

A word from your President

Are Our Electricity Customers Ready for a Blackstart?



The customer and political outrage caused by recent power outages in the CBD of Sydney has highlighted the total disconnect between what customers expect as normal and what modern power systems can deliver. Our systems have been so reliable for such a long period of time that near perfect reliability performance is now considered normal.

By their very nature, modern power systems are fragile and always vulnerable to outages. Having an N-1 or even an N-2 redundant supply is no guarantee of perfect reliability or even near perfect reliability. Common mode failures, protection malfunctions, adverse weather conditions, natural disasters and simple human errors are always threatening our power systems. Power system collapse is the ultimate low risk high consequence event. In my view, the "normal" things that go wrong in our power systems far outweigh the risks to our systems from terrorism. Customers, politicians, and electricity businesses be aware!

The main threat to our communities is not the failure of our power systems, but failing to understand that power outages are an inevitable part of our world. As customers we need to be able to deal with power interruptions without loss of life, personal injury, major pollution events or large economic loss. Every year we are becoming more and more reliant on our power systems. Continued added reliance on a system vulnerable to major collapse is a threat to us all.

The recent Sydney CBD outage shows how unprepared customers are for a New York style total power system collapse. While the risk per year of a major collapse of the interconnected Queensland, NSW, ACT, Victoria, Tasmania and South Australia system is low, it is not zero. Each passing day brings use closer to the next blackstart. The public need to understand that a system collapse followed by a blackstart could leave many customers without power for more than a day. We all need to understand that a major power system collapse is inevitable over the long term. Such events will occur on average about every 25 years. Without wishing to sound alarmist, most parts of Australia are overdue. When it happens, it will occur without warning and the fallout will be immense.

We have a responsibility to help our customers plan for the inevitable major power interruptions that will occur in future years. The priority needs to be in preventing loss of life, preventing personal injury, preventing major pollution events and preventing large economic loss. Simply ask your customers if they could cope with a 24 hour loss of electricity supply. Asking that question on a frequent basis and preventing an over reliance on our power systems is something we have a duty to do.

EESA Arc Hazard Seminar Coming to Perth

Shane Duryea has plans in place for Dr David Sweeting to deliver his Arc Hazard Seminar in Perth on the evening of Tuesday 12 May 2009. I will be attending and I look forward to assisting Shane in invigorating the EESA in Western Australia.

Dr Robert Barr, EESA National President

Dates for your diary.....

- **Country Energy's Intelligent Network Centre and the Impact of small-scale Renewable Generation**

Queanbeyan, Thursday 30 April

Register quickly as places are limited!

For more information go to www.eesa.asn.au

or [click here](#)

- **EESA National Conference 2009**
Smart Grid, Smart Energy, Smart People

5-7th August, Conrad Jupiters

Gold Coast, Queensland

For more information go to

www.eesa.iamevents.com.au

The Electric Energy Society of Australia

News and issues from around the Industry...

EnergyAustralia and IBM Unite for Large-Scale Smart Grid Implementation (Source: Marketwire 31 March 2009)

EnergyAustralia, Australia's largest electricity distribution network, today announced an agreement with IBM for the implementation of an energy network monitoring and control solution.

A key project within EnergyAustralia's overall intelligent network program, the Distribution Monitoring and Control (DM&C) project involves the roll-out of 12,000 sensing devices throughout the electricity distribution network, creating a smart grid. The project will enable EnergyAustralia to deliver energy more efficiently and reliably, and allow a greater number and range of environmental solutions to be integrated into the electricity network such as renewable energy.

Under the agreement signed in the first quarter of this year, IBM will design and build the system IT architecture to support the project, in which sensing devices will connect with EnergyAustralia's operational systems using a combination of fourth generation and existing technologies. This world-class intelligent network will carry the necessary data for EnergyAustralia to reduce outages through faster fault location and preventative maintenance and, to work towards managing distributed energy sources such as solar and storage devices. EnergyAustralia's Managing Director George Maltabarow said the project was an important part of the company's initial investment of \$170 million in its smart network rollout.

