

A word from your president



Visiting the Energy Centre of the World

I've just returned from a brief visit to the Middle East. Not the unfriendly parts of Afghanistan or Iraq but the friendly parts of Dubai and Abu Dhabi. The development of Dubai as a world class business and commercial centre is well in hand and has to be seen to be believed. The Burj Khalifa (tallest building in the world) and Dubai Shopping Mall (largest shopping centre in the world) complete with large aquarium are the outward signs of this rapidly growing economy.

Dubai and Abu Dhabi are living the energy dream. While oil reserves provide massive income for the United Arab Emirates, it also provides a cheap source of electricity that is a key part of their national development. This is an area where fresh water is more valuable than oil. With the desert landscape providing minimal natural water resources, energy intensive water desalination and cheap energy are the key elements to sustaining the cities and the region. I have no doubt that cheap energy and plentiful supplies of desalinated water will drive the future ongoing growth and development of this region.

From what I could see as a visitor, not only does the UAE have massive energy reserves but they have built a lifestyle that requires massive amounts of energy to sustain. Desalinated water is not only used for normal drinking water and domestic purposes, but also agricultural irrigation, industry and to create oasis like city green parks and manicured suburban road median strips from the desert sands. In combination with the very widespread use of air conditioning, I don't think that I have ever seen a more energy intensive society.

Energy is the key weapon against the harsh natural desert environment. Without low cost electricity, this society could not exist in its present form. Low cost energy is the key to transforming a harsh dry desert landscape into a lush comfortable place for the masses. A special place to visit, holiday and do business.

The use of energy in this way brings into question sustainability. While energy use in the Middle East can grow while large oil reserves remain, the challenge will be to keep it going when the oil runs out. While this is unlikely to happen in my lifetime, the UAE need to start planning how it can be done. While the desert provides a significant "solar" resource, the UAE energy use is on such a large scale, in my view, nuclear seems to be the only long term viable solution.

In Australia, we experiment with high cost solar and other renewables to try and achieve sustainability, while many parts of the world are full steam ahead living the low cost energy dream where long term sustainability is not yet a priority.

Sydney 2010 and Hobart 2011 National EESA Conferences

I congratulate our chapter chair Bob Smith and the NSW chapter committee on organising and delivering a most successful 2010 national conference. Special thanks to our Gold Sponsors EnergyAustralia, Integral Energy, Country Energy and TransGrid, Silver Sponsor Wilson Transformer, Bronze Sponsor ActewAGL, Dinner Sponsor ABB and Welcome Reception Sponsor Schneider Electric.

Our focus now is looking forward to our next national conference, EECON2011 Hobart, set for 6-8 April 2011.

Dr Robert Barr
EESA National President



E R Y (Bob) Smith Awarded EESA Honorary Life Membership



At our recent National Conference it was my great privilege to present honorary EESA life membership to Bob Smith.

Bob graduated with first class honours from Sydney University in a combined mechanical and electrical engineering degree. Bob spent his entire working career in the design, production, sales and management departments of the organisation manufacturing utility meters. He spent 6 months with Westinghouse USA studying world trends in metering in addition to working with most major European meter manufacturers.

In 1965, as Chief Design Engineer of Email Ltd he designed the first Australian made single phase meter with magnetic bearings and extended load range. The basic design is still current today and has demonstrated a maintenance free life in excess of 40 years under extreme Australian conditions.

On the international stage, Bob represented Australia at all meetings of the peak international (IEC) meter committee TC13 for about 20 years and also the IEE Metering & Tariff conferences in the UK.

On the standards front, Bob was a member of many Standards Australia metering committees for over 35 years and chaired their Electrotechnology Standards Sector Board for a period. He was also a commissioner with the National Standards Commission for 6 years.

Bob chaired the executive of the D2000 (later E21C) conferences from 1998 to 2009.

Bob is currently chair of the NSW chapter of the Electric Energy Society of Australia where he has made a huge contribution to the society for many years. I've always found Bob to be a person of immense integrity who has made and continues to make great contributions to the EESA and the Australian electricity industry. Bob is a most worthy recipient of EESA life membership and I congratulate him on his award and his distinguished career.

