

## A word from your President



### Smart Grids, Smart Energy & Smart People!

Smart Grids, Smart Energy & Smart People was the theme of the 2009 EESA national conference recently held on the Gold Coast. The “smart” theme generated an enormous number of informative, carefully prepared and well executed presentations. The Queensland location was a show case for the premium sponsor ABB and the major sponsors Energex and Ergon. In addition to the quality of the papers, the dual stream and 30 minute format made the conference a pleasure to attend.

What the conference highlighted is that the “Smart Grid” means different things to different people. For some it is smart metering, for others it is network automation or bidirectional power flows with embedded generation. For some it is a philosophy that empowers customers to make better more informed choices. Whatever the smart grid is going to be, it is clearly going to be part of our future network evolution. Below are a some of my predictions on the evolution of the smart grid:

**Smart Grid Prediction 1 :** Stronger networks and more capital expenditures will be required to cater for embedded generators and directional power flows. All my work keeps showing that embedded generation is not “negative load”. Timing differences between wind generation, solar generation and the daily distribution load cycle means a wider dynamic loading range for distribution assets. This has major ramifications for network investment needs.

**Smart Grid Prediction 2:** New metering will have a lot more capability and will need to give customers feedback and price signalling. Automatic meter remote reading, power quality monitoring and loss of supply reporting will become the norm.

**Smart Grid Prediction 3:** Bare overhead mains at 11kV and 22kV will be replaced over time with underground and Aerial Bundled Conductor systems. This will improve reliability and voltage sag performance.

**Smart Grid Prediction 4:** Our radial 11kV and 22kV systems will become more meshed with the introduction of more sophisticated and faster protection schemes. This will improve reliability, voltage sag performance and reduce losses.

**Smart Grid Prediction 5:** Our power industry will need more staff with I.T. and telecommunication skills.

**Smart Grid Prediction 6:** Regulators will have trouble incorporating the “Smart Grid” concepts into their responsibilities. They will struggle with the cost and value balance. Power Quality and Reliability issues are not well understood by customers. Reliability is only really valued by customers when it is absent. Power quality impacts on equipment performance and reduced equipment life and is so unclear to customers that it is almost impossible for them to assign a sensible value. The industry will become more dependant on regulators taking up the key role of the pseudo “informed” and “rational” customer. That is, regulators will need to make economic choices for customers based on what customers would want if they were very highly informed on reliability and power quality issues.

In conclusion I’d like to thank Lawrie Cleary,( The EESA Queensland Chapter Chairman), Greg Bartlet (Conference Convener), Anthony Bordignon (I AM EVENTS) and the full organising committee consisting of Keith Callighan (Powerlink), Louise Gillis (INGAL EPS), Ross Grainger (Aurecon Group), Mark Hibbert (Aurecon Group), Marius Jansen (Avera T&D), Rowan Kendal (Ergon), Ian Nichols (Transfield Services), Kevin Nuttall (Energex) and Ben Prinsloo (Schneider Electric) for organising such a successful conference.

### 2010 & 2011 EESA National Conferences

At our recent national committee meeting in Queensland it was decided to hold the 2010 National conference in Sydney and the 2011 conference in Hobart. Dates and other details will become available on our web site.

### EESA Electricity NSW Conference 28-30 October 2009

This conference is shaping up to be a very special event. Patrick McMullan has put together a fabulous program. The theme of this year’s event is “Managing the Winds of Change”. With Gold sponsors EnergyAustralia, Integral Energy, Country Energy, TransGrid and Bronze Sponsor ActewAGL this conference is set to be a 1st class event.

Dr Robert Barr  
EESA National President

# The Electric Energy Society of Australia

## News and issues from around the Industry...

### Britain Unveils Plan To Curb Carbon Emissions

Barely a week after the inconclusive G8 summit in Italy, British secretary of state for energy and climate change, Ed Miliband, released a white paper that spells out a path to cut UK's greenhouse gas emissions by 34% by 2020 relative to 1990 levels. This represents an 18% reduction from current levels, not an insignificant feat if it can be accomplished. A big if.

The plan envisions a massive change in electric power generation mix by 2020 – increasing the role of renewables from 6% to 31 while reducing coal's share from 32% to 22. Nuclear, while heavily favored by the current UK government, will not have sufficient time to grow in this time frame, actually falling in relative terms. The plan calls for "up to" 10 new nuclear power plants, but their long construction time means that even if built quickly, they will barely make up for those expected to retire by 2020.

### With So Much Cheap Gas Who Needs Coal?

Coal has been under attack for environmental and health reasons for some time in the US, and to a lesser extent, in Europe even before climate change became a household word. Now, with so much effort to reduce carbon emissions, coal-fired power plants are getting serious pushback. Making matters worse for coal is a glut of natural gas with prices well below their recent peaks. These factors have combined to make investment in new coal-fired plants a non-starter in many developing countries as governments ponder how they are going to curb their carbon emissions in the future.

