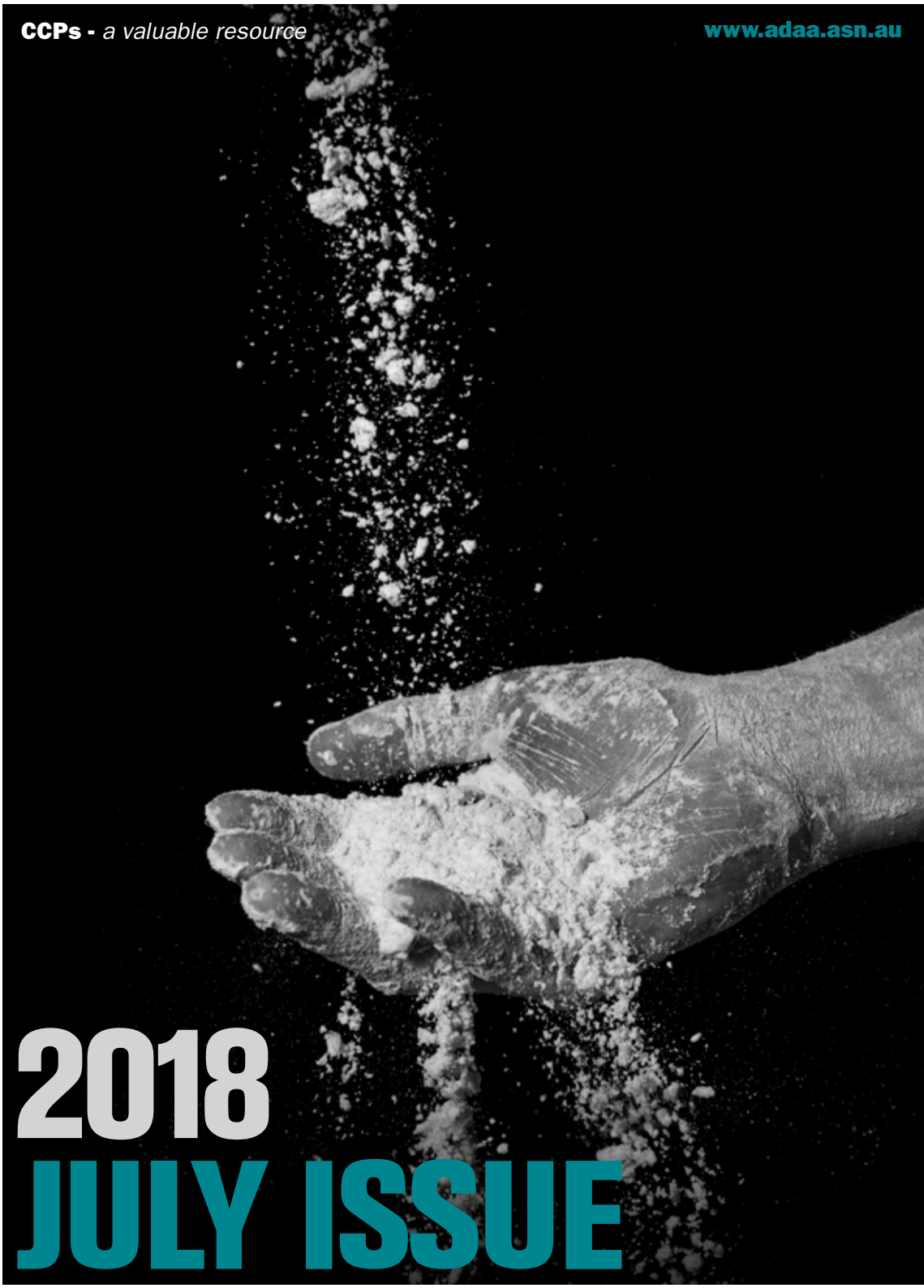
Ash Development Association of Australia

COAL ASH matters

18 JULY

THIS ISSUE - JULY 2018



Ash Development Association of Australia

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Coal Ash Matters is a bi-annual publication

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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 visit us at **www.adaa.asn.au**

CURRENT MEMBERS

- BG&E Materials Technology
- Boral Quarries & Recycling
- Brickworks Ltd
- CS Energy
- Delta Electricity
- Golden Bay Cement (New Zealand)
- Heeleys Consulting
- Hyrock (NSW)
- Intergen (Millmerran)
- Latrobe Magnesium
- NRG Gladstone Power Station
- Origin Energy Eraring Power Station
- Sphere One
- Stanwell Corporation
- Synergy
- Vecor Australia

RECIPROCAL MEMBERSHIPS

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

Editorial

The Ash Development Association of Australia (ADAA) are honoured to bring you the latest Coal Ash news from around the Globe.

2018 has been off to a productive start and our attention is now shifting towards the latter half of the year for the ADAA team. This edition of Coal Ash Matters brings you updates and reviews on recent and upcoming research, events and opportunities in the industry!

The Ash Development Association of Australia (ADAA) are excited to announce that we are holding a Technical and Education Forum on Coal Combustion Products (CCPs) in July. We are now taking registrations for this one-day workshop featuring international and local speakers.

