

# The Electric Energy Society of Australia

## A word from your President



### Get Ready for an Emissions Trading Election

December 2009 will go down in Australian political history as the month the government and opposition consensus on the ETS fell apart. The Senate's rejection of the ETS legislation is a tipping point in the development of environmental policy. While many in the community are disappointed with the outcome, I'm optimistic that the added scrutiny this change will bring to the ETS will produce a better outcome for Australia.

Make no mistake, even though an ETS has not been enacted, it has already had big impacts on the electricity industry. When I hear politicians say the ETS cannot have increased electricity prices because it has not been enacted yet, I know they don't understand the impact of their actions.

The anticipation of an ETS in combination with the renewable energy incentive schemes has already caused a shift of investment from coal powered generation to wind, solar and natural gas. Investment in coal generation is extremely risky because of a looming ETS while investment in wind, solar and other renewables is also risky because they are totally reliant on the maintenance of government's incentive schemes that could evaporate into the future. Natural gas is the current fuel of choice resulting in cheaper power stations but higher fuel costs. What this means is that all generation has been under a risk cloud for some years. High risks put off new investment and as a result we are all paying a substantial risk premium for our energy.

The political events of the December 2009 have already resulted in even higher levels of uncertainty and I anticipate higher electricity costs will result.

The good thing about the upcoming federal election is that the focus of the ETS will put the microscope on the climate change issues. What has been completely lacking is any scrutiny of the underlying scientific justification of man made climate change. For me this has been the most frustrating part of the ETS debate to date. Almost all politicians and commentators have just taken the "CO2 is bad" argument as a given. Now that the old government/opposition consensus is dead, we are now in a position to have a more thorough and wide-ranging debate. The CO2 issue needs to be brought into perspective with all the other environmental issues. This election is shaping up to be quite unique in our history.

The electricity industry will continue in this uncertain environment. Generation investment will become riskier and electricity prices will be pushed higher in the short term. Wholesale electricity markets will factor in all the uncertainty. I have confidence that we will ride through the bumps and I look forward to a more stable energy environment after all the political transients die away.

### Christmas Greetings

I'd like to wish all our EESA members and EESA friends the very best for the Christmas season. We have had a very successful year with major conferences in Queensland and NSW as well as many other events across Australia.

2010 is shaping up to be a most interesting year for the electricity industry. I'm looking forward to that Christmas /New Year break that most of us enjoy to recharge the batteries and enjoy the company of family and friends. So enjoy the break and come back in 2010 with renewed energy for the challenges that lie ahead.

Dr Robert Barr  
EESA National President



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Please email submissions by 5 February 2010 to the Bulletin Editor,  
Patrick McMullan on pmcmullan@energy.com.au

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## Queensland Chapter News

### EESA Technical Program

#### Arcing Faults in Electrical Equipment: Dr David Sweeting, 18 November 2009

EESA 2009 Conway Prize Winner Dr David Sweeting presented a paper on arcing faults in electrical equipment at the Schneider auditorium in Eagle Farm, Brisbane.

The presentation provided a practical insight into electrical arcing hazards including elements from recent ground breaking papers, and was illustrated using high speed colour movies, recorded at 10,000 frames per second. Research work completed recently by Dr. David Sweeting is leading the world in better ways to protect our people who operate electrical apparatus.

The presentation included new study results in an ongoing process of better understanding the impact of arcing faults and how to provide protection against such faults”

1) In 2003 Dr. David Sweeting and Prof. A.D.Stokes presented a paper entitled ‘Electric Arc Burn Hazards’ to the 7th International Conference on Electric Fuses and their Applications in Gdansk Poland and subsequently at the 2004 IEEE PCIC Conference in San Francisco. This appeared with much discussion in IEEE Transactions on Industrial Applications in 2006. This paper explained that the physics of electrical arcing faults was significantly different to that assumed in NFPA 70E and IEE 1584. The major criticism during PCIC was that Sweeting and Stokes had destroyed the existing methodology without providing a replacement.

2) In 2007, Dr. Sweeting presented ‘Energy Transfers within Arcing Faults in Electrical Equipment’ to the 8th International Conference on Electric Fuses and their Applications to describe the physics of arcing faults and used this to explain the energy transfers within an arcing fault. Whilst the first paper explained what arcing faults are not, the second paper explains what they are in order to provide a basis for future standards development.

3) In 2008, Dr. Sweeting presented ‘Electrocutions and Arcs’ at the EESA-NSW conference in Sydney. This paper explains why victims survive high voltage electrocutions and will have a significant impact on PPE.



