



**Ash Development
Association of
Australia**

COAL ASH matters

13
APRIL

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CCPs - a valuable resource

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Editorial:

The Ash Development Association of Australia continues to operate in an industry that provides opportunities to those who think outside the box. This observation was supported by the launch of the largest Cooperative Research Centre in history, being the CRC for Low Carbon Living in December of last year. This initiative seeks to encourage industry stakeholders to think creatively when it comes to the built environment in order to improve both current and future environmental sustainability. This \$100 million partnership is essential because "Tackling climate change is one of the most pressing challenges we face as a nation and how we adapt is critical to our future prosperity," as stated by the Minister for Science and Research, Senator Chris Evans. As a CRC member, the Association will continue to keep you updated.

This theme of innovation transcends borders with our focus on international project developments with an examination of Eco Industrial Parks such as that seen in Kalundborg, Denmark. Despite the almost utopic objectives of this project, it represents a way of setting up industries in order to maximise efficiencies whilst reducing environmental impacts. This kind of project has been replicated throughout the world, with varying levels of success, proving that this aspirational paradigm is not so easy to achieve!

The update of a number of Technical Notes and Reference Data Sheets continues with *RDS 3- Use of Coal Combustion Products as Construction Material Components* due for publication towards the end of April. This document has undergone significant amendment with two member review cycles to ensure the document represents the majority of stakeholder interests from the Association. The four remaining documents will be progressively released as members generously provide input in addition to their everyday employment.

A number of members have contributed articles to Coal Ash Matters including Genesis Energy's Portfolio, providing an insightful look into the various energy generation projects owned and operated by the New Zealand company. Additionally, Lend Lease provides an article on the development of additional CCP utilisation areas, particularly in agriculture. Another project worth noting is the Gladstone Land Reclamation Project undertaken by NRG featured later in this edition. This project demonstrates yet another beneficial reuse opportunity for fly ash which has given back to the greater community. Lets hope that more of these projects come to light as the utilization potential of fly ash is continually recognised.

Lastly, the Ash Development Association of Australia is excited about attending a number of important industry conferences this year on behalf of its members. Firstly, the Australian Society of Concrete Pavements is set to hold a conference during the month of August at Darling Harbour, Concrete 2013 will take place in Brisbane during the month of October later this year, whilst Craig Heidrich will be attending and presenting a plenary paper at the World of Coal Ash in Lexington Kentucky in late April. www.worldofcoalash.org/agenda/Craig-Heidrich-plenary.pdf We encourage members to consider attending these conferences which provide valuable networking opportunities to members and offer potential membership opportunities to the Association.

The ADAA continues to work hard to secure content to publish Coal Ash Matters twice a year. To these ends, your contributions are much appreciated with content always welcome. Please contact us at info@adaa.com.au for further information.



Coal Ash Matters is published by ADAA

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Membership

COMPANY MEMBERS

A primary role of the ADAA is to bring together producers and marketers of coal combustion products (CCPs). Our activities cover research and development into CCP usage, advocacy and technical assistance to CCP producers and users, as well as a forum for the exchange and publication of CCP information.

For more information on the Association, visit us at www.adaa.asn.au

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- Adbri Masonry
- AGL Loy Yang
- Alinta Energy
- Boral Quarries & Recycling
- Bulk Flyash Grouts
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- Keller Mine Fill
- Latrobe Magnesium
- LLIS Industrial (formerly Conneq Industrial Infrastructure)
- NRG Gladstone Power Station
- Roads and Maritime Services
- Stanwell Corporation
- Sunstate Cement
- Vecor Australia
- Verve Energy
- Wagners Cement
- Weston Matrix

RELATED ASSOCIATIONS

- CSIRO www.smit.csiro.au
- Association of Canadian Industries Recycling Coal Ash (CIRCA) www.circainfo.ca
- UK Quality Ash Association www.ukqaa.org.uk
- American Coal Ash Association www.acao-usa.org
- World Wide Coal Combustion Products Network (WWCCPN) www.wwccpn.org

Genesis Energy's Electricity Generation Portfolio



Genesis Energy is committed to providing reliable energy in New Zealand, utilising available fuel sources in the most efficient way. We consistently deliver responsible energy solutions through a diverse portfolio of generation sites. Our current installed capacity from all plant is 2135 MW, contributing approximately 20% of New Zealand's total requirements.