This edition features an article by Dr Jane Aiken, an environmental scientist, about what the future could look like for Coal Ash Utilisation.

Dr Daksh Baweja updates us on the American Concrete Institute's ACI Committee 232 on Fly Ash in Concrete. The ACI 232 Committee have overcome hurdles to accomplish major milestones. Dr Baweja also speaks about the ADAA's role working with ACI 232, along with the committee's future goals.

We take a look back at projects by the Cooperative Research Centre for Low Carbon Living (CRC-LCL) as they are approaching their final days. One of their recent projects aimed to perfect geopolymer concrete (GPC) for use in coastal constructions. We have a look at this process and the short and long-term value propositions the project provides.

In this edition, we review the recent international industry event, World of Concrete 2018. Craig Heidrich attended WOC18 in January, on behalf of the ADAA. The event drew in over 58,000 registered professionals, 1,500 exhibitors and tens of thousands of visitors, proving to be an excellent opportunity to showcase the ADAA's activities and connect with industry personnel from around the world.

Looking forward, there are many upcoming industry events and opportunities. The fib Congress will be held in Australia this year, at Melbourne's Convention and Exhibition Centre from 7 – 11 October. The Construction Material Industry Conference (CMIC18) will be held from 19 – 21 September at the brand new International Convention Centre (ICC), Sydney. Concrete 2019 has recently been announced and will also be held at ICC, Sydney from 8 – 11 September 2019.

The Ash Development Association of Australia team have relocated to our new office at **Unit 5, 41-47 Five Islands Road, Port Kembla NSW 2505**. Our phone numbers and email addresses remain the same at 02 4228 1389 and info@adaa.asn.au.

Finally, we would like to wish all our members and readers a great year ahead! We are looking forward to bringing you a final review of 2018 in the next edition of Coal Ash Matters.

Happy Reading!

ADAA TECHNICAL & EDUCATION FORUM

The Coal Combustion Product (CCP) Technical and Education Forum will be held on 16 July at the University of NSW from 10am – 4pm.

The Ash Development Association of Australia (ADAA) and Prof. Stephen Foster, from the CRC for Low Carbon Living (CRC-LCL) are hosting the event, focusing on the State of EPRI Research Priorities.

Coal continues to be the largest energy source for electricity generation within Australia, moreover throughout the world, and significant volumes of CCPs continue to be produced and stored. Over 1.2 billion tonnes of coal were reported in 2017.

During the day, we will explore and explain the likely impacts from the changing landscape of coal fired power on CCP generation, processing, use and regulatory implications.

This will be an essential event for anyone responsible for;

- Marketing and sales of CCPs
- Environment management and reporting of CCPs
- Operations and Asset management of CCPs
- Legal council
- Strategic management of CCPs.

The Association looks forward to your involvement and contribution to this important forum discussion about Coal Combustion Products: International Perspectives on Utilisation Opportunities and Threats.

To find out more and register for this free event, head to the **ADAA website**.

During this workshop, we bring together a number of international speakers to share their experiences from North America and how Generators are addressing the challenge of **Utilisation Opportunities and Threats**.

Prof. Stephen Foster
UNSW Civil Engineering Director, Centre for Infrastructure Engineering and Safety (CIES).
Presentation: 6 Years On, what we have learned about Geopolymer Concrete

Craig Heidrich
CEO Ash Development Association of Australia.
Presentation: The New Operating Paradigm for Coal Combustion Products

Ken Ladwig
Electric Power Research Institute (EPRI), Sr. Technical Executive.
Presentation: EPRI Research on Management of Coal Combustion Products

Dr Bob Jewell
Research Program Manager Environmental & Coal Technologies Centre for Applied Energy Research, University of Kentucky.
Presentation: Research Experiences with Coal By-Product Utilisation

Ari Lewis
Gradient, Principal.
Presentation: Coal Combustion Residual (CCR) Beneficial Use Evaluation Under the CCR Rule and other US Regulatory Updates

CONSTRUCTION MATERIAL INDUSTRY CONFERENCE 2018
BUILDING TOMORROW'S AUSTRALIA

As the seventh Construction Materials Industry Conference, CMIC18 will continue to evolve whilst retaining much of what delegates know and love including;

Exhibition
A re-energised exhibition with a focus on maximum delegate flow and exposure for exhibitors

Industry Innovation Day
Dedicated exhibition visitor full day on Wednesday expanding on 2016 with technical industry presentations providing increased opportunity and value for local day visitors from across the industry at a very affordable price.

Partnership
An open and inclusive partnership offering encouraging more opportunities to show your support for the Conference to the delegates and industry at large.

Program
A two-day compressed and punchy plenary program with high profile, dynamic thought leaders.
A Business Leaders Lunch Forum jointly presented with Roads Australia. The Friday lunch will be the perfect opportunity to network with industry participants and hear from key leaders in the infrastructure sector.

Social Program
A networking focused Welcome Reception on Wednesday night to energise delegates for the official Conference opening on Thursday.
Premier Gala Dinner to celebrate the industry on Thursday night featuring high-profile entertainment and open to additional ticket holders.

The biennial Construction Materials Industry Conference will be held from the **19 – 21 September** at the **International Convention Centre (ICC), Sydney**.