Dr Sweeting emphasizes the power of arcing faults

### UQ Student award

#### Electrical branch AGM 11/11/2009

The first of a series of joint student awards given by the Electrical Branch of Engineers Australia and EESA was awarded during the branch AGM held at the Powerlink offices in Northgate, Brisbane, on 11 November 2009.

Our congratulations go to David Edwards, who is completing his studies at the University of Queensland (UQ). The UQ criteria for the award are:

- 1) The student must be in his/her final year in the year of award (graduating either in Semester 1 or Semester 2),
  - 2) Selection is based on the overall GPA at the end of the first semester of the year of graduation.
  - 3) The student must have completed at least two third or fourth level power engineering courses by the end of the first semester of the year of graduation.
  - 4) The student must be undertaking or have completed a thesis project in the area of power engineering.
- The award consists of a Medal and a Certificate. A cash premium of \$500 is awarded by EESA.



In the picture taken at the award are (left to right) Prof. Tapan Saha (UQ), David Edwards, Kevin Nuttal (EESA)

### Facebook: Moving with the times

The Queensland chapter has recently proven that it is not just a collection of near-extinct power engineer dinosaurs by setting up a group on Facebook. The group is called “EESA Qld: Electric Energy Society of Australia – Queensland” and anyone can join. The technical program is announced to the members of the group, and feedback on events is given. Please feel free to join and comment.

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## NSW Chapter News

### EESA NSW State Conference – October 29,30 at the Power House Museum.

The EESA NSW Annual Conference was held once again at the Powerhouse Museum at Darling Harbour a location which continues to be very popular and convenient to the conference participants. The theme for this year's conference "Managing the Winds of Change" addressed the ongoing evolution in energy networks and the new drivers emerging that will change its nature and operation. All this in an environment of changing regulatory structures, an emphasis on overall sustainability, intelligent grid applications, an uptake in embedded generation and an unprecedented public spend by NSW energy utilities to replace aging networks and still cope with ongoing growth in energy demands.

The conference started with a keynote address looking at the emerging role world wide for nuclear energy presented by Tony Irwin from ANSTO and was followed by a series of thought provoking keynote addresses from major energy figures in the electricity supply industry including George Maltabarow from EnergyAustralia , Kevin Murray from TransGrid ,Rod Howard from Integral Energy , Col Ussher from Country Energy and Matt Zema the new CEO of the Australian Energy Market Operator. Dr Ralph Craven from Ergon and Bob Simpson from Transpower, New Zealand also presented their thoughts on the complex issues confronting the industry.

This plenary session was attended by nearly 160 conference participants all of whom benefited from the views and analyses of the industry that we work in.

Then in the company of fellow utility members there were one and a half days of industry learning to be enjoyed as current energy concerns and issues were discussed and clarified. Industry experts provided timely papers and discussions on topics such as implementing Embedded Generation into Networks , aspects of Power Quality , introducing and implementing Smart Networks and the progress to date , details of current large energy projects in NSW, climate change and its impact on networks, asset management challenges and solutions, smart energy meters and updates on safety aspects and the role of standards in the energy industry. As the speakers were drawn mainly from the energy supply industry the problems and solutions discussed were real and current.

The conference finale was another plenary session with the new topic of "Recovery from large scale disasters – lessons learnt and future challenges". This was well attended and provided a fascinating insight into large scale disasters and blackouts across the world which was balanced with some presentations on local disasters and emergencies closer to home and the lessons learnt from them.

Awards were presented for the "Best paper at the conference" from a non-member and member of EESA and these were won respectively by Ty Christopher from Integral Energy for his presentation entitled "Planning for the Parramatta CBD Upgrade", and Dr Robert Barr for his presentation entitled "A simplified approach to the management of harmonics in distribution networks".

The conference provided an invaluable opportunity to catch up with energy industry developments from a 'macro and micro' view as well as encouraging many networking opportunities with colleagues from other networks and manufacturers. A notable feature of this conference was the large number of young engineers present and it is to be hoped that this trend continues.

Once again the conference was very strongly supported by industry and utilities alike and so there is a special thanks to our sponsors, with our corporate members EnergyAustralia , Integral Energy , Country Energy and TransGrid taking up Gold Sponsorship and ActewAGL Bronze sponsorship. Schneider Electric this year was the host for the very popular conference dinner and the dinner speaker, an "expert" on climate change had tongues wagging well into the night.