Dr Robert Barr, EESA National President

National Conference 2011

**EESA 87th National Conference EECON2011
6-8 April 2011, Wrest Point Conference Centre
Hobart, Tasmania**

"Future energy ... empowering sustainable solutions"

EECON2011 is what the 87th EESA National Conference will now be known as, and delegates are invited to meet in Hobart early next year. EECON2011 will reflect a number of major changes to the conference, notably the early date to overcome conflict with competing events. The EECON2011 Organising Committee is challenged to be innovative, different and exciting.

The vision for EECON2011 addresses the idea that the demographic of the delegates needs to better represent the industry at large. In particular the number of Young Engineers, Women in Power Engineering, Overseas Qualified Engineers, Engineering Associates and Technologists practising in the Industry, represent an opportunity to attract a new demographic to the conference. Registration fees have been set to attract a changing cohort and in particular, to challenge senior engineers to bring younger engineers along and to present a joint front in presenting a paper on a topic on which both may have worked. The Call for Papers is now open. You have until the end of October to submit an abstract online. Our theme - "Future energy ... empowering sustainable solutions" - is designed to encourage greater participation from young engineers.

EESA's purpose is to represent members of Engineers Australia who have an interest in the field of electric energy. This field is defined as generation, transmission, distribution, retail and customer end-use of electric energy, however the Conference is dominated by transmission and distribution. We also hope to attract electrical engineers from other parts of the industry such as the emerging renewable/sustainable energy sector, Public Private Partnerships and the end use Customer.

The shared vision for EECON2011 is the opportunity for change. It is an opportunity to bring together the future of the Industry and give them a chance to showcase their achievements and share their visions of how they may take over and lead the Energy Supply Industry as the elders of the Industry inevitably move towards retirement.

EECON2011 in Hobart, Tasmania should set an Agenda for a reform in the way the Industry provides Continued Professional Development to our future Leaders.

Further details from <http://www.eesa.asn.au/events/national>



Europe's Ambitious 'Green Grid' Plan

To boost new energy sources such as wind, solar, and tidal, nine countries will link up producers through a €30 billion smart grid under the North Sea

Valentina Pop in Bloomberg Business Week

Nine north-western European countries are planning a giant underwater energy grid in the North Sea linked to wind farms, tidal power stations and hydroelectric plants.

Thousands of kilometers of high-tech energy cables are set to be laid on the seabed of the North Sea in the coming ten years, in what will become Europe's groundbreaking energy park, Germany's Sueddeutsche Zeitung newspaper reports.

The cables would link existing and new windmills off the German and British coasts with Belgian and Danish tidal power stations and Norwegian hydroelectric plants. The €30 billion project would compensate for the irregular nature of renewable energy and provide a steady flow to the countries involved.

Germany, Great Britain, France, Denmark, Sweden, the Netherlands, Belgium, Ireland and Luxembourg are behind the project. Officials aim to sign a binding agreement by the end of 2010. The project is mainly going to be funded by energy firms, which will be drawn into the negotiations. It is expected to produce 100 gigawatts of power.

The EU hopes to generate a fifth of its electricity needs from renewable energy sources by 2020, a move which requires new modern energy grids, capable of absorbing the fluctuations of wind and solar energy.

http://www.businessweek.com/globalbiz/content/jan2010/gb2010017_256132.htm

IEA Energy Technology Data Exchange update

IEA Energy Technology Bulletin No 71

Since 1987, the IEA Energy Technology Data Exchange (ETDE) has been building up vast stores of crucial energy-related scientific, technical and policy information. Its ETDEWEB database now offers more than 4.3 million worldwide energy literature references spanning a multitude of energy fields. ETDE is one of the IEA international energy technology collaborative programmes. More than 100 countries now have access to its ETDEWEB database. The programme is exploiting advances in information technology to ensure that scientists, researchers, engineers and policy makers around the world can capture ETDE's massive resources of information. Brian Hitson, ETDE's Executive Committee Chair provides an update in his article "ETDE: Quenching the Thirst for Energy Research and Technology Knowledge".