"This project will help us stay at the forefront of the global intelligent network transformation," Mr. Maltabarow said. "It will give us an instant picture of the electricity network which will help shorten power interruptions by allowing us to quickly locate and repair faults. "It will also mean preventative maintenance can be better targeted so we can avoid faults and outages in the first place."

EnergyAustralia began its intelligent network program in 2006. It was the first utility in the world to build and operate a communications network using carrier grade Internet Protocol (IP) technology. EnergyAustralia has also rolled out 800 kilometres of fibre optic cable to its 200 major substations and depots, installed hundreds of communications switches, and built a trial telecommunications network to allow two-way communication across its electricity network.

For more information see <http://www.energy.com.au/energy/ea.nsf/Content/Splash>

Improved recognition in NSW for engineers (Source: Engineers Australia enews 30 March 2009)

Following legislative changes, engineers accredited under the National Professional Engineers Register (NPER) will now be continually recognised by the NSW Building Professionals Board. This recognition was previously governed by a time-dependent sunset clause in the board's accreditation scheme which expired on 1 March. Following efforts by Engineers Australia's national office and Divisions, the NSW minister for planning approved that the clause be deleted. This now means NPER registration is continually recognised under clause 12.3 of the scheme.

'Elder' statesman of electricity (Source: The Goldburn Post 9 February 2009)

ONE of Country Energy's talented employees, Leith Elder has recently been made an honorary professor in recognition for his outstanding contribution to the electricity industry. (Leith is a strong supporter of EESA and has presented papers at a number of EESA conferences). The University of Wollongong invited Mr. Elder to the prestigious position of Visiting Professorial Fellow of the School of Electrical, Computer and Telecommunications Engineering. The University awarded Mr. Elder with the professorship to thank him for his contribution to the University and his efforts in assisting engineers across the globe. He was a pioneer of the NSW electricity industry and has written and introduced a number of different software packages that are still used today for designing and analysing the electricity network.

Don't Like Coal? Try More Energy Efficiency (Source: EEnergy Informer April 2009)

Adopting energy efficiency measures could cut 30% of US electricity use. Anti coal and the environmental lobbies received a timely gift in the form of another report from the energy efficiency sage of Snow Mass, Colorado, the Rocky Mountain Institute (RMI), founded by Amory Lovins. The report, *Assessing the Electric Productivity Gap and the U.S. Efficiency Opportunity*, which comes with a clever interactive web tool at <http://ert.rmi.org/cgu> concludes that closing a national "electric productivity gap" could curtail up to 30% of current electric power consumption nationwide. Not surprisingly, the RMI report finds large disparities in electric productivity among states, defined as how much gross domestic product (GDP) is produced for each kilowatt-hour consumed. If the "laggard states achieved the electric productivity of the top 10 performing states by adopting best practices for energy efficiency, more than 60 percent of coal-fired generation could be displaced in the country."

Aurecon (Source: Australian Financial Review 16 March 2009)

Connell Wagner (Pty) Ltd, one of Asia Pacific's largest and most experienced multi-disciplinary infrastructure consulting companies, Africon (Pty) Ltd, South Africa's largest privately owned infrastructure consultancy, and Ninham Shand (Pty) Ltd, one of South Africa's most established engineering and environmental consultancies, have confirmed that they have come together to form a new multi-disciplinary global group. The group will be known as Aurecon.

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Batteries now included: The missing piece of the electric-car jigsaw has just turned up

(Source: *The Economist* print edition 12 March 2009)

IF YOU want to buy an electric car, you can. Tesla Motors, a firm based in San Carlos, California, will sell you a nifty open-top sports job for \$109,000. Not cheap, admittedly, but cheap to run. Plugged in overnight, it can be refuelled for the equivalent of 25 cents a litre of petrol. The catch is, "plugged in overnight". Tesla's vehicles use standard lithium-ion battery cells. As any owner of a mobile phone or laptop computer knows, these take time to charge. If you use 6,831 of them, as a Tesla sports car does, that time does tend to drag on. Which is fine if you are not planning a long trip the following day, for a full charge will take you about 350km (220 miles).