Australia's Infrastructure Boom will be one and a half times the size of the recent Australian Mining Boom. The Construction Materials Industry must be ready for the challenge. To retain our community's right to operate, it is essential that our industry must innovate and evolve in a socially and environmentally sustainable way, meeting growing expectations.

CMIC18 is fast approaching, with the theme of '**Building Tomorrow's Australia**', focusing on some of the key drivers that will allow the Construction Materials Industry to deliver. This event aims to widen the scope of information exchange, educate the industry on trends and developments occurring within and outside of industry, while also providing concrete networking opportunities.

Once again, Cement Concrete and Aggregates Australia (CCAA) and the Institute of Quarrying Australia (IQA) have joined forces to host CMIC18.

CMIC18 offers an unparalleled opportunity for the Construction Materials Industry to wrestle with the challenges of the Infrastructure Boom.

Registration Now Open! Visit **cmic.com.au**

CMIC18

USWAG MEETING

SOILS CONFERENCE FOCUSING ON FA IN LAND APPLICATION

DR JANE AIKEN

Thank you to the ADAA for an opportunity to write an article for the Coal Ash Matters June 2018 publication. In previous articles, I addressed potential in using coal ash in soil and for Australian agriculture. Also, recently highlighting that working within the framework a resource recovery regulation there is the necessity to be vigilant in managing the supply chain for ash to land application. In this article, I lament a lack of tangible change and collectively, a lack of progress by the coal ash industry. We need a shared resource management vision. The goal is simple. Use more coal ash. Change our thinking into a paradigm that is coal ash being a mineral resource.

The reality is that during a twelve-year career focusing on coal ash utilisation, the records for ash reuse show minimal progress in commercial development. Coal ashes are being managed as raw wastes. Some ash gets used, but 80% will be pumped, dumped, disposed and placed in a landfill that we politely called a repository. For those of us still in the ash industry, the practical reality of ash repository management is that the sector lacks sustainable leadership.

We cannot claim to have more ash utilisation than ash production. Nor can it be said that we as participants have instigated an economic development program that is anywhere near a characteristic that is either sustainable or renewable. On the other hand, all good things take time. We have progressed. The coal ash industry now operates with materials reuse within the framework that is waste management. While this framework remains as an industry outside the cementitious arena, it will not be commercially viable.

Ash reuse in a framework of waste is not a sustainable business model for either the owners of the ash or the proponents, because the product traded is a 'raw' unprocessed material. Alternately, the CRC for Low Carbon Living identifies two promising pathways - geopolymer concrete in the construction industry and fly ash based manufactured lightweight synthetic aggregate for concrete. Why? Lightweight concretes offer superior insulation properties that can reduce energy consumption in buildings and reduce the dead weight and material handling cost in construction. Further, the rapid depletion of quality natural aggregate quarry sources close to most major metropolitan regions of Australia, emphasizes the need to explore alternative economic sources.

This has become imperative to support increasing vital infrastructure development, including housing, roads, bridges, schools and hospitals. In accepting the expert opinion, we now have our direction. The use of coal ash remains dedicated to the construction and building industry. Now, how to make this happen!

In my alternate world, the reality for a next decade ash repository industry is the progression into the concept of end-of-waste. We will also have turned our current 20% utilisation rate into 80%, and we will be in a complete-utilisation mind-set. There will be business hubs with expertise in ash management and manufacturing having established around the ash resources. The coal ash mineral will be a highly recognised commodity capable of significant contributions to the environmental paradigm of shared benefit. We will start a mineral extraction industry, supporting manufactured 'natural resources'. Our Australian coal ash minerals will be completely utilised in the construction, building and agricultural economic sectors. Our shared environmental vision will balance and lead sustainability as an economic business model.

> "THE GOAL IS SIMPLE. USE MORE COAL ASH."

[1] Direct reference from State of Practice: High Volume Applications of Fly Ash and Barriers to Commercialisation Research Project: RP1004-II. CRC-LCL

AMERICAN CONCRETE INSTITUTE
ACI COMMITTEE 232 ON FLY ASH IN CONCRETE

DR DAKSH BAWEJA

> **"THERE HAS NEVER BEEN A MORE CRITICAL TIME FOR US TO LOOK HOW WE MIGHT MEET THESE CHALLENGES."**

Committee Constitution:

Over the last four years, the Concrete Institute of Australia has been looking at strategies to work closer with the American Concrete Institute (ACI). These organisations are similar in their constitution. ACI is the biggest producer of technical information in the concrete field in the world. ACI has about 500 technical committees that operate in the area of concrete design, construction, materials and use. In 2017, the Concrete Institute set up a procedure with ACI to have Australian nominees represent on key technical committees with an Australian Reference Group to oversee input to these committees.

ACI Committee 232 focuses on Fly Ash in Concrete. It has a membership of over 70 people from North America and around the world. The Chairman of the committee is Professor Lawrence Sutter from Michigan Technological University. On this committee, I am the Australian nominee representing the Concrete Institute of Australia and I also represent the interests of the Ash Development Association of Australia (as National Technical Committee Chairman). With me on ACI 232 are my reference group being Craig Heidrich (ADAA), David Farah (AdBri), Warren South (CCAA), Tom Benn (UniSA) and Vute Sirivivatnanon (UTS).