Thermal energy generation plays an important role in Genesis Energy's diverse portfolio of power generation in the North Island. Thermal power is one way Genesis Energy is continuing to help provide electricity to New Zealand, particularly when there is insufficient hydro capacity. Genesis Energy owns and operates the Huntly Power Station, which presently supplies up to 1198 MW to the National Grid. As Coal Ash Matters readers will be aware, a substantial proportion of this site relies on coal for fuel.

Hydro-power generation has been operating in New Zealand since 1887 and is still the dominant source of electricity generation, with around 70% of the country's electricity provided by hydro power stations. Hydro generation relies on the provision of adequate and timely rainfall, snowmelt, other precipitation and storage in lakes. Hydro generation plays an important role in Genesis Energy's generation portfolio. We have three hydro schemes with seven power stations. These schemes are located at Waikaremoana, Tongariro, and Tekapo, and consist of a series of dams, canals, artificial and natural lakes, rivers and power stations.

The Waikaremoana Power Scheme is located between the Te Urewera National Park and Wairoa, in the northern Hawke's Bay region on New Zealand's North Island. The scheme uses water from Lake Waikaremoana, Waikaretaheke River, Mangaone Stream and Kahuitangaroa Stream to generate electricity and incorporates three power stations: Kaitawa (36 MW), Tuai (60 MW) and Piripaua (42 MW). Water is taken from Lake Waikaremoana via tunnels to Kaitawa Power Station, before being discharged into Lake Kaitawa. Water is then passed through Tuai Power Station and discharged into Lake Whakamarino. From there, water is carried by tunnel to Piripaua Power Station and is discharged into the Waikaretaheke River. The scheme was progressively commissioned between 1929 and 1948.

The Tongariro Power Scheme is located on the central volcanic plateau south of Lake Taupo in the North Island. The scheme and its structures extend from the southern flanks of Mount Ruapehu in the south, to the southern point of Lake Taupo in the north, and along either side of the mountain range formed by Ruapehu, Ngauruhoe and Tongariro. The scheme taps a catchment area of more than 2600 sq km. The scheme is operated to provide water to the Tokaanu (240 MW) and Rangipo (120 MW) power stations and uses a series of lakes, canals and tunnels to do so. Tokaanu Power Station is located on the slopes of Mount Tihia, near the township of Turangi, south of Taupo. Rangipo Power Station is situated underground in the Kaimanawa Forest Park, on the eastern side of the Tongariro Power Scheme. The Tokaanu and Rangipo stations were commissioned in 1973 and 1983 respectively. A 2 MW mini-hydro plant was added in 2008 on Mangaio stream near the large reservoir at Moawhango Dam.

As a result of government reforms enabled under the Electricity Industry Act 2010, Genesis Energy purchased ownership of the Tekapo Power Scheme in 2011. The scheme is located in the South Island, at the head of the Waitaki Valley in the Mackenzie District, and uses water from the glacial-fed Lake Tekapo to generate electricity through two power stations: Tekapo A (25 MW) and Tekapo B (160 MW). The scheme is situated close to the majestic Aoraki Mt Cook and near the township of Lake Tekapo. Water is taken from Lake Tekapo through an intake tunnel and generates electricity through Tekapo A Power Station. Outflows from Tekapo A flow through the Tekapo Canal before entering Tekapo B Power Station. Tekapo B sits in the bed of Lake Pukaki, with outflows entering Lake Pukaki.

In addition to the thermal and hydro assets, Genesis Energy also owns and operates a small 9 MW wind farm at Hau Nui in the Wairarapa region of the North Island. The company sells electricity and natural gas in a wholesale and retail capacity throughout New Zealand, with over 650,000 current customers. Genesis Energy joined the Ash Development Association of Australia in 2012. This was in order to benefit from the extensive knowledge base on CCP handling and re-use, to help with the sustainable management of Huntly Power Station's coal-fired activities. They are represented on the Association's Technical and Education Committee by Andrew Cave, from the Generation Assets business unit.