Gerbrand Ceder and Byoungwoo Kang of the Massachusetts Institute of Technology hope to change this, and thus help make the electric car a work-a-day consumer item, rather than a high-end boy's toy. In this week's *Nature* they have published the technical details of a new battery material that will, if all goes well, take the waiting out of wanting, at least when it comes to recharging.

What Dr Ceder and Mr Kang have done is create electrodes that are made of two different materials, one of which is good at storing ions while the other is good at conducting them. The two substances themselves are arranged in tiny spheres less than 50 billionths of a metre across. The core of each sphere is a crystal of lithium iron phosphate. This acts as a standard battery material. The surface, however, is made of a glassy (ie, non-crystalline) form of lithium phosphate. This lithium-phosphate glass is good at conducting lithium ions, though it cannot actually store many. It thus acts as a supercapacitor. The result is that any ion arriving at a sphere is quickly conducted around the surface by the supercapacitor phase until it finds its way to the right place to enter the battery phase in the core—or, if the battery in question is being charged, the other way round.

The really clever bit, though, is how the spheres are made. They crystallise from a melt that does not have enough iron in it to become pure lithium iron phosphate, so eventually no more of that material can form as the melt cools down. From then on the growing sphere is just lithium phosphate and, by manipulating the conditions, the researchers were able to make the coating glassy rather than crystalline.

The result is a material that, when tested in experimental batteries, was able to charge and discharge in a few seconds. In the future, therefore, that weekend in the south of France need not be interrupted by running out of juice.

http://www.economist.com/science/displaystory.cfm?story_id=13277371

Aurora's \$3 lifesaver (Source: *Hobart Mercury* 24 February 2009)

MOST Tasmanians do not know that simply turning on a tap or a metallic household appliance may kill them. But with roughly one to two complaints of tingling taps or flickering lights received by Aurora Energy each month, the threat is a ticking time-bomb. Dr Peter Davis in February officially launched the CablePI device that is aimed at detecting a dangerous electrical fault that has challenged the electrical industry for decades.

Aurora has spent more than \$2 million on the invention and production of a world-first device aimed at potentially saving lives around the globe. The small device, which looks like a plug-in air freshener, plugs into your power socket and can detect a "broken neutral", which inventor Eric Myers says is a relatively common but potentially lethal problem. It costs roughly \$3 a year to operate and Aurora, which holds the patent for the invention, hopes it will become mandatory in houses around the country and even the world.

Dr Davis said the device, which is not available now, will eventually be delivered for free to all Tasmanian households. "People just don't know this threat exists," he said. "Broken neutrals are potentially life-threatening and have the capacity to direct dangerous voltages into household objects." I encourage people when they get one of these to plug it in and continually check if the green light is on." A green light indicates that the active current coming into the house is being released properly through the neutral, or if the neutral is broken, the earth wire. An orange light indicates high or low voltage and a red light indicates a threat of electrocution.

Dr Davis said households should contact Aurora immediately if anything other than the green light comes on. "This is essentially like a smoke detector. If a smoke detector goes off you go looking for the smoke or the fire and you deal with it.

http://www.themercury.com.au/article/2009/02/24/57325_tasmania-news.html

Recent Honour for EESA Member (Source: *Camden Advertiser* 28 January 2009)

"Rod Howard, General Manager Network Development and Control at Integral Energy, has been awarded a Public Service Medal in the 2009 Australia Day Awards for outstanding service to Integral Energy. Rod's award reflects the high regard in which he is held by his peers and stakeholders in the energy industry and is based on his significant contribution as a senior executive in the NSW electricity supply industry for more than 35 years."