The opportunity to gain market share away from coal has not been lost on those in the natural gas business. America's Natural Gas Alliance, a trade group, has been running adverts in print media with the slogan "We can cut carbon emissions by over 50% – today." How? By simply switching the relative contributions of coal and natural gas in the current fuel mix of the US electric power sector. ANGA claims that, "American natural gas power plants are ready – not someday, but today – to produce as much as 50% of our nation's electricity."

### Ceramic Fuel Cells and GDF Suez move ahead with development of CHP units for French market

Ceramic Fuel Cells Limited (ASX/AIM: CFU), a global leader in fuel cell development, has extended its agreement with GDF Suez to develop and deploy fuel cell micro combined heat and power (mCHP) units in France

Ceramic Fuel Cells' heat and power units convert natural gas to electricity and heat, providing power and heating for homes and other buildings. GDF Suez has agreed to fund their share of the development of a fully integrated mCHP, comprising a fuel cell module from Ceramic Fuel Cells together with a condensing boiler from the De Dietrich Remeha Group. The mCHP unit will produce up to 2kW of power and provide hot water for use in French households.

Ceramic Fuel Cells and De Dietrich Remeha expect to deliver the first fully integrated unit to GDF Suez in late November 2009. The integrated mCHP will be operated at GDF Suez's test facilities in Paris. This mCHP will have all the functionality expected of a commercial mCHP product. In parallel the parties will work on the next version of the mCHP for deployment in large numbers.

This agreement to move to the next stage of product development follows the successful completion of the first phase of the partners' product development. In this phase a semi-integrated prototype unit was developed in order to meet GDF Suez's performance and lifetime requirements for the French market.

The company's heat and power units have achieved electrical efficiencies of 60 per cent while exporting power to the grid. This electrical efficiency is far higher than any other micro combined heat and power technology. Ceramic Fuel Cells is also developing products with leading utility and appliance partners in Germany, the United Kingdom and Japan.

### New Concern: Minimum, Not Peak, Load From EEnergy Informer June 09 – Perry Sioshansi

Renewable energy resources are everyone's favourite, but come with problems of their own. Traditionally a grid operators' worst nightmare was how to get through a hot summer day's peak demand period without a glitch. Since most electrical systems are summer peaking, having sufficient generation to meet the peak air conditioning demand still is a worrisome challenge for most grid operators.

But as more renewable energy resources are added in many parts of the world, a new and even more daunting challenge is likely to face grid operators in the future – how to get through the minimum demand periods. This is especially a problem in systems where the difference between the day time peak, usually in the early to late summer afternoons, and minimum load, usually in the late evening and early morning hours, is significant.

cont....

# The Electric Energy Society of Australia

For example, in the Electric Reliability Council of Texas (ERCOT), summer time peak load may be as high as 64 GW while minimum load could be as low as 22 – that is a staggering 42 GW swing, which currently intermediate and peaking units must manage. It is not an easy problem to address. California Independent System Operator (CAISO) faces similar pronounced daily swings on its network during typical summer days. Peak demand during the 2006 summer heat wave exceeded 50 GW while minimum load could be in the mid 20 GW range.

Add significant amounts of wind generation and the problem becomes considerably worse because wind tends to blow hardest at night and early morning hours when the load is at its lowest. Making matters worse, during the peak demand periods, wind could be all but absent when it is needed the most.

During the California's heat wave in 2006, for example, average wind generation at 4 pm was around 400 MW, out of an installed capacity of 2,700 MW. Solar energy, on the other hand, tends to be much better correlated with demand patterns on most summer peaking systems, but tends to be a much smaller resource at the present. In Texas where over 10 GW of wind is expected by 2010, it is already creating problems.

Moreover, the combined effect of generous financial subsidies and mandatory renewable portfolio standards (RPS), suggests significant new wind, and to a lesser degree, solar generation for the foreseeable future. In 2008, for example, 42% of new US capacity additions were wind, 8,300 MW. The American Wind Energy Association (AWEA) predicts that more than half of new generation built in the US over the next 3 years will come from wind. One way to absorb wind generation during off-peak hours is to charge the batteries of electric vehicles – and some thinking is going into schemes such as this.

Advocates of renewable energy believe that the US can get 20% of its electricity from wind by 2030, even more if we add other renewables such as solar, small hydro, geothermal and bio fuel. But add more non-dispatchable renewables and managing the minimum load problem becomes an even bigger headache than it already is.

## The Efficient Solution – Power to the People

Posted Energy Blogs.com at : July 31, 2009 by Chris Dreibelbis

Two new reports in July highlight the essential role that energy efficiency will play in reducing energy use and carbon emissions. The new analyses on the immense benefits of efficiency and what it will take to achieve them underscore the need to actively engage and involve the public in energy and climate policy.