Committee Output:

ACI 232 has a mission to "Develop and report information on the use of fly ash in concrete". This is similar to strategies being pursued by the ADAA National Technical Committee and the Concrete Institute of Australia, who have a Current Practice Note 25 dedicated to Fly Ash in Concrete. ACI 232 has a published report on the use of fly ash in concrete which has just been revised, designated ACI 232.2R-18. This is a major revision that has been under way for some years which provides a summary of activity in this area - important to our members and to broader users of the material.

ACI 232 have also recently developed a report on High Volume Fly Ash Concrete for Structural Applications (232.3R-14). In addition, Committee 232 was responsible for the development of the 232.1R-12 Report on the Use of Raw or Processed Natural Pozzolans in Concrete, which also led to the formation of a new Committee 240 on Pozzolans.

Other matters that ACI 232 has been considering include limits on the quantity of fly ash in concrete, a guide to its specification in concrete and the use of recovered ashes (pond ashes) in concrete applications. Their next meeting is in Las Vegas, USA in October, 2018.

Roles of ADAA, Concrete Institute, CCAA, Australian Recognised Research Authorities and ACI:

As previously discussed, there are some significant issues relating to fly ash and its general utilisation. ACI 232 provides a forum within which interested parties can come together to discuss these matters from a technical and application perspective. This is a major resource of information and strategic thinking outputs for our Australian community. Clearly, there are many issues that are key to ACI 232 that are also directly relevant to the ADAA and specifically, its National Technical Committee. In addition, the Concrete Institute of Australia's role in facilitating communication and direct access to ACI is critical to future collaboration. Other groups such as Cement Concrete and Aggregates Australia (CCAA) who represent members who have a direct interest in the supply of such materials is important. Finally, this is a forum where our local academics working in the field of binders and concrete can communicate with their counterparts in North America.

Summary:

The ACI, Concrete Institute and ADAA have been able to set up a mechanism by which liaison between North American and Australian practitioners and researchers can occur. I would encourage all interested parties in Australia to review the latest publication, ACI 232.2R-18, which provides a wealth of knowledge on issues relating to fly ash in concrete. With the current demands for sustainability, a drive to reduce cost, increased levels and costs of disposal of fly ash, increased level of imports of ash materials in Australia and more effective utilisation of stored ash, there has never been a more critical time for us to look how we might meet these challenges in future, knowing that what we have done in the past will not work in future.

THE FINAL DAYS OF THE COOPERATIVE RESEARCH CENTRE FOR LOW CARBON LIVING

The CRC for Low Carbon Living (CRC-LCL) is a national research and innovation hub aiming to drive Australia's built environment towards a low-carbon future.

With over 100 research projects commissioned with CSIRO and six universities, CRC-LCL are delivering outcomes to government and industry participants as well as the wider community.

CRC-LCL are approaching the final days of their five-year initiative. Here's a look back at their programs.

Program 1: Integrated Building Systems

Targeting next generation construction practices, this program aims to develop;

- Building-integrated multipurpose solar products,
- Low-carbon-lifecycle building construction components/materials,
- Integrated design, energy rating and reduction methodologies.

Program 2: Low Carbon Precincts

With an expected 60 per cent growth in Australia's population by 2050, infrastructure changes in the built environment will significantly influence the way energy is consumed and the resulting carbon signature. This program focuses on reducing the carbon footprint of urban systems, in particular, looking at integrating aspects of energy, water, waste, transport and buildings. CRC-LCL has developed, applied and tested new knowledge and tools that allow the design of low carbon infrastructure at the precinct scale.

Program 3: Engaged Communities

This program focuses on understanding and influencing consumer behaviour and decision making to reduce the community's carbon footprint. The results from this research will be used to develop community education and training resources.

