

Summary of Australian Institute of Energy's Symposium

DISTRIBUTED ENERGY

Ready, Willing & Able

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"The New Face of DE"

Craig Chambers, GridX Power

Craig describes GridX Power as the lone ranger in Australia pushing the distributed energy (DE) barrow. GridX Power is a vertically integrated utility and a licensed DE provider, that integrates combined heat and power systems burning natural gas from the mains in an internal combustion engine for onsite production of electricity and heat. GridX has partnered with Mirvac and created Australia's first residential housing estate powered by natural gas using technology generating three forms of energy from a single source (trigeneration - cooling, heat and power). This showcase project is small though highly scalable and saves between 4-7tonnes of CO₂-e per house p.a. Craig explained that in the last 12-18 months sustainability has become the new driver for GridX's distributed energy systems, and that building codes, including BASIX and ABGR, have now become the single biggest driver. GridX views the current increasing network constraints as another very significant driver and believes their distributed energy systems are an elegant solution. The benefits of their solution according to Craig are that there is no noise or visual impact, there is higher power reliability and quality, currently provides lower cost energy and a results in a reduction in emissions. It is also possible to upgrade sustainability ratings by installing GridX power systems; this upgrade would be isolated to the plant room and is also less expensive than GreenPower.

"The DE program in APP: Renewable Energy and Distributed Generation Task Force Update"

John Jende, Renewable Energy Partnerships Renewable Energy Branch, Department of the Environment and Water Resources

John contextualized his presentation by providing us with the background of the Asia Pacific Partnership on Clean Development and Climate (APP) and its

emphases on "practical partnerships to develop, deploy and transfer cleaner, more efficient technologies" and that "private sector engagement is recognized as a key ingredient of success". He summarised the APP's Renewable Energy and Distributed Generation Task Force (REDGTF) of which Korea is the chair and Australia the co-chair. The goals of REDGTF are to accelerate the deployment of renewable energy and DE over the next five years, to identify market and policy barriers and implement mechanisms to overcome them, and to close the gap between the cost of renewable energy generation and conventional generation. Australia is leading a number of projects in REDGTF that address market barriers. There are three broad categories of projects; deployment projects, market enabling or RD&D. Examples of projects receiving APP funding include: High Efficiency Solar Power Stations for Affordable Energy led by Solar Systems, Identifying High Value Geothermal Resources in China, Pursuing Clean Energy Business in India, Building Expertise in Solar Energy Engineering led by UNSW, and many more. John also highlighted IEA projections of electricity demand by region and contrasted this with current generation and renewable electricity. Given the large projected increases in demand in India, China and the US, John does not believe that renewable energy generation can keep up with this increase in demand, let alone replace current sources of conventional generation.

"The MCE Code of Practice for Embedded Generation"

Ryan Thew, Energy and Environment, Department Industry, Tourism and Resources:

Ryan's presentation focused on the economic efficiency of Distributed Generation and what the federal government is doing to review rules, change the law in order to help the economic case of DE. The Ministerial Council on Energy (MCE) was established in 2001 to reform the national energy market. The reform of the energy market is not driven by environmental concerns but rather by economic efficiency. The MCE has established a renewable energy and distributed generation working group to examine wind energy policy, the code of practice for embedded generation and to improve grid accessibility. Their stated aim is

not to bias DE and renewable energy but rather to level the playing field by removing barriers and disincentives. They also want to ensure that connection arrangements are not unduly complex for micro DE systems. Fundamentally the MCE recognizes the need for equivalent incentive for investment in DE as an alternative to network investment.

"Global Opportunities for DE"

David Sweet, World Alliance for Distributed Energy (WADE)

David began his presentation by stating that he believes energy is the number one factor for the economy in the future, and that our energy future and the future for civilization in general is inextricably linked and that there is a need to find alternatives to coal and oil. WADE is a non-profit research, promotion and advocacy organisation started in 1997, their mission is to accelerate the worldwide deployment of high-efficiency cogeneration, on-site power and DE systems. WADE works with a number of organisations from all over the world to promote this mission. WADE is interested in the replicated development of economic models to prove DE. David pointed out that DE technology is ready now, can improve the environment and the bottom-line, that energy prices and climate change will accelerate DE deployment worldwide and that distributed technologies have led to major market shifts in other areas, such as computing and telecom. David elaborated and gave examples of these analogies such as mainframes Vs internet and landlines Vs mobile phones. WADE work is cited in the IPCC's 4th Report on Climate Change Mitigation in a section on "Decentralized Energy". Benefits cited include:

- Reduced need for costly transmission systems
- Shorter lead times
- Substantially reduced grid power losses
- Deferred costs for upgrading transmission and distribution infrastructure
- Improved reliability

- Increased total energy recovery from 40–50% up to 70–85% with corresponding reductions in CO2 emissions of 50% or more

In Australia, DE represents only 5.4% of total electricity generation, the 7th lowest out of the 41 countries surveyed. David concluded with DE is a win-win form of power generation; that it has great potential to reduce CO2 emissions and reduce overall costs of supplying power; and that the barriers tend to be policy barriers.

"Plug-in Vehicles – the ultimate distributed utility?"

Richard Hunwick, Hunwick Consultants Pty Ltd

Richard's presentation focused on the potential future role of plug in vehicles as storage of power in the electricity grid. Richard considers storage, for all intents and purposes, as a form of DE, albeit expensive. Up until recently people have only really looked at stationary forms of storage, though emerging technologies such as plug in vehicles (PEVs) now beg the question: What about transport? There is amazing storage potential in PEVs, power can flow both ways (recharging, grid to vehicle [G2V] and vehicle to grid [V2G] during the day), and this can be very favourable for renewable energy by absorbing and storing some of the energy produced. PEVs could also eliminate peak capacity and generation on the grid and can defer generation, transmission and distribution capacity. They can supplement shortcomings of grid supply to host buildings providing UPS and "high nines" supply reliability. The use of PEVs is likely to benefit the electricity supply industry and governments, though will disadvantage oil and car companies, Richard explained. "The business case for distributed storage is however yet to be made". Batteries have been the limiting factor for PEVs however they are improving all the time and the cost is halving each year. "PEVs are coming". Richard believes that if incumbent car manufacturers resist the trend then demand will be met by Chinese and Indian manufacturers. Combined

with smart metres and appropriate control software, PEVs promise to have a disruptive but benign effect on our electricity supply system.

"The Intelligent Grid"

Stuart White, Institute for Sustainable Futures, UTS

Stuart's presentation outlined the interdisciplinary project that he is leading which involves collaboration between CSIRO and several universities from across Australia. The project essentially integrates and to the greatest extent possible harmonises a number of research and development projects and aims to increase the understanding of the real benefits of DE, develop a robust and transparent model to measure the value of DE options in network development (such as avoided network costs), and to effect more public debate on the role of DE. The intelligent grid will use information and communications control technology to integrate the electricity network with distributed energy resources, and will enhance network stability and control. Broadly there are three dimensions of research: Technological, Economic and Social. The research is focused on generating solutions and addressing and overcoming the myriad barriers that are preventing optimal economic and environmental outcomes, thus moving us closer to best practice.