A new report from the American Council for an Energy Efficient Economy finds that energy efficiency will substantially reduce greenhouse gas emissions and cut consumers' energy bills in half by 2050.

Likewise, a study from McKinsey and Company finds that an aggressive national energy efficiency strategy will save 17% of U.S. 2005 CO2 emissions in ten years at a net savings of \$700 billion to U.S. consumers and businesses. The savings would exceed the upfront investment needed to realize these measures.

The "central conclusion" of the study is "Energy efficiency offers a vast, low-cost energy resource for the U.S. economy – but only if the nation can craft a comprehensive and innovative approach to unlock it. Significant and persistent barriers will need to be addressed at multiple levels to stimulate demand for energy efficiency and manage its delivery across more than 100 million buildings and literally billions of devices. If executed at scale, a holistic approach would yield gross energy savings worth more than \$1.2 trillion, well above the \$520 billion needed through 2020 for upfront investment in efficiency measures (not including program costs). Such a program is estimated to reduce end-use energy consumption in 2020 by 9.1 quadrillion BTUs, roughly 23 percent of projected demand, potentially abating up to 1.1 gigatons of greenhouse gases annually."

Fostering innovative technologies and undertaking ambitious initiatives will be vital to enhancing efficiency on the scale called for in the reports. However it must be recognized that at the heart of making this work will be encouraging businesses and consumers to change their habits significantly. Among the observations of the report is the need to "Forge greater alignment between utilities, regulators, government agencies, manufacturers, and energy consumers." Collaboration among all stakeholders and education to the public will be vital to realizing the full potential of efficiency.

The new reports accentuate the need for policymakers to connect with the nation's greatest resource – its people – in confronting its energy challenges. All of us, as energy consumers, must be brought into the national effort to reduce greenhouse emissions and reliance on carbon-based energy.

**Bulletin 5, October - November 2009:**

Please email submissions by 9 October 2009 to the Bulletin Editor,  
Patrick McMullan on pmcmullan@energy.com.au

# The Electric Energy Society of Australia

## EPRI: Full portfolio of technologies key to cutting carbon

Palo Alto, Calif., August 3, 2009 – The Electric Power Research Institute (EPRI) today released updated "Prism and Merge" analyses that show a full portfolio of electricity sector technologies could simultaneously address the challenge of growing load demand while meeting carbon constraints and limiting increases in the cost of electricity

The research shows that the sector could potentially reduce annual CO2 emissions in 2030 by 41 percent relative to 2005 emissions levels, but that it will require sustained research, development and demonstration and aggressive deployment of the full technology portfolio. The full portfolio includes coal-fired generation with carbon capture and storage, renewable resources, and nuclear generation, as well as significant efficiency improvements throughout the electricity production and delivery system and reduced consumption through end-use efficiency.

The full portfolio requires deployment of advanced technologies by 2030 comparable to those assumed in the Prism analysis; an 8 percent reduction in electricity consumption through improved end-use efficiency; 45 new nuclear units; new renewables generation equivalent to four-fold increase in current wind and solar generation capacity; and 100 million plug-in electric vehicles.

An increase in the use of decarbonized electricity through electro-technologies present opportunities to reduce CO2 emissions in applications such as heat pumps, water heaters, ovens, induction melting and furnaces.

"Our analyses clearly show the imperative for the electricity sector to move aggressively to deploy a full portfolio of technologies that will lead to low-carbon energy future while limiting costs to the nation's economy," said Steve Specker, EPRI president and chief executive officer.

The results indicate that the full portfolio could reduce the cost to the U.S. economy of reducing emissions by more than \$1 trillion by 2050. Deployment of the full portfolio could result in an 80 percent increase in the real wholesale cost of electricity by 2050 relative to current costs, compared with a projected increase of more than 210 percent with a limited portfolio.

If expended today these costs would represent an average of about \$16,000 per household in the full portfolio scenario compared to \$28,400 in a limited portfolio that excludes new nuclear generation or carbon capture and storage.

## A Tribute to Allan Charles Moore 1915 - 2009



Those EESA members and others who knew Allan Moore will be saddened to learn of his death on 24th July 2009. Bob Low below has recalled some of the history of a man who played a major role in the development of the electricity distribution system

Allan began his career in 1931 at the Riverstone Meatworks as an Electrical Fitters Apprentice, but he will be remembered as the inaugural Chief Electrical Engineer of Prospect County Council (now known as Integral Energy).

At the formation of Prospect County Council on 1st January 1957 Allan was elected Chief Electrical Engineer to oversee the technical structure and system of supply for the new organisation. The formation of this single purpose council included the amalgamation of the electricity departments of the Baulkham Hills, Blacktown, Fairfield and Holroyd Local Government Councils and the Parramatta Electric Supply Company. It was brought about to cope with the spectacular residential, commercial and industrial development then taking place in the Western Region of Sydney.

