologies, coal-to-liquids, underground coal gasification, syngas, carbon capture and storage and much more... Visit <http://www.operationalexcellence.com.au/coal-tech>

### 10 - 11 October 2012

#### **All-Energy Australia 2012, Melbourne Convention & Exhibition Centre, Victoria Australia**

Australia's largest and most comprehensive, free to attend, business-to-business event in the clean and renewable energy sector. Visit [www.all-energy.com.au](http://www.all-energy.com.au)

### 11 October 2012

#### **Australia Japan Coal Conference (AJCC) 2012, Four Seasons Hotel, Sydney Australia**

For information on this event, visit <http://www.tmm.com.au/whats-coming-up/details/71-AJCC12.html>

### 15 - 18 October 2012

#### **2012 Pittsburgh Coal Conference, David L. Lawrence Convention Center, Pittsburgh, PA**

This conference focuses on environmental emissions issues and technologies surrounding the continued use of coal and the development of future coal-based energy plants to achieve near-zero emissions of pollutants, reduced costs, and high thermal efficiency while producing a suite of products to meet future energy market requirements.

Visit [http://www.engineering.pitt.edu/Coal\\_Conference/2012\\_Conference.aspx](http://www.engineering.pitt.edu/Coal_Conference/2012_Conference.aspx)

### 21 - 23 October 2012

#### **2012 National CCS Conference, Burswood Entertainment Complex, Perth, WA Australia**

National CCS Week, from 21 to 26 October 2012, is a biennial Australian-based event providing a focus for CCS as an essential part of the global greenhouse gas mitigation portfolio. The major event of National CCS Week is the 2012 National CCS Conference. Visit [www.nationalccs.com.au](http://www.nationalccs.com.au)