<http://www.iea.org/impagr/cip/pdf/Issue71ETDE.pdf>

Spurring energy technology innovation

IEA Energy Technology Bulletin No 71

Speeding innovative low-carbon energy technologies from laboratory to market requires both the "push" of demonstration and the "pull" of market deployment. It calls for comprehensive national energy technology strategies bringing governments and industry together in a process that links basic science to applied energy research, ensures that R&D resources are well spent and catalyses market uptake. To gain more insight on fostering the necessary linkages, the IEA has launched an "Accelerating Energy Technology Innovation" project, providing an international forum to facilitate peer exchange on good practice, including shaping custom-made national strategic programmes. It is underpinned by an informal advisory group of more than 100 members from government, academia, non-governmental organisation and business, in both IEA and non-IEA countries. The summary document and presentations from the project's kick-off meeting in June can be downloaded, along with presentations and other material.

http://www.iea.org/work/workshopdetail.asp?WS_ID=475

Standby power and low-energy networks

IEA Energy Technology Bulletin No 71

It is more than 20 years since standby power was first pinpointed as a policy-making issue. Today, standby power is still a concern, notably because of the growing number of electronic products that eat up electricity in low-power modes and the expanding use of network-connected equipment. A recently published downloadable study, Standby Power and Low Energy Networks - issues and directions, takes an exhaustive look at this complex subject. The 157-page scoping study has been released by the 4E Standby Power Annex of the IEA Efficient Electrical End-Use Equipment programme (4E), in conjunction with the Asia Pacific Partnership on Clean Development and Climate. It explores the technical issues, identifies potential solutions and offers recommendations. Also downloadable from the 4E website are proceedings from the International Monitoring, Verification and Enforcement Conference - Saving More Energy Through Compliance, co-organised by 4E in London on 14-16 September 2010. 4E is an IEA international collaborative programme.

<http://www.iea-4e.org/events/compliance-conference>

Vattenfall inaugurates world's largest offshore wind farm

Vattenfall has opened the world's largest offshore wind farm, Thanet Offshore Wind Farm, off England's south east coast. The wind farm has 100 turbines and will generate electricity equivalent to the annual consumption of over 200,000 British households.

Wind power is an important part of the energy mix for Vattenfall which is one of the leading European energy companies. Between 2009 and 2011, the company will double its wind power electricity generation, constructing nine wind farms in six countries to supply electricity equivalent to the demand of 800,000 households annually.

Thanet is so far the company's largest offshore wind farm and a significant investment in renewable energy generation. The electricity generated from the English Channel winds will constitute a significant increase of green energy in the UK and a considerable contribution to Vattenfall's efforts to decrease the amount of carbon dioxide emissions from its electricity generation.

The construction of the 300 MW Thanet Offshore Wind Farm has taken just over two years and the wind farm is expected to operate for at least 25 years. At 300MW, it is the largest offshore wind farm in the world. Each turbine is up to 115 metres tall at its highest point. The wind farm covers an area of 35 square kilometres, which is enough to cover 4,000 football pitches.

<http://www.vattenfall.com/en/press-details-hidden.htm?newsid=CFD166933A1C4036933E8F13831EF0DA>

Obama Administration Announces Plans to Install New Solar Panels on the White House Residence

Department Of Energy Washington 5 October 2010

The U.S. Energy Department today announced plans to install solar panels and a solar hot water heater on the roof of the White House Residence. These two solar installations will be part of a demonstration project showing that American solar technologies are available, reliable, and ready for installation in homes throughout the country.

By installing solar panels on their homes, consumers are able to effectively lock in the price of electricity they will pay in the years ahead, acting as an insulator against future rises in electricity prices since the systems installed in homes today are expected to last approximately thirty years. Financial incentives are also available to offset the initial costs of installing solar energy systems, including a 30 percent federal tax credit and additional state, local, and utility incentive programs to encourage the deployment of renewable energy.