Article written by Andrew Cave. For more information, please visit: http://www.genesisenergy.co.nz/genesis/home-page_home.cfm



The Eco-industrial Park Paradigm

The eco-industrial park (EIP) has no definition yet, hundreds of these almost enigma-like sustainable industry precincts have been setup around the world with some striving and others failing.

The three main characteristics of EIPs are:

1. Co-location or clustered proximity between companies
2. Shared by-products which are used to replace virgin materials or feedstocks
3. Clean production

Kalundborg, situated on the coast of Denmark has been in operation for over 40 years and is known as the first large-scale EIP to exist worldwide. Its inception was not made through the wheeling and dealing of government or business leaders, rather the park came into existence through a gradual symbiotic process. Businesses sought to create their own links with their neighbours where they foresaw an increase in profits and a reduction in costs whilst also meeting sustainability initiatives.

Kalundborg is centered around the coal-fired Asneas Power Station which is the largest power station in Denmark, the Statoil operated oil-refinery, a pharmaceuticals company and plasterboard manufacturer, Gyproc.

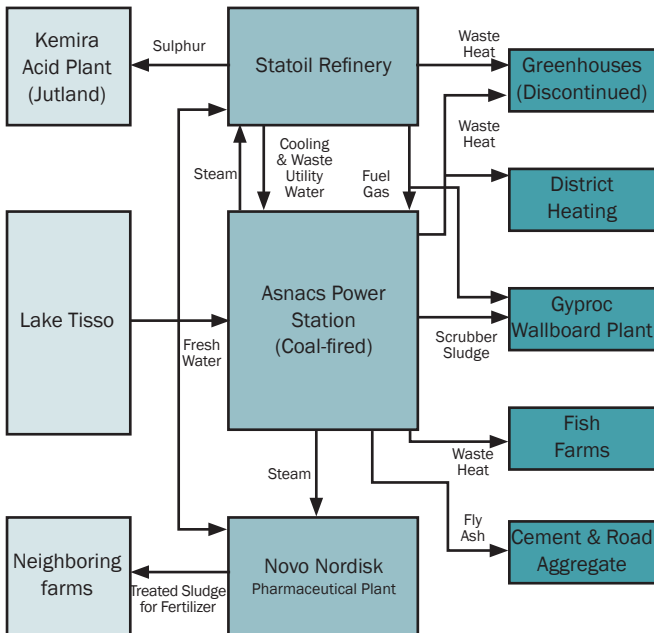


Figure 1 The industrial ecosystem at Kalundborg, Denmark

The sustainable processes enacted by the EIP includes:

- Asneacs Power Station has reduced the use of oil-fired residential furnaces by 3,500 units by directly distributing heat via underground pipes which are paid for by residents in return for cheap heating.
- Heat is also used in the Asneacs fish farm, removing costs for warming the water.
- The sludge from the fish farm is then sold to local farmers for use as fertilizer.
- Additionally, Statoil's oil refinery receives 40% of its process steam and pharmaceuticals company Novo Nordisk receives all process steam required for company operation with the two-mile long pipeline paying for itself within 2 years of operation.
- Steam usage by neighbouring stakeholders has thereby reduced thermal pollution on nearby fjord as an added environmental benefit.
- Plasterboard manufacturer, Gyproc receives two-thirds of its gypsum requirements from Asneacs after the installation of a \$115 million sulfur dioxide scrubber. Gypsum is the primary feedstock in the production of wallboard with the remaining requirements supplied by other power stations.
- Fly ash and clinker are sold for road building and cement production which reduces the 200,000 tonnes landfill burden.

Therefore, through the use of mutually beneficial exchange relationships, businesses within the Kalundborg EIP as well as the greater community and environment have found benefit from the simple re-routing of by-products that were formerly considered as wastes of processes. It is also important to note that these kinds of relationships would probably not exist without the incentive of satisfying environment regulators and the subsequent recoupment of some cost.

There are a number of challenges faced by EIPs. Firstly, the type of symbiosis that is seen in Kalundborg is difficult to replicate because it requires two or more companies that both produce and use a continuous stream of by-product. Other problems include the large infrastructure demands, a potential lack of funding, heavy-handed regulations, political difficulty and stakeholder and community participation.