<http://camden.yourguide.com.au/news/local/news/general/a-winner-passes-on-the-credit/1417534.aspx>

Bulletin 3, June-July 2009:

Please email submissions by 12 June 2009 to the Bulletin Editor,
Patrick McMullan on pmcmullan@energy.com.au

The Electric Energy Society of Australia

EESA South Australia Chapter News

"Hot Rocks Potential" Seminar

On 18 March 2009 in Engineering House, North Adelaide, Terry Kallis, Managing Director of Petratherm Ltd., provided an up date on the progress of Petratherm's projects to exploit "Hot Rocks Potential" and develop it as a future form of commercial power generation in South Australia.

Terry's presentation described the technology and the business development, exploration, drilling and reservoir development activities of the company, with particular reference to the flagship project at Paralana in the Northern Flinders Ranges. Having an up front exploration focus, plans are now underway for the company to drill an injection well of approximately 4 kilometres depth.

There were about 75 attendees at the seminar. Many thanks to the EESA National Committee members for attending the seminar.

Coming Events:

Planning for a Carbon Constrained Future

A seminar is to be held at Engineering House, North Adelaide, on Wednesday 6 May 2009 on this subject. Paul Breslin of ACIL Tasman will deliver a presentation on his summary report for the esaa, "The Impact of an ETS on the Energy Supply Industry". This report describes the future profile of generation in Australia in 2020 under an Emissions Trading Scheme.

There will also be a presentation by David Swift of Electricity Supply Industry Planning Council to provide a South Australian perspective of a carbon constrained future.

Technical Aspects of Wind Turbine Operation

This seminar will be held at Engineering House, North Adelaide, on Tuesday 16 June 2009. The talk will be delivered by Graham White of Garrad Hassan. It will cover the operational and maintenance aspects of wind turbines, learned from their field experience.

Martyn Pearce

Chairman, South Australia Chapter

NSW Chapter News

Site Visit / Seminar

TRUenergy's Tallawarra 400 MW power Station and Integral Energy's 132 / 33 kV Transmission Substation

Twenty four EESA members and guests attended the site visit / seminar arranged by the EESA as part of its program of providing opportunities for ongoing professional development.

The EESA members were welcomed by John McIntyre, Plant Manager, TRUenergy, who provided an excellent introduction to the 435 MW power station, which is Australia's most energy efficient, large scale, combined cycle, generation facility. The plant is based just south of Wollongong and operates on natural gas. The Alstom GT 26 turbine is rated at 288 MW, with the waste heat from the turbine driving a HSRG, providing steam to an Alstom triple casing, triple pressure, reheat 160 MW steam turbine. These turbines operate on a single shaft with the alternator located between them. The alternator is supported on a 750 tonne base which can be shifted sideways for alternator maintenance. The total station efficiency is 59% and produces 65% less greenhouse gas emissions than the average Australian coal fired plant.

The EESA members also inspected Integral's latest subtransmission substation which is in the commissioning stage. This substation is connected to the Tallawarra power station, has a transformation capacity of 540 MVA and transforms 132 kV into 33 kV for the Wollongong and associated industrial loads. Greg Schafer hosted the detailed inspection and was ably assisted by a number of Integral engineering experts in relation to the 132 kV and the 33 kV indoor gas insulated switchgear and the 60 and 120 MVA transformers. Inspection was also undertaken of the massive cable basement and cable tunnels.

Upcoming Events

EPECentre PQ Conference 2009 "Power Quality in Future Electrical Networks"

23 - 24 April 2009, University of Canterbury, Christchurch, New Zealand. For more information go to www.epecentre.ac.nz

Electricity Supply Industry Field Days -6 & 7 May 2009

Energy Australia will host the annual Electricity Supply Industry Field Days event at the Dome, Sydney Showground, Sydney Olympic Park on the 6,7 May 2009.

The event comprises an exhibition, seminar, competitions and demonstrations all aimed at further improving safety training and awareness for those associated with the electricity supply industry. The theme for these 2009 Field Days is "Watts New - Watts Safe." Entry is free for all participants and the web site is www.fielddayswithenergy.com.au.

Accredited training programs will again be available to allow industry participants the chance to improve their qualifications by enrolling in safety-related training courses.