LOW CARBON LIVING CRC

BUILDING COMMUNITY RESILIENCE
COASTAL PROTECTION USING HIGH DENSITY LOW CARBON CONCRETE

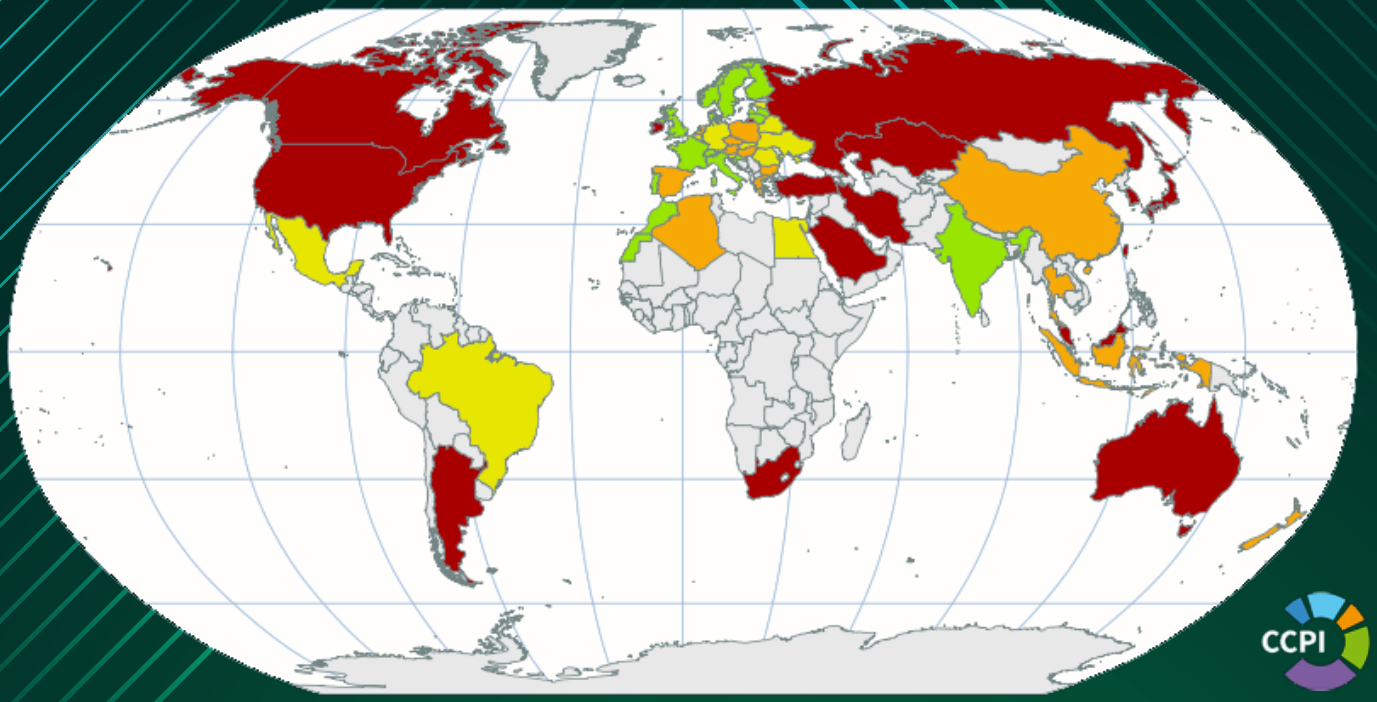
A recent project by the Cooperative Research Centre for Low Carbon Living (CRC-LCL) University of NSW hub aimed to perfect geopolymer concrete (GPC) for use in coastal construction applications.

Eight million tonnes of CO2 is produced annually by the manufacturer of portland cement in Australia. Fourteen million tonnes of fly ash and three million tonnes of slag is produced every year Australia-wide. By substituting portland cement with fly ash and slag to make GPC, significant CO2 reduction and economic benefits can be achieved. NSW Ports recognised this potential, hosting a field trial of GPC armour units in the northern breakwater at Port Kembla.

To do this, CRC-LCL worked with the maritime and concrete industries to perfect GPC for use in coastal constructions through research and development. The 18-tonne armour units made from high-density GPC were monitored for stability and integrity, providing a benchmark for the future use of GPC.

- Lower carbon footprint for the construction industry
- Contributes to the Circular Economy
- More resilient coastal communities through better infrastructure
- Simpler, efficient repair and adaptive measures for breakwaters and seawalls

EU RANKED BEHIND INDIA & BRAZIL ON CLIMATE ACTION



The European Union's first year in the Climate Change Performance Indicator (CCPI) rankings has landed them in the 21st spot globally, behind both India and Brazil.

CCPI Rating: Very Low | Low | Medium | High | Very High

The CCPI continuously measures countries' efforts in combating climate change. Given the difficulty in distinguishing strengths, weaknesses and varying interests and strategies, this provides a clearer understanding of international climate policy.

The Conference of the Parties, held in Paris in December 2015, outlined an international goal to limit global warming to "well below" 2°C and pursue efforts to limit warming to 1.5°C. To measure how well they are on track to achieving this, countries' developments and recent trends are compared in multiple categories; "GHG Emissions", "Renewable Energy" and "Energy Use", as well as the 2°C-compatibility of their current status and future targets in each category.

The EU consists of 28 nations, all with vast differences in individual performance. When combined, the EU accounts for about 8 percent of global GHG emissions. The union has rated "medium" in all three categories; emissions, renewables and energy use. The CCPI also ranks the EU as the 29th largest CO2 emitter among participating countries. For reference, Australia was ranked 57th with "very low" CO2 emissions.

According to experts, this is due to the EU's slow progress in establishing innovative policies and targets. Disagreements over the future of the European project have led to weak agreements, such as their failure to significantly improve the Emissions Trading System.

See the report at **https://www.climate-change-performance-index.org.**

COAL COMBUSTION *Products Factbook*

The Ash Development Association of Australia (ADAA) are excited to announce our latest e-publication endeavour - the Coal Combustion Products FactBook - with the primary objective to communicate the complex ideas about coal combustion products to a broader and less technical audience.

The FactBook employs a simple 'story telling' methodology to disseminate complex ideas. The eBook is available on mobile and tablet devices, meaning you will have all you need to know about CCPs right there in your pocket.