One factor in this problematic context that does seek to aid the continued existence of EIPs in Denmark is the open, flexible and consultative legislative framework used by the Danish government to determine their environmental regulations. However whilst this flexibility allows stakeholders to have more input into the types of systems they implement to navigate around these regulations, this may also in some cases create the potential for lower technical compliance with difficulty in maintaining a minimal level of pollution control. Therein lies the conundrum, however the use of sustainable practices at Kalundborg is definitely a step in the right direction.

Please see John Ehrenfield and Nicholas Gertler, 'Industrial Ecology in Practice: The Evolution of Interdependence at Kalundborg', Journal of Industrial Ecology,(1997) Massachusetts, USA for more information.





Twitter: Using social media to the advantage of the Association

As of April 2012, the ADAA introduced a Twitter feed to the Association's webpage as a powerful communication tool that provides almost instantaneous information from the ADAA office to your laptop, iPad or smartphone. Often downplayed as a social media tool for younger generations who wish to keep up-to-date with their favorite celebrity, there is also an important function for Twitter within our Association, especially amongst our members.

As part of the Association, you have access to regular updates on relevant industry specific news subscribed to by the ADAA and circulated on a weekly basis. The beauty of twitter is that any 'tweets' posted have a limit of 140 characters, ensuring that information is refined to the crucial facts that you need to know, providing important news without impinging on your time constraints - links to additional material can be included.

If you don't already have a Twitter account, it is a free service that is open to the public and available at www.twitter.com. Once you have set up your account, you can search and 'follow' the Association on [@adaa_info](https://twitter.com/adaa_info) which will subsequently display any 'tweets' on your page for you perusal. Additionally, if you have an iPad or smartphone, the twitter app is free to download, making it even easier to access industry news.

If you have any further questions regarding Twitter, please email research@hbmgroup.com.au



New Twitter feed available on the ADAA website

Brokering the Use of Coal Combustion Products



The prospect of brokering the development of local manufacturing industries that use coal combustion products (CCPs) as their raw materials has a bright future and is a new aspect to the profile of environmental science and management for our region.

Lend Lease's infrastructure services business has a contract with Delta Electricity to manage and maintain all aspects of coal combustion products for the Mt Piper and Wallerawang Power Stations in New South Wales. Our work includes the ash management for operations and environmental considerations for site and ash repository areas and the facilitation and brokering of an ash utilisation program. We are also a member of the Ash Development Association of Australia (ADAA) which provides our business with an excellent opportunity to work with a peak industry association to achieve a wider acceptance for the use of coal combustion products (CCPs).

Ash utilisation for Australian CCPs has evolved within the construction sector, primarily as a supplementary material for cement and concrete manufacture, today consuming some 2.0 million tonnes annually. There is however a considerable volume of surplus material remaining which is unused and could be used for building and construction products, civil work applications or soil improvement materials to support agriculture. Through our work at Mt Piper and Wallerawang Power Stations, we



have undertaken research to identify opportunities for the use of CCPs that lead to high-volume value-added benefits and the development of commercially sustainable and local manufacturing industries in the western NSW region.

Working since December 2008 to develop the ash utilisation program, we focused our professional interest on agricultural and civil market opportunities (Coal Ash Matters, 2011). The potential for agricultural applications has already received substantial research and development funds from the ADAA and several articles have been published outlining findings to date (Yunusa *et al.* 2012; Yunusa *et al.* 2006; Yunusa *et al.* 2007). The next step is to take the research findings into the public and commercial space, including industry associations, conferences and professional publications (Aiken, 2012, Aiken and Heidrich 2012, Aiken 2010, Aiken 2011).

We now have in-depth knowledge of the CCPs at Mt Piper and Wallerawang. We have undertaken testing that is broader than the conventional scope to characterise the CCPs, so their suitability for land and manufacturing application is being expedited.

To date an extensive material assessment program has been completed for the Western Power Station CCPs (fly-ash and furnace bottom ash) and a comprehensive database has been created which describes the chemical and elemental composition of the materials. Test results include particle size and fraction, crystalline and oxide composition, trace concentrations of heavy metals, the solubility of those metals in water and the potential availability of those elements as essential micro-nutrients for plants. The supply of fly-ash and furnace bottom ash from Mt Piper and Wallerawang Power Stations is documented with Material Safety Data Sheets and supported by our knowledge base of product composition.