One of Allan's first tasks was to divide the area into a number of districts, each under the supervision of a District Engineer being responsible for supply to customers and inspection of installations. Later, other areas were added and the sub-transmission systems were purchased from the Electricity Commission of NSW at a higher voltage than before. This allowed bulk supply to be provided at a more favourable tariff. At the time of Allan's retirement Prospect County Council was the second largest in NSW.

Allan took an active interest in the Electricity Supply Engineers' Association of NSW (ESEA), the forerunner of the Electric Energy Society of Australia (EESA). He was awarded the Conway Prize for his outstanding paper "The Electrical Distribution Problems Associated with All Electric Housing Commission Homes". This was presented at the 1953 Annual Conference. He served on the Board of the ESEA for several years and was elected President for the 1954-1955 year.

Throughout his career Allan was ably supported by his wife Stella. They married in 1941 and Stella died in 2005. They had two children, Eleanor and John (deceased), and there are five grandchildren. Allan and Stella retired to Henry Kendall Village at Wyoming and enjoyed their life there, following many varied interests. Allan was able to do everything for himself until the day he died.

### A further tribute to Alan Moore – Chief Electrical Engineer Prospect Country Council

I was very saddened to hear of the death of EESA life member Alan Moore. Alan was the Chief Electrical Engineer when I joined Prospect County Council in 1972. I look back on his life and professional achievements with great respect.

Allan played a key leading role in the electrification of Western Sydney at a time when there were enormous challenges requiring innovation, focus and a real sense of purpose. I see him as the father of the modern day Integral Energy and a person who made an outstanding contribution to the people of Western Sydney. He will be missed by all who knew him.

Dr Robert Barr, EESA National President

# The Electric Energy Society of Australia

## NSW Chapter News

### Nominations to the EESA NSW State Chapter Committee

NSW members are invited to submit their nomination for a position on the State Chapter Committee. The existing members are Bob Smith, David Barr, Neville Cooper, Patrick McMullan, Peter Dulhunty, Maurice Overy, Tony Patterson, Larry Meng, Robert Barr, Paul Russell, David Sweeting, Chris Dalitz, Bob Parkinson, Dennis Stanley and Ray Thorn and all are expected to re-nominate. If necessary, an election will be conducted at the NSW AGM at the NSW annual conference on the 30th October. Meetings are generally held at Chatswood monthly, but there are several corresponding committee members who are unable to attend each meeting. Nomination forms should be returned to Bob Smith. Please click [here](#) to download the nomination forms.

## ENERGY NSW 2009 Conference & Exhibition

The one constant in the energy sector seems to be change and the electricity sector in NSW is no exception. The local news seems to be full of equipment failures, concerns about equipment age and reliability, the sale of the NSW electricity retail businesses as well as generation blocks of power and how private enterprise is being wooed to buy these assets. Is it a fire sale or a shrewd move transferring risk to the private sector – you decide! This in an environment of changing regulatory structures, an emphasis on energy sustainability, an economic downturn (did I say recession) and an unprecedented public spend by utilities in the electricity sector in NSW to replace aging infrastructure and cope with ongoing growth in energy demands.

As every state in Australia is widely adopting strategies regarding sustainability, emissions offsets and reducing our footprint on the environment, the challenge for our industry is to work as one to be a part of the solution to these challenges. At the same time, the growth in demand for electricity is putting pressure on all aspects of supply and delivery, including ageing networks and the supply of skilled resources, equipment and materials.

**The Electric Energy Society of Australia** NSW State conference and exhibition in 2009 will examine a number of these issues and seek to provide informed and timely guidance on how the industry is dealing with them in the short and longer term. The conference theme is “Managing the winds of change” which aptly encapsulates the challenges facing the electricity energy sector. The conference is again being held in the Powerhouse Museum located in the heart of Sydney. This makes for an excellent opportunity to come to Sydney and enjoy the other aspects of this exciting city.

The conference has a number of dedicated sessions dealing with topical areas of interest to electricity industry participants. These include :

- Climate Change and its impact on Networks
- The Growth Challenge – Planning, designing and delivering new large ambitious projects
- The progress on Smart Networks and Smart Energy Meters
- The Challenge of implementing embedded generation into Networks
- The Safety and Communications Challenge – new solutions and standards
- Recovery from large scale disasters – what have we learned?

Limited opportunities remain for sponsorship and exhibition for the conference.

**For more information please visit the EESA website at – [www.eesa.asn.au](http://www.eesa.asn.au) and click on the NSW Events page.**

**Alternatively, please contact the conference managers:  
The Meetings Managers on [meetings@tmm.com.au](mailto:meetings@tmm.com.au) or 02 9810 7322.**