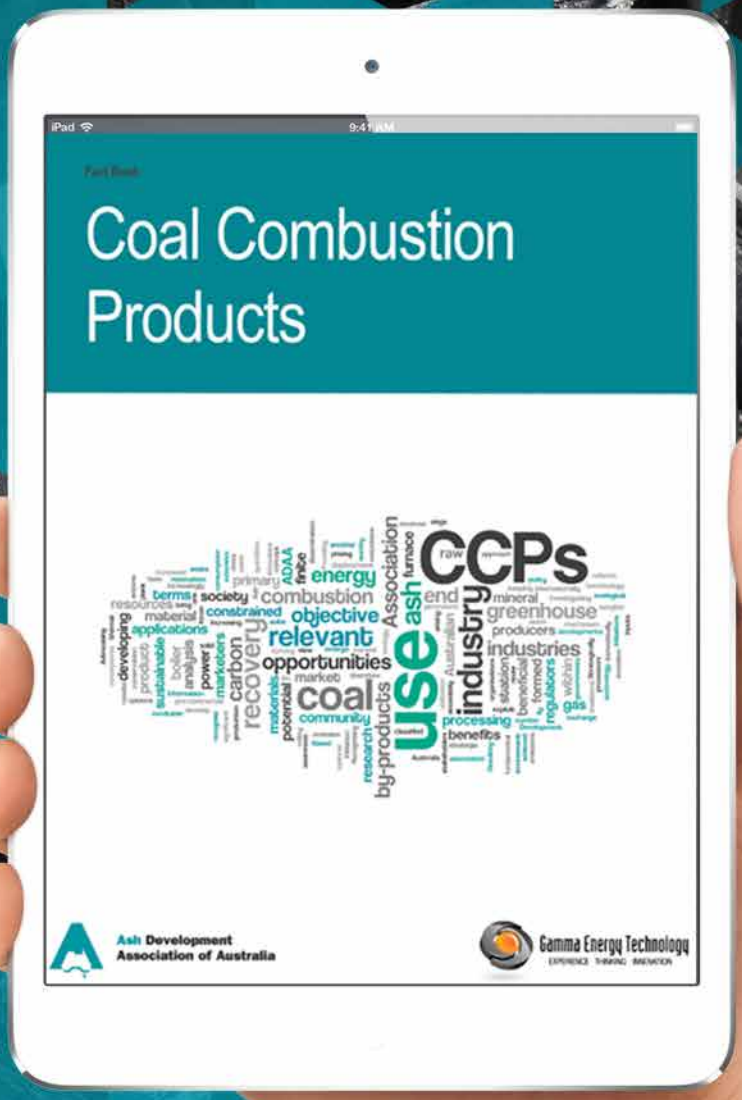
The FactBook covers the essential beginners pack to understanding CCPs including:

Coal Combustion Product Summary
"Australia produces approximately 13 million tonnes of coal combustion products annually. The majority of this material is not beneficially used despite a range of utilisation opportunities."

Coal Formation
"The quality, quantity and location of coal is not uniformly distributed and the nature of the mineral matter also varies significantly."

Coal Combustion Product Collection
"Fly ash constitutes up to 90% of the coal combustion products from a coal-fired power station."

Coal Combustion Product Use
"There are mature industries which utilise coal combustion products - some require simple transformation, others more elaborate processing."



FREQUENTLY ASKED QUESTIONS

Q. What is a FactBook?
A. It is a proven, simple 'story telling' methodology to communicate complex ideas to a broad range of audiences.

Q. How can the FactBook improve my understanding of coal combustion products?
A. The ***FactBook*** helps breaks down complex concepts into easily understandable ideas and demystifies coal combustion and resulting by-products with references for further reading.

Q. Who is the FactBook targeted at?
A. Anyone who needs to systematise, simplify and unlock the value of coal combustion products so they can disseminate understanding.

The CCP FactBook is available to download now across a range of eBook platforms and operating systems including Apple iBooks, Amazon and the Google Play Store.

GEOPOLYMER HANDBOOK

COAL COMBUSTION PRODUCTS HANDBOOK 2ND EDITION

The new edition of the Coal Combustion Products Handbook continues the strong relationship developed between researchers, industry experts and the energy industry.

Advances in the understanding of coal combustion products (CCPs) and their uses have led to the release of this second edition. The handbook provides a very useful resource for industry, researchers and potential users of CCPs.

The Coal Combustion Products Handbook: Second Edition is now available to purchase via **the ADAA Store**.

fib congress 2018

BETTER | SMARTER | STRONGER

The fib 2018 Congress will be held from 7 – 11 October at Melbourne's Convention and Exhibition Centre (MCEC).

The objectives of fib (Fédération internationale du béton / International Federation for Structural Concrete) are to develop the study of scientific and practical matters that are capable of advancing the technical, economic, aesthetic and environmental performance of concrete construction.

The fib Congress is held every four years and helps facilitate the stimulation of research and education necessary to achieve these objectives.

This year, fib will be hosted by The Concrete Institute of Australia. The theme **'Better - Smarter - Stronger'** will focus on bringing together international thought leaders and practitioners in the concrete industry. The Congress will feature a Welcome Cocktail Function, fib Awards Ceremony, Congress Dinner and a four-day technical program with technical and keynote presentations and site tours. Early bird registrations close on **6 July**, so register now!