The test results demonstrate that these CCPs are suited to the manufacture of geopolymer concrete, incorporation into road sub-base materials, as a soil-filler, as a sand replacement, as an asphalt additive or as a soil improver (providing micro-nutrient additions to soil products and agricultural soils). The furnace bottom ash is suitable for addition to potting mixes for the germination and propagation of local *Eucalyptus* species or alternatively for use as a free draining pipe or backfill material. The fly-ash will provide an excellent basis for the manufacture of

building products or as a composition filler to retain nutrients in locally composted products. All CCPs, when used as unbound products, are supplied under the NSW general exemption to waste regulations (NSW Environment Protection Authority 2006, 2010).

To progress the development and acceptance of these CCPs as a resource in our regional communities, we are actively inviting proposals from interested proponents to implement site trials and research and development projects that cover any aspect (civil, engineering, manufacturing or environmental).

Leading our ash utilisation program and representing our ADAA membership, is Mt Piper site environmental scientist Dr Jane Aiken with Mr Brett Lowry State Manager NSW. Jane has a PhD qualification in environmental studies from the University of Western Sydney and is the environmental team leader for the Mt Piper and Wallerawang ash repository sites. Also an accredited stage 2 soil scientist with the Australian Society of Soil Science Incorporated (ASSSI), she has a particular interest in facilitating supply of ash products to consumers within the agricultural and construction sectors.

For further information about possible site trials and research and development projects, please contact: Lend Lease, Mt Piper Power Station, Portland NSW 2847. T: 61 2 6355 7217 or email Brett Lowry, Project Manager (brett.lowry@lendlease.com) or Jane Aiken, Program Leader Ash Utilisation (jane.aiken@lendlease.com).

The references within this article are listed below.

- Aiken JT 2012 Promise of developing coal combustion products (CCPs) in soil amendments; in Soils and Infrastructure Developments, Presented Poster Presentation Joint SSA and NZSSS Soil Science Conference, Soil solutions for diverse landscapes, Wrest Point Hotel and Convention Centre, Hobart, Tasmania 2-7 December 2012: 1: 42 p
- Aiken JT 2012 Power Industry Liaison of Coal Ash Products For Agriculture. NSW Branch Regional Meeting Recent Advances In Soil Science and Management, Australian Society Soil Science Temora Soils Workshop, 22-23rd June 2012 Farmlink Research Limited Temora Research and Advisory Station, Barmedman Road, Temora NSW. 2 page extended abstract.
- Aiken JT and Heidrich CR 2012 Coal combustion products: Assessment using acid sulfate soil methods, in Soils and Infrastructure Developments – Oral Presentation, Joint SSA and NZSSS Soil Science Conference, Soil solutions for diverse landscapes, Wrest Point Hotel and Convention Centre, Hobart, Tasmania 2-7 December 2012. 1:24 p
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- Environment Protection Authority (2010) Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A: The coal-ash exemption 2010. Office of Environment and Heritage, www.environment.nsw.gov.au/waste/generalRRE.htm

Coal Combustion Handbook Review Update

The review of the Coal Combustion Products Handbook first published in 2007 continues in 2013. Since the proposal for the update and production of the Coal Combustion Products Handbook: Second edition, authors and contributors have been working tirelessly in the design and completion of drafts for each chapter.

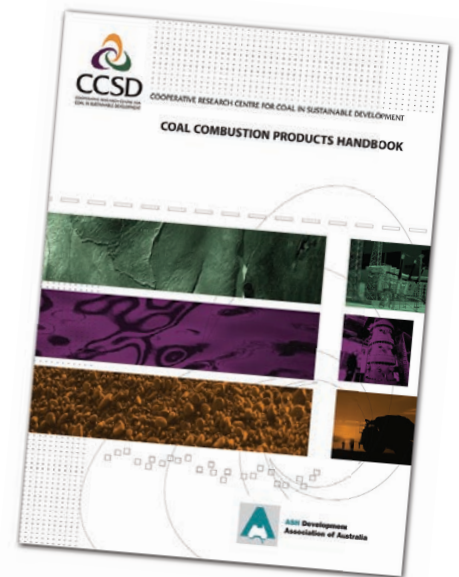
To reiterate the original aims of the update, the purpose of this project was to update existing and new information with research for application in market developments and the distillation of trends. This new research also calls for legislative changes which are incorporative of the changing face of CCP application.