The exhibitors , who are a major feature of these conferences excelled in their trade displays of equipment and software and promotional items and a large and interested throng of conference members were usually to be found amongst the exhibitors as opportunities presented themselves.

The conference in Sydney in 2010 will be the EESA National Conference and so we are moving to a larger venue and bringing the timing of the conference forward to the 2 and 3 September 2010.



### **Burning Fuels Thermodynamic Crime: MacKay**

Perry Sioshanshi in the December EEnergy Informer writes what do you get when you appoint a smart and independent-minded expert as your chief scientific advisor? You get sensible but blunt advice that has not been filtered by the PR experts, embarrassing friends and surprising foes.

That is precisely what happened when Professor David MacKay was appointed as the UK government's chief scientific advisor starting in October 2009. Even before taking the job, he told BBC that UK's greenhouse gas emissions were probably twice as bad as the official figures suggest. Any reductions in CO2 since 1990 were "an illusion" as "our energy footprint has decreased over the last few decades and that's largely because we've exported our industry," he said.

On his first day as chief scientific advisor he declared, "Britain could never live on its own renewables. If the aim is to get off fossil fuels, we need nuclear power or solar power generated in other countries' deserts, or both," adding that by 2050 Britain would need three times more generation capacity than today, partly to cut emissions from road transport, which currently accounts for roughly a third of all UK emissions. This, he said could only be done by introducing "millions" of electric vehicles charged by carbon-free nuclear energy.

He wants to see an end to the use of gas for central heating and the replacement of boilers with heat pumps that extract heat from the atmosphere. But that is not all. Professor MacKay said, "Setting fire to chemicals like gas should be made a thermodynamic crime," adding, "If people want heat they should be forced to get it from heat pumps. That would be a sensible piece of legislation."

What about carbon capture and sequestration (CCS) technology? It is untried technology and it could not be relied on.

Barely a week later, he told the Times that the UK's nuclear power generation capacity should be quadrupled as it was the only way Britain could meet rising demand for electricity while keeping greenhouse gas emissions under control. He said renewable energy would never provide more than a fraction of Britain's power needs, not exactly in synch with the official government pronouncements.

A Cambridge University Professor, MacKay is the author of the book Sustainable Energy – Without the hot air, available for download at [www.withouthotair.com/download.html](http://www.withouthotair.com/download.html). The book is essentially an expose of many popular but impractical and/or absurd ideas on how we can save energy and reduce our carbon footprint.

### **Chemists Describe Solar Energy Progress And Challenges, Including The 'Artificial Leaf'**

ScienceDaily (Nov. 6, 2009) — Scientists are making progress toward development of an "artificial leaf" that mimics a real leaf's chemical magic with photosynthesis -- but instead converts sunlight and water into a liquid fuel such as methanol for cars and trucks. That is among the conclusions in a newly-available report from top authorities on solar energy who met at the 1st Annual Chemical Sciences and Society Symposium. The gathering launched a new effort to initiate international cooperation and innovative thinking on the global energy challenge.

The scientists pointed out during the meeting that plants use solar energy when they capture and convert sunlight into chemical fuel through photosynthesis. The process involves the conversion of water and carbon dioxide into sugars as well as oxygen and hydrogen. Scientists have been successful in mimicking this fuel-making process, termed artificial photosynthesis, but now must find ways of doing so in ways that can be used commercially. Participants described progress toward this goal and the scientific challenges that must be met before solar can be a viable alternative to fossil fuels.

### **Award of Peter Nicol Russell Memorial Medal**

Engineers Australia has presented its most prestigious individual award for 2009, the Peter Nicol Russell Memorial Medal, to Professor Mike Dureau. "Mike Dureau has contributed enormously to Australia's wellbeing as an industry leader, and generously through his contributions to the engineering profession, education and the community," said the citation. He retired from industry as the president of ABB Alstom Power in Australasia a few years ago. Since then he has been chairman of RedR Australia and International RedR, and now holds the position of Chairman and Chief Executive of the Warren Centre in Sydney.

### **Engineers Australia's Make It So Campaign**

Daniel Indyk from EnergyAustralia is the winner of the \$1500 barbecue in the BBQ description competition, part of Engineers Australia's Make It So Campaign.

Indyk's entry was chosen for its originality and brevity. He said:

"Engineering is the discipline of using I(E)NGINUITY combined with the known laws of science to design and create devices and systems that improve the overall quality of life for mankind."

His use of the word ingenuity captured the essence of engineering inventiveness and originality.