Programme themes include:

- Design & Construction
- Models & Design for Durability
- Ultra-High Performance Concrete
- Concrete Materials
- New Concrete Materials
- History of Concrete
- Structural Strengthening
- Seismic
- Alkali-Activated & Geopolymer Concrete
- Concrete Deterioration Mechanisms

CONCRETE 2019

CONCRETE IN PRACTICE - PROGRESS THROUGH KNOWLEDGE

The Concrete Institute of Australia's 29th biennial national conference will be held from 8 – 11 September 2019 at the International Convention Centre (ICC) in Sydney.

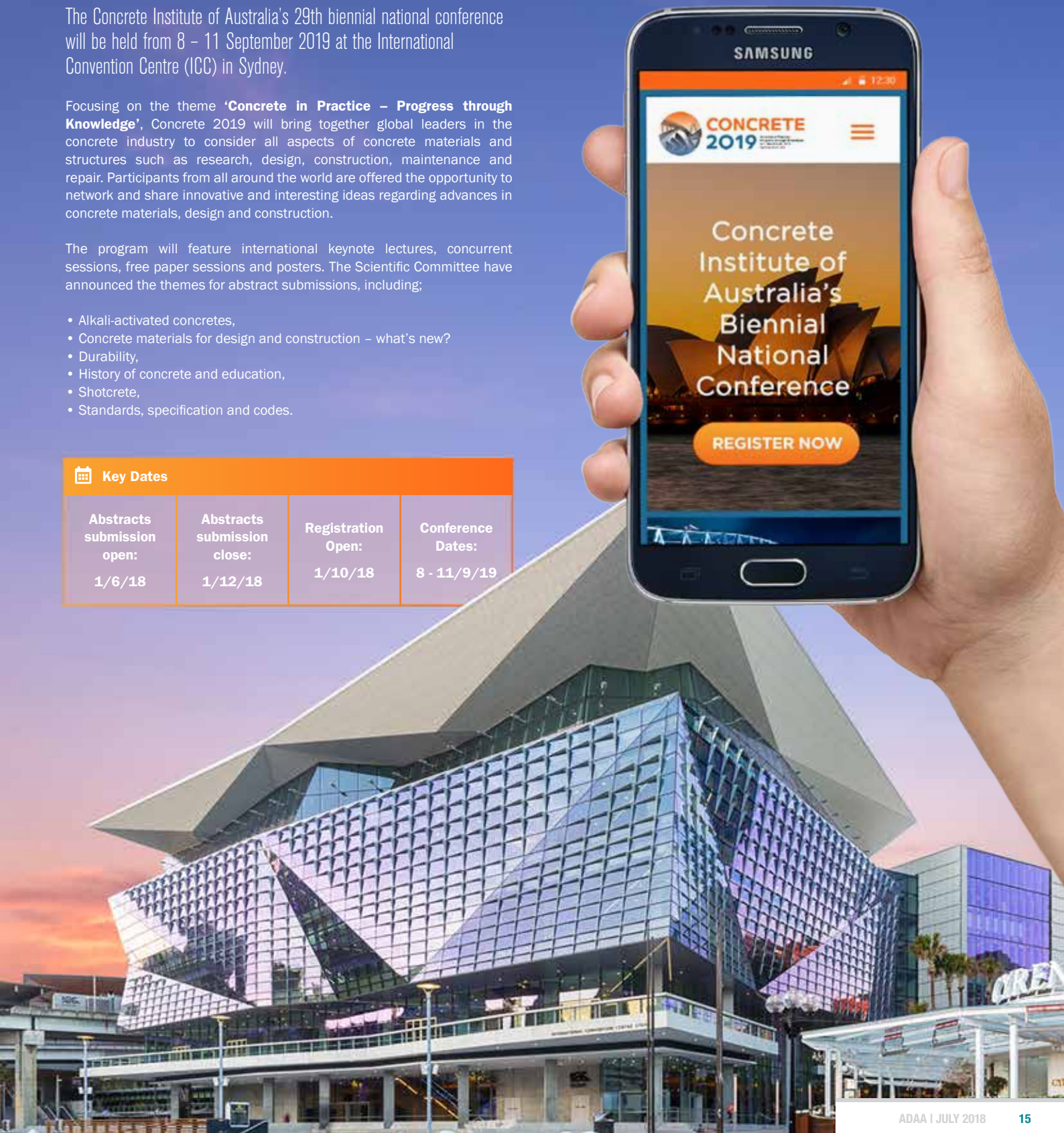
Focusing on the theme **'Concrete in Practice – Progress through Knowledge'**, Concrete 2019 will bring together global leaders in the concrete industry to consider all aspects of concrete materials and structures such as research, design, construction, maintenance and repair. Participants from all around the world are offered the opportunity to network and share innovative and interesting ideas regarding advances in concrete materials, design and construction.

The program will feature international keynote lectures, concurrent sessions, free paper sessions and posters. The Scientific Committee have announced the themes for abstract submissions, including;

- Alkali-activated concretes,
- Concrete materials for design and construction – what's new?
- Durability,
- History of concrete and education,
- Shotcrete,
- Standards, specification and codes.