With the completion of some draft chapters, future progress requires:

- Completion of all working drafts.
- Revision and confirmation of data to meet current standards.
- Final sign-off on content.
- Proofing and publication.

After an initial slow period of work over Christmas, authors have once again begun work on draft chapters. The upcoming ADAA Technical and Education meeting on the 27th May will see a number of drafts tabled for member comment in addition to those already circulated and approved.

We encourage our members to review documents and provide any valuable contributions by email to cheidrich@adaa.asn.au. Working drafts will be available in PDF format in the Product Section of the ADAA. Updates on new chapter releases will also be advised by email and the Association's Twitter Feed.



Gladstone Land Reclamation Project



The handover of the coal ash reclamation area known as Area 7 to the Gladstone Regional Council has now been completed. This site covers approximately 70 hectares and is located adjacent to the CBD near Blain Drive in the Gladstone region.

As yet another beneficial re-use, Environmental and Communities Superintendent Paul Van der List said the site is ideally located for leisure activities which may include recreational facilities, showgrounds, a racecourse or light industrial zones. Paul also commented on the reclamation as being "...a very good example of power station ash being used to generate an incredibly valuable resource and asset for the local community.'

The area was initially a low-lying tidal zone and with the bulk of land reclaimed using wet slurry placement of the Gladstone Power Station (GPS) coal combustion products 'coal ash'. The process began in the early 1980's and was completed in 2007. The final stages of reclamation used dry placement methods and the site was capped with 100 mm of clay and grassed. In addition, the perimeters have been successfully and extensively vegetated with native trees and shrubs to ensure self propagation, low upkeep and erosion minimisation. This appearance and natural outlook enhances the aesthetics and appeal of the location to the community to ensure its popularity with recreational users.

GPS, Superintendent Production Commercial, Clinton Windsor said he was not aware of any similar example of this type of large scale reclamation project and handover occurring anywhere within Australia.

During March, an official hand over celebration as well as a road naming ceremony was held to honour former Ash Management Specialist John Kunze.



Update: CRC for Low Carbon Living

With the emergence of climate change as the biggest challenge of this century, the CRC for Low Carbon Living aims to provide the government and industry with social, technological and policy tools to motivate the use of cost efficient low carbon products and services. Statistically, this will be the largest project since the inception of the CRC, running for 7 years and due for completion in 2020.

This research seeks to fill an important void in the understanding of low carbon products where they have traditionally been thought unable to compete within the industry market due to cost and quality concerns. The built environment is a significant target for the initiatives of this CRC as the majority of low cost emissions saving opportunities are found within this area of industry. Therefore, it is because of this previous lack of understanding and pragmatism that has led to minimal development in the minimisation of carbon emission initiatives up until this point.

The main stakeholders involved in this project are those with direct involvement in the built environment industry, including the ADAA with the potential for the beneficial utilisation of coal combustion products. Representatives from the University of New South Wales joined ADAA members at the first National Technical and Promotion Meeting for 2013 to provide an overview of their first research project funded under the CRC. This initial one year project will focus on manufacturing low emission geopolymer

concretes within existing standards AS 3600 and AS 5100.5. This project comes under the first of three main research programs to be undertaken over the course of the CRC:

- i. Program 1: Integrated Building Systems
- ii. Program 2: Low Carbon Precincts
- iii. Program 3: Engaged Communities

The expected beneficial outcomes for the 7 year CRC include:

- A reduction in carbon emissions by 10MT CO₂-e/yr by 2020
- Projected economic benefit of over \$684 million
- Adoption of government policies and industry building models which support the 2050 greenhouse emissions reduction target for the built environment
- 88 higher degree by research students with detailed experience in the low carbon built environment

The beginning of this CRC, with the official launch taking place on the 12th December 2012, marks a new and positive attitude towards the reduction of carbon emissions. WATCH THIS SPACE!

For more information, please visit: www.lowcarbonlivingcrc.com.au



News Update: AGIC Rebranded



The Australian Green Infrastructure Council (AGIC) launched the Infrastructure Sustainability (IS) rating scheme in Canberra last year. In addition to launching the scheme, delivering two rounds of IS Foundation Training and commencing infrastructure project ratings last year, the organisation also committed to a rebrand. Therefore, as of 4th April 2013, this organisation will be known as the Infrastructure Sustainability Council of Australia (ISCA). This rebrand goes well beyond the name and includes a new website, www.isca.org.au

Additional updates include:

- The first IS rating will be announced soon
- We will be launching the IS scheme in Queensland on the 18 April 2013 by the Minister for Natural Resources and Mines, Hon Andrew Cripps MP
- A new membership model has been developed and is available online
- The appointment of Menno Henneveld (recently the Commissioner for Main Roads Western Australia) as an Independent Director

The ADAA will continue to support the ISCA as an important body for increased awareness of sustainable infrastructure in Australia.



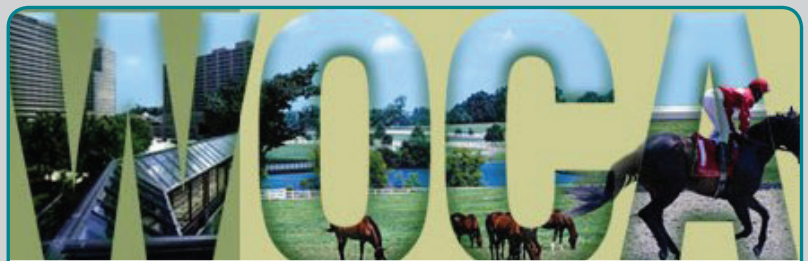
Concrete 2013

Concrete 2013, as an industry leading event in the Southern Hemisphere, will take place on 16-18 October 2013, on Queensland's renowned Gold Coast. With a location that boasts sun and surf not to be rivaled around the world, the Gold Coast Convention and Exhibition Centre places participants close to Brisbane and the beach.

The theme of this conference, "Understanding Concrete", will delve into the areas of materials, research, design, construction and innovation in a forum that facilitates knowledge share as well as valuable industry experience. Sessions will include formal presentations, industry displays and informal networking with delegates culminating in a Gala Dinner on the final evening and the Awards for Excellence ceremony.

Conference organisers have placed high importance on quality technical presentations, with keynote speakers currently being recruited from global concrete industry leaders. Abstract submissions to the Technical Committee are now open. For more information, please see: www.concrete2013.com.au/technical-program

The ADAA looks forward to attending this conference and encourages members to make the journey to enjoy the benefits of this valuable technical and professional networking opportunity.



World of Coal Ash 2013: Lexington, Kentucky (Reminder)

The fifth biennial World of Coal Ash(WOCA) Conference is fast approaching in 2013. This popular international event, under the organisation of the American Coal Ash Association (ACAA) and the University of Kentucky's Center for Applied Energy Research (CAER), will focus on the sustainability of coal ash and its applications worldwide from a scientific perspective.

The conference will be held in April 2013 in Lexington, Kentucky This conference, as an international forum, brings industry leading members and Associations together to discuss and promote further use of coal combustion products (CCPs) and gasification products. With organizers looking to improve on previous participant numbers, the presentation schedule will cover a wider-ranging number of CCB/CCP related topics including:

- Utilisation of coal ash and flue gas desulfurization materials
- Sustainable projects using CCPs
- Emerging technologies
- General ash management (including disposal)
- Mercury related topics
- Recent research and specific case studies
- International activities
- Regulatory topics from local, State and Federal perspectives

WOCA 2013 will provide an excellent opportunity to continue working with other countries in incorporating CCPs further in industry-related fields and we encourage our members to make the journey. Craig Heidrich will be attending and presenting a plenary paper at the World of Coal Ash in Lexington Kentucky in late April. www.worldofcoalash.org/agenda/Craig-Heidrich-plenary.pdf

For further information, please visit: www.worldofcoalash.org

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