The deployment of solar energy and other renewable energy sources will help expand U.S. clean energy manufacturing and create new jobs for American workers. As a result of investments under the Recovery Act, the solar energy industry is growing and solar resources can now be seen in communities nationwide. Continued investments in innovation and cutting-edge solar technologies in the coming years will help make solar energy cost-competitive with conventional electricity sources all across the country.

<http://www.energy.gov/news/9641.htm>

Lightbulbs: The more efficient they get, the more light we use

Sandy Bauers in The Philadelphia Inquirer 14 September 2010

This is a cautionary tale about a few porch lights. Once upon a time, porch lights had incandescent bulbs. Eventually, many residents subbed them out with those swirly compact fluorescent bulbs, which use a quarter of the energy.

The funny thing was that once they made the switch, some residents were so delighted with the energy savings that they dispensed with the hassle of turning the lights off at dawn, then back on at dusk.

They left the porch lights lit round the clock. This is one of the beautiful things about technological advances: They often make life simpler and easier. But the obvious rub is that electric usage didn't decline as much as it could have.

Researchers from the Sandia National Laboratories in Albuquerque, New Mexico, have studied historical patterns of lighting use, and they have reached some disquieting conclusions.

Consistently over the last 300 years, as humans have progressed from candles to oil lamps to gas lamps to electricity, we've responded by simply opting for more light.

Fortunately, dimming technologies also are improving, which might blunt the energy sucking effects of more lighting. Some parking garages, for instance, are lit, but at a low level. Motion detectors sense when a person walks through, and they make that section brighter. Regulations might also have an effect. In the U.S., an energy bill passed by Congress in 2007 will phase out the incandescent bulb by 2014.

Our hope is that we can do both: Have a brighter, better world, and still use less electricity. After all, as in the case of the porch lights, where the efficiency of fluorescents more than made up for the doubled usage, that's precisely what happened.

http://www.philly.com/inquirer/columnists/sandy_bauers/20100906_GreenSpace__Lightbulbs__The_more_efficient_they_get__the_more_light_we_use.html

Stuxnet - Fact and Fiction - or how the worm turns!

Stuxnet is said to be the first publicly known worm to target industrial control systems, often generically referred to as SCADA systems. Not only did Stuxnet include malicious STL (Statement List) code, an assembly-like programming language, which is used to control industrial control systems, it included the first ever PLC (programmable logic controller) rootkit hiding the STL code. It also included a zero-day vulnerability to spread via USB drives, a Windows rootkit to hide its Windows binary components, and it signed its files with certificates stolen from other unrelated third-party companies. All of these characteristics are noteworthy in their own right, however when they all converge within one threat it is clear that there is a special force at work. Any threat that is capable of taking control of a real-life physical system is worthy of a closer look, and a number of conferences are now analysing the threat..

The analysis to date suggests that the true intention of the creators is to take over industrial control systems (ICS) . The threat's ability to control physical machinery is what sets it apart from any other threat we have seen to date and is the aspect of the threat that is concerning.

With this threat, the attackers are capable of injecting code into industrial control systems and hiding that code from the designers and operators of the ICS giving the attackers full control over the day-to-day functionality of the physical system under attack.

<http://www.virusbtn.com/conference/vb2010/abstracts/LastMinute7.xml>

Developing Geothermal Energy Projects in Australia

Dr Stephen Hinchliffe, Geothermal Development Manager at SKM, made a presentation on Developing Geothermal Energy Projects in Australia to the Queensland Chapter of the EESA on 19th August at the Hawken Auditorium – Engineers Australia. A large audience attended which led to a very good question time.

Dr Hinchliffe outlined how Geothermal Energy has the potential to become a large scale, base load, zero carbon emission power source in Australia. The statement was made that Geoscience Australia estimates that by extracting just 1% of the energy content in Australia's 'hot rocks' and 'hot sedimentary aquifers' Australia's current base load energy demand could be met for some 26,000 years. Levelised costs for a commercial scale geothermal power plant (\$/MWh) are comparable with wind power.