Key Dates

Abstracts submission open:	Abstracts submission close:	Registration Open:	Conference Dates:
1/6/18	1/12/18	1/10/18	8 - 11/9/19



CONFERENCE UPDATES

WORLD OF CONCRETE® 2018

THE INDUSTRY'S ONLY ANNUAL INTERNATIONAL EVENT DEDICATED TO THE COMMERCIAL CONCRETE AND MASONRY CONSTRUCTION INDUSTRIES.

World of Concrete 2018 was held in Las Vegas from 23 – 26 January 2018. Over 58,000 registered professionals, 1,500 exhibitors and tens of thousands of visitors gathered at the Las Vegas Convention Center to experience the largest World of Concrete in nine years.

Leading industry suppliers showcased innovative products, technologies and a world-class education program. Demonstrations and competitions provided participants with interactive opportunities at the industry's only international event.

Craig Heidrich, Ash Development Association of Australia CEO, attended WOC18 on behalf of the association. He presented on Iron and Steel Slags: Global Perspective on the Circular Economy and reported on the changing paradigms of ISS as a globally traded commodity and the impacts on investment. The event provided an opportunity to showcase the ADAA's activities and connect with many international industry personnel, increasing our database of contacts.

World of Concrete 2019 will be held from **22 – 25 January 2019**, once again at the **Las Vegas Convention Center**.

New Member - Ultimate Housing Solutions

Ultimate Housing Solutions is an innovative construction company with a senior management team that has deep industry expertise in operating businesses, building homes and designing construction systems.

Ultimate Housing Solutions (UHS) is an innovative construction company using low value fly ash to manufacture durable and economic walling solution for the World Construction Industry.

UHS have developed The Modular Locking Wall System ('U'Panel), based on years of scientific research and practical experience. Over half the main ingredients in this walling solution are fly ash. In Australia, 12 million tonnes of fly ash is produced per year and currently only 43% of that is reused. Just one of UHS' plants producing 100,000sqm of walls will use 6000 tonne of fly ash per year.

The 'U'Panel's practical, economic and simplistic approach will significantly affect the way residential and commercial buildings are constructed in the future.

The 'U'Panel system can reduce build time by 75% (compared with bricklaying), creating cost efficiencies through faster installation times, without the need for skilled labour. This system is extremely strong, able to withstand a category 4 cyclone (230km/h) and strong enough to build double storey houses. It has also passed water penetration tests due to the 'U'Panel's unique offset locking system.

No transporting of wet concrete is required as all mixing is done in plant to produce panels, delivering ready-to-use panels to site for installation. It is the complete solution for internal and external walls.

UHS plans to manufacture, distribute and sell the 'U'Panel system from their plant in NSW.

Learn more about Ultimate Housing Solutions here:
www.ultimatehousing.com.au

JAMIE NORTH

DRIFTING TO VOID (2016)

Drifting to Void (2016) presents as an eroded brick column inhabited by a community of plant species native to the Illawarra. The form of the column has as its reference points various columns of antiquity, in addition to more modern industrial stacks. This industrial reference is reinforced by the use of blast furnace slag along the eroded edges of the column.

Each brick within the column was moulded and cast individually to fit exactly within its prescribed place. Rather than using mortar to set the bricks in place, the bricks fit together in mutual dependency and are secured by being thread onto a steel armature. The column was made as a homage to my father, who was both a bricklayer and coal miner.

For more information, visit www.jamienorth.com

WE WANT YOUR FEEDBACK

MEMBERSHIP SURVEY REMINDER

CCPs produced from coal-fired power stations represent useful sources of raw materials for a range of applications and products. In addition to the new ash produced each year, the ash already stored (estimated to be in-excess of 400 million tonnes) in ponds and other storage sites represents shallow-lying mineral deposits that are more readily accessible than many equivalent geological materials.

The utilisation of CCPs in a variety of both high and low value add products helps to conserve natural resources such as sands and gravels. This reduces the environmental impact that would otherwise be caused by mining these resources. In addition, the need to construct additional storage facilities at the power stations can be deferred or even eliminated.

The ADAA conducts an annual survey for information regarding CCP production and sales by members and non-members for each calendar year to determine the utilisation of CCPs annually. Information provided by members and non-members is collated and then aggregated into a national set of results and include CCP production levels, and nominated uses for all CCPs.

The survey results include all generators, marketers, (processing and marketing companies) and users for the total production and resulting sales by each end use. **To complete the 2018 Membership Survey** please fill out via link below and email completed spreadsheet to: info@adaa.asn.au.
ADAA> Technical> Membership Survey>2018> 2018_ADAA_Membership survey

WRITE FOR COAL ASH MATTERS

Coal Ash Matters is the ADAA's main educational publication that is produced twice a year for the benefit of ADAA members and readers. Before each publication is drafted, an email is sent out to all members, urging them to contribute stories that they think are of interest. The types of content we are looking for include:

- New Developments
- Technological Innovations
- New Projects
- New Employees
- Industry Research

If you have an idea or some content that you think should be shared with the CCP community, get in contact with the Editor, Emma Bruce at 02 4228 1389 or email: publications@adaa.asn.au

SUBSCRIBE TO COAL ASH matters

www.adaa.asn.au