Drawing on a world class heat resource, geothermal companies in Australia are leading the world in addressing the challenges of providing renewable, base load geothermal power to the grid. Dr Hinchliffe outlined the two main types of geothermal resources in Australia and he explained the pros and cons of each resource type, giving an overview of the current state of the Australian geothermal industry and explained the current framework (regulatory and legislator) under which geothermal projects are being developed. He then went on to detail the process steps involved in developing geothermal power plant such as:

- Identifying, characterising and reporting on the resource under the Geothermal Energy Reporting Code;
- Selecting the appropriate power plant technology and designing a geothermal power plant matched to the resource;
- Accessing grid infrastructure;
- Obtaining planning approvals and engaging the community.

Dr Stephen Hinchliffe is SKM's Geothermal Development Manager for Australia with more than 17 years experience in developing co-generation and renewable energy power project in Europe, Australia and Indonesia.

EESA Notice of meeting

<http://www.engineersaustralia.org.au/fms/Divisions/Queensland%20Division/Events/EESA%20Developing%20Geothermal%20EnergyProjects%20in%20Australia%2019%20Aug%202010.pdf>

Slide show on presentation

<http://www.cleanenergyweek.com.au/mediaObject/events/2010-conference/presentations/1440-Hinchliffe/original/1440%20Hinchliffe.pdf>

Next Stop: Ultracapacitor Buses**A U.S.-Chinese venture is out to prove the benefits of quick-charge buses**

Tyler Hamilton in Technology Review

Municipal transit agencies have tried to reduce the carbon footprint of their bus fleets using a range of options over the years, from biofuels and hydrogen to batteries and hybrid-electric diesel. Now a Chinese company and its U.S. partner say that ultracapacitors could offer the greenest and most economical way of powering inner-city buses.

There's just one catch: the best ultracapacitors can only store about 5 percent of the energy that lithium-ion batteries hold, limiting them to a couple of miles per charge. This makes them ineffective as an energy storage medium for passenger vehicles. But what ultracapacitors lack in range they make up in their ability to rapidly charge and discharge. So in vehicles that have to stop frequently and predictably as part of normal operation, energy storage based exclusively on ultracapacitors begins to make sense.

Sinautec Automobile Technologies, based in Arlington, Virginia, and its Chinese partner, Shanghai Aowei Technology Development Company, have spent the past three years demonstrating the approach with 17 forty-one seat municipal buses on the outskirts of Shanghai. The two companies offered a one-day demonstration at American University in Washington, DC, where an 11-seat minibus running on ultracapacitors spent the day shuttling people around campus.

The trick is to turn some bus stops along the route into charge stations, says Dan Ye, executive director of Sinautec. Unlike a conventional trolley bus that has to continually touch an overhead power line, Sinautec's ultracapacitor buses take big sips of electricity every two or three miles at designated charging stations, which double as bus stops. When at these stations, a collector on the top of the bus rises a few feet and touches an overhead charging line. Within a couple of minutes, the ultracapacitor banks stored under the bus seats are fully charged.

"It's a brilliant concept," says ultracapacitor expert Joel Schindall, professor of electrical engineering and computer science at MIT. "It's not well suited for electric-only cars, but it is practical to stop a bus every few city blocks."

The buses can also capture energy from braking, and the company says that recharging stations can be equipped with solar panels (although this is mainly to further the perception that the vehicles have a lower carbon footprint). Ye says the buses use 40 percent less electricity compared to an electric trolley bus, mainly because they're lighter and have the regenerative braking benefits. They're also competitive with conventional buses based on fuel savings over the vehicle's 12-year life, based on current oil and electricity prices. Sinautec estimates that one of its buses has one-tenth the energy cost of a diesel bus and can achieve lifetime fuel savings of \$200,000.

<http://www.technologyreview.com/energy/23754/>

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**Please email submissions by 17th December to the Bulletin